ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 414 and 416

[WH-FRL 2305-7]

Organic Chemicals and Plastics and Synethic Fibers Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards

AGENCY: Environmental Protection Agency.

ACTION: Proposed regulation.

SUMMARY: The Environmental Protection Agency (EPA), is proposing effluent limitations guidelines for "best practicable technology", "best conventional technology" and "best available technology", new source performance standards and pretreatment standards for the Organic Chemicals and Plastics and Synthetic Fibers (OCPSF) Category as required under Sections 301, 304, 306, 307, and 501 of the Clean Water Act. These proposed regulations will limit the discharge of effluents into waters of the United States or into publicly owned treatment works from facilities that produce organic chemicals, plastics and synthetic fibers. After considering comments received in response to this proposal, EPA will promulgate a final rule.

DATE: Comments on this proposal must be received by June 19, 1983. However, the Agency solicits earlier comments on the additional data collection activities (Section XV of the preamble) for immediate use in program planning.

ADDRESSES: Send comments to or obtain technical information from E. H. Forsht, Effluent Guidelines Division (WH-552), Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460, Attention EGD Docket Clerk, Organic Chemicals, Plastic and Synthetic Fibers Industry (WH-552). The supporting information and all comments on this proposal will be available for inspection and copying at the EPA Public Information Reference Unit, Room 2404 (EPA Library Rear) PM-213. Copies of technical documents may be obtained from Denise Beverly, Distribution Officer at the above address or by calling (202) 382-7115. A copy of the economic analysis may be obtained from Harold Lester, Economic Analysis Staff (WH-586), Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460, or by calling (202) 382-5380. A copy of the preliminary regulatory impact analysis may be obtained from Alec McBride, Monitoring and Data Support Division (WH-553) Environmental Protection Agency, 401 M Street SW., Washington, D.C. 20460, or by calling (202) 382-7046.

FOR FURTHER INFORMATION CONTACT: E. H. Forsht, Senior Project Officer, Organic Chemicals Branch, Environmental Protection Agency by calling (202) 382-7135.

SUPPLEMENTARY INFORMATION:

Overview: This preamble describes the scope, purpose, legal authority and background of this proposal, the technical and economic bases and the methodology used by the Agency to develop proposed effluent limitations guidelines and standards for the Organic Chemicals and Plastics and Synthetic Fibers (OCPSF) industrial category, and the procedures which will be utilized to implement the regulations upon promulgation. It also presents a summary of public comments on the draft contractor's engineering reports which were circulated in December, 1981 and April, 1982 to the industry and other interested parties, and solicits comments on specific areas of interest.

These proposed regulations are supported by EPA's technical conclusions which are detailed in the Development Document for Best Practicable Technology, Best Conventional Technology and New Source Performance Technology in the Organic Chemicals and Plastics and Synthetic Fibers Industry, and in the Development Document for Best Available Technology, Pretreatment Technology, and New Source Performance Technology in the Organic Chemicals, Plastics and Synthetic Fibers Industry. (These documents are referred to in this preamble as the BPT Development Document and BAT Development Document, respectively). The Agency's economic analysis is presented in the Economic Impact Analysis of Effluent Limitations and Standards for the OCPSF Industry.

Abbreviations, acronyms, and other terms used in the Supplementary Information section are defined in Appendix A to this notice.

Organization of Supplementary Information

I. Legal Authority

The regulations described in this notice are proposed under authority of Sections 301, 304, 306, 307, and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1251 *et seq.*, as amended by the Clean Water Act of 1977, Pub. L. 95-217 (the "Act")). These regulations are also proposed in response to the Settlement Agreement in *Natural Resources Defense Council, Inc.* v. *Train*, 8 ERC 2120 (D.D.C. 1976), modified 12 ERC 1833 (D.D.C. 1979), and modified again by order of the Court dated October 26, 1982.

II. Background

A. The Clean Water Act

The Federal Water Pollution Control Act Amendments of 1972 established a comprehensive program to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters," (Section 101(a)).

Section 301(b)(1)(A) set a deadline of July 1, 1977, for existing industrial direct dischargers to achieve "effluent limitations requiring the application of the best practicable control technology currently available" ("BPT").

Section 301(b)(2)(A) set a deadline of July 1, 1983, for these dischargers to achieve "effluent limitations requiring the application of the best available technology economically achievable which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants" ("BAT").

Section 306 required that new industrial direct dischargers comply with new source performance standards ("NSPS"), based on best available demonstrated technology.

Sections 307 (b) and (c) required the Administrator to set pretreatment standards for new and existing dischargers to publicly owned treatment works ("POTWs"). While the requirements for direct dischargers were to be incorporated into National Pollutant Discharge Elimination System (NPDES) permits issued under Section 402, the Act made pretreatment standards enforceable directly against dischargers to POTWs (indirect dischargers).

Sections 402(a)(1) of the 1972 Act does allow requirements for direct dischargers to be set on a case-by-case basis. However, Congress intended control requirements to be based for the most part on regulations promulgated by the Administrator of EPA.

Section 304(b) required regulations that establish effluent limitations reflecting the ability of BPT and BAT to reduce effluent discharges.

Sections 304(c) and 306 of the Act required regulations for NSPS.

Sections 304(g), 307(b), and 307(c) required regulations for pretreatment standards.

In addition to these regulations for designated industry categories, Section 307(a) required the Administrator to promulgate effluent standards applicable to all dischargers of toxic pollutants.

Finally, Section 501(a) authorized the Administrator to prescribe any additional regulations "necessary to carry out his functions" under the Act.

The EPA was unable to promulgate many of these regulations by the deadlines contained in the Act, and, as a result, EPA was sued in 1976 by several environmental groups. In settling this lawsuit, EPA and the plaintiffs executed a "Settlement Agreement" which was approved by the Court. This agreement required EPA to develop a program and meet a schedule for controlling 65 "priority" pollutants and classes of pollutants in 21 major industries. See *Natural Resources Defense Council, Inc.* v. *Train, supra.*

Several of the basic elements of the Settlement Agreement program were incorporated into the Clean Water Act of 1977. This law also made several important changes in the Federal water pollution control program.

Sections 301(b)(2)(A) and 301(b)(2)(C) of the Act now set July 1, 1984, as the deadline for industries to achieve effluent limitations requiring the application of BAT for "toxic" pollutants. "Toxic" pollutants here includes the 65 pollutants and classes of pollutants which Congress declared "toxic" under Section 307(a) of the Act.

Likewise, EPA's programs for new source performance standards and pretreatment standards are now aimed principally at controlling toxic pollutants.

To strengthen the toxics control program, Section 304(e) of the Act authorizes the Administrator to prescribe certain "best management practices" (BMPs"). These BMPs are to prevent the release of toxic and hazardous pollutants from: (1) Plant site runoff, (2) spillage or leaks, (3) sludge or waste disposal, and (4) drainage from raw material storage if any of those events as associated with, or ancillary to, the manufacturing or treatment process.

In keeping with its emphasis on toxic pollutants, the Clean Water Act of 1977 also revised the control program for non-toxic pollutants.

For "conventional" pollutants identified under Section 304(a)(4) (including biochemical oxygen demand, suspended solids, oil and grease, fecal coliform and pH), the new Section 301(b)(2)(E) requires "effluent limitations requiring the application of the best conventional pollutant control technology" ("BCT"), instead of BAT, to be achieved by July 1, 1984. The factors considered in assessing BCT for an industry include the relationship between the cost of attaining a reduction in effluents and the effluent reduction benefits attained, and a comparison of the cost and level of reduction of such pollutants by publicly owned treatment works and industrial sources. For nontoxic, nonconventional pollutants, Sections 301 (b)(2)(A) and (b)(2)(F) require achievement of BAT effluent limitations within three years after their establishment or by July 1, 1984, whichever is later, but not later than July 1, 1987.

B. Prior EPA Regulations

EPA promulgated effluent limitation guidelines and standards for the Organic Chemicals Manufacturing Industry in two phases in 40 CFR Part 414. Phase I, covering 40 product/processes (a product that is manufactured by the use of a particular process—some products may be produced by any of several processes), was promulgated on April 25, 1974 (39 FR 12076). Phase II, covering 27 additional product/processes, was promulgated on January 5, 1976 (41 FR 902).

EPA also promulgated effluent limitation guidelines and standards for the Pastics and Synthetics Industry in two phases in 40 CFR Part 416. Phase I, covering 31 product/processes, was promulgated on April 5, 1974 (39 FR 12502). Phase II, covering 8 additional product/processes, was promulgated on January 23, 1975 (40 FR 3718).

Several industry members challenged the above regulations. On February 10, 1976, the Court in *Union Carbide* v. *Train*, 541 F.2d 1171 (4th Cir. 1976), granted the parties' motion to remand the Phase I Organic Chemicals regulations. The Court also directed EPA to withdraw the Phase II Organic Chemical regulations, which EPA did on April 1, 1976 (41 FR 13936). Pursuant to an agreement with the industry petitioners, however, the regulations for butadiene manufacture were left in place. The Court in *FMC Corp.* v. *Train*, 539 F.2d 973 (4th Cir. 1976), remanded the Phase I Plastics and Snythetics regulations. In response EPA withdrew both the Phase I and Phase II regulations on August 4, 1976 (41 FR 32587) except for the pH limitations, which had not been addressed in the lawsuit.

Today, there are no promulgated regulations for the Organic Chemicals and Plastics and Synthetic Fibers industries except for the butadiene and pH regulations mentioned above.

C. Scope of This Rulemaking

EPA is today proposing effluent limitations guidelines based on the application of the best practicable technology (BPT), best conventional technology (BCT), best available technology (BAT), new source performance standards (NSPS), and pretreatment standards for existing and new sources (PSES and PSNS).

These proposed regulations apply to wastewater discharges resulting from the manufacture of organic chemicals, plastics and synthetic fibers. The organic chemicals industry is generally included within the U.S. Department of Commerce, Bureau of the Census Standard Industrial Classification (SIC) Major Groups 2865 and 2869. The plastic and snythetic fibers industry is generally included in SIC Groups 2821, 2823, 2824. Due to the interdependence of these two industries, EPA studied them in combination and is today including both of them in a single set of proposed regulations.

When finally promulgated, these regulations will supersede the existing regulations for butadiene manufacture and the pH limitation for the manufacture of plastics and synthetic fibers.

Some plants have OCPSF operations that are a minor portion of and ancillary to their primary production. In some such cases, effluent guidelines for the primary production category (*e.g.*, the guidelines for the petroleum refining, pesticides, and pharmaceuticals industries) include subcategories for the discharge of combined wastewaters from the primary production and the OCPSF processes. In such cases, to avoid duplication and potential inconsistencies, these OCPSF discharges are exluded from coverage by today's proposed OCPSF regulations and remain subject to the other applicable regulations.

The proposed regulations also do not apply to discharges from the extraction of organic chemical compounds from natural materials. Natural materials used to make organic chemical compounds include a variety of parts of plants (e.g., trees and seaweed) and animals. Today's proposal addresses the manufacture of organic chemicals via chemical synthesis. Readers should note that extraction of chemical compounds from natural materials is included in many other industrial categories—*e.g.*, Adhesives and Sealants, Pharmaceuticals and Gum and Wood Chemicals. Readers should also note that discharges from the synthesis of organic chemical compounds that have been extracted from natural materials are covered by today's proposed regulation.

III. Overview of the Industry

The OCPSF industry is large and diverse, and many plants in the industry are highly complex. The industry includes approximately 1,200 facilities which manufacture their principal or primary product or group of products under the OCPSF SIC Groups. Some plants are secondary producers, with OCPSF products ancillary to their primary manufacture. Various sources studied by EPA indicate that the number of secondary OCPSF plants is in the range of 320 to approximately 900 plants. Thus the total number of plants in the OCPSF industry may be as high as 2,100. This range is attributed to the difficulties inherent in segregating the OCPSF industry from other chemical producing industries such as petroleum refining, inorganic chemicals, pharmaceuticals and pesticides as well as chemical formulation industries such as adhesives and sealants, paint and ink, and plastics molding and formulating. Even though over 25,000 different organic chemicals, plastics and synthetic fibers are manufactured, only 1,200 products are produced in excess of 1,000 pounds per year. As mentioned above, except for certain specified exceptions, all discharges from OCPSF operations at these plants are covered by today's proposed regulations.

Some plants produce chemicals in large volumes, while others produce only small volumes of "specialty" chemicals. Large-volume production tends toward continuous processes, while small-volume production tends toward batch processes. Continuous processes are generally more efficient than batch processes in minimizing water use and optimizing the consumption of raw materials in the process.

Different products are made by varying the raw materials, chemical reaction conditions, and the chemical engineering unit processes. The products being manufactured at a single large chemical plant can vary on a weekly or even daily basis. Thus, a single plant may simultaneously produce many different products in a variety of continuous and batch operations, and the product mix may change frequently.

Total production of organic chemicals in 1980 was 291 billion pounds with sales of $54 billion. Production of plastics and synthetic fibers in 1980 was 60 billion pounds with sales of $26 billion.

For the 1,200 facilities whose principal production relates to the OCPSF industry, approximately 40 percent are direct dischargers, approximately 36 percent are indirect dischargers (plants that discharge to publicly owned treatment works) and the remaining facilities use zero or alternative discharge methods. The estimated average daily flow per plant is 2.31 MGD (millions of gallons per day) for direct dischargers and 0.80 MGD for indirect dischargers. The remainder use dry processes, reuse their wastewater, or dispose of their wastewater by deep well injection, incineration, contract hauling, or evaporation or percolation ponds.

As a result of the wide variety and complexity of raw materials and processes used and of products manufactured in the OCPSF industry, an exceptionally wide variety of pollutants are found in the wastewaters of this industry. This includes conventional pollutants (pH, BOD, TSS and oil and grease); toxic pollutants (both metals and organic compounds); and a large number of nonconventional pollutants (including the organic compounds produced by the industry for sale). EPA focused its attention in today's rulemaking on the conventional pollutants and on the 65 toxic pollutants and classes of pollutants required to be addressed in accordance with the Settlement Agreement.

IV. Available Wastewater Control and Treatment Technology

To control the wide variety of pollutants discharged by the OCPSF industry, OCPSF plants use a broad range of in-plant controls, process modifications and end-of-pipe treatment techniques. Most plants have implemented programs that combine elements of both inplant control and end-of-pipe wastewater treatment. The configuration of controls and technologies differs from plant to plant, corresponding to the differing mixes of products manufactured by different facilities. In general, direct dischargers treat their waste more extensively than indirect dischargers.

The predominant end-of-pipe control technology for direct dischargers in the OCPSF industry is biological treatment. The chief forms of biological treatment are activated sludge and aerated lagoons. Other systems, such as extended aeration and trickling filters, are also used, but less extensively. All of these systems reduce BOD and TSS loadings, and, in many instances, incidentally remove toxic and nonconventional pollutants. Biological systems biodegrade some of the organic pollutants; remove bio-refractory organics and metals by sorption into the sludge; and strip some volatile organic compounds into the air.

Other end-of-pipe treatment technologies used in the OCPSF industry include neutralization, equalization, polishing ponds, filtration and carbon adsorption. While most direct dischargers use these physical/chemical technologies in conjunction with end-of-pipe biological treatment, at least 39 direct dischargers use only physical/chemical treatment.

In-plant control measures employed at OCPSF plants include water reduction and reuse techniques, chemical substitution and process changes. Techniques to reduce water use include the elimination of water use where practicable and the reuse and recycling of certain streams, such as reactor and floor washwater, surface runoff, scrubber effluent and vacuum seal discharges. Chemical substitution is utilized to replace process chemicals possessing highly toxic or refractory properties by others that are less toxic or more amenable to treatment. Process changes include various measures that reduce water use, waste discharges, and/or waste loadings while improving process efficiency. Replacement of barometric condensers with surface condensers; replacement of steam jet ejectors with vacuum pumps; recovery of product or by-product by steam stripping, distillation, solvent extraction or recycle, oil-water separation and carbon adsorption; and the addition of spill control systems are examples of process changes that have been successfully employed in the OCPSF industry to reduce pollutant loadings while improving process efficiencies.

Another type of control widely used in the OCPSF industry is physical/chemical in-plant control. This treatment technology is generally used selectively on certain process wastewaters to recover products or process solvents, to reduce loadings that may impair the operation of the biological system or to remove certain pollutants that are not removed sufficiently by the biological system. In-plant technologies widely used in the OCPSF industry include sedimentation/clarification, coagulation, flocculation, equalization, neutralization, oil/water separation, steam stripping, distillation, and dissolved air flotation.

Many OCPSF plants also use physical/chemical treatment after biological treatment. Such treatment is used in the majority of situations to reduce solids loadings that are discharged from biological treatment systems. The most common post-biological treatment systems are polishing ponds and multimedia filtration.

At approximately 5 percent of the direct discharging plants surveyed, no treatment is provided. At another 20 percent, only physical/chemical treatment is provided. The remaining 75 percent utilize biological treatment. Approximately 36 percent of biologically treated effluents are further treated by polishing ponds, filtration or other forms of physical/chemical control.

At approximately 52 percent of the indirect discharging plants surveyed, no treatment is provided. At another 39 percent, some physical/chemical treatment is provided. Nine percent have biological treatment.

V. Best Practicable Technology Effluent Limitations

A. Legal Criteria for Developing BPT

The factors considered in defining the best practicable control technology currently available (BPT) include: (1) The total cost of applying the technology relative to the effluent reductions that result, (2) the age of equipment and facilities involved, (3) the processes used, (4) engineering aspects of the control technology, (5) process changes, (6) non-water quality environmental impacts (including energy requirements), (7) and other factors, as the EPA Administrator considers appropriate. In general, the BPT level represents the average of the best existing performances of plants within the industry of various ages, sizes, processes, or other common characteristics. When existing performance is uniformly inadequate, BPT may be transferred from a different subcategory or category. BPT focuses on end-of-process treatment rather than process changes or internal controls, except when these technologies are common industry practice.

The cost/benefit inquiry for BPT is a limited balancing, committed to EPA's discretion, that does not require the Agency to quantify benefits in monetary terms. See e.g., *American Iron and Steel Institute* v. *EPA*, 526 F. 2d 1027 (3rd Cir. 1975). In balancing costs against the benefits of effluent reduction, EPA considers the volume and nature of existing discharges, the volume and nature of discharges expected after application of BPT, the general environmental effects of the pollutants, and the cost and economic impacts of the required level of pollution control. The Act does not require or permit consideration of water quality problems attributable to particular point sources, or water quality improvements in particular bodies of water. Therefore, EPA has not considered these factors. See *Weyerhaeuser Company* v. *Costle, 590 F. 2d 1011 (D.C. Cir. 1978).*

B. Technical Data Gathering Efforts for BPT

The technical data gathering efforts for BPT (described in detail in Section III of the BPT Development Document) were conducted by reviewing existing literature relating to the OCPSF industry and by procuring additional information (through written surveys of the industry and contacts with representatives of governmental agencies and private research facilities).

Under the authority of Section 308 of the Act, EPA sent two sets of data collection questionnaires to 556 reported operating OCPSF plants seeking information on the age and size of facilities, raw material usage, production processes employed, wastewater characteristics and methods of wastewater control treatment and disposal. In particular, we requested end-of-pipe data covering periods of at least 18 months. Followup letters with computer transcriptions of the questionnaires were sent to all plants to validate and update their data.

In addition, EPA considered, where relevant, the information collected as part of the BAT technical data gathering efforts (discused below in Section VII of this preamble).

C. BPT Technology Selection Criteria

In selecting appropriate BPT technologies, EPA focused on the primary end-of-pipe technologies used in the industry. These technologies are widely used in the industry to control conventional pollutants. To varying extents, these technologies also remove toxic and nonconventional pollutants. However, it is not possible to calculate consistent removals of specific toxic and nonconventional pollutants across the industry without carefully considering a variety of process controls and in-plant treatment technologies that are more appropriately considered to be BAT controls and technologies. Therefore, the selected BPT technologies are end-of-pipe technologies that address the conventional pollutants BOD and TSS, supplemented by those in-plant controls and technologies that are commonly used to assure the proper and efficient operation of the end-of-pipe technologies.

The proposed BPT regulations do not require the installation of any particular technology. Rather, they require plants to achieve effluent limitations that are based upon the proper operation of the recommended technologies or equivalent technologies. The proposed limitations are based on the average of the best performance of plants that use the recommended technologies.

EPA has based the proposed BPT limitations on two technologies. The predominant technology used in the OCPSF industry, and thus the primary technology used as a basis for the limitations, is biological treatment preceded by the necessary controls to protect the biota and otherwise assure that the biological system functions effectively and consistently. Activated sludge and aerated lagoons are the primary examples of such biological treatment. Other biological systems, such as aerobic lagoons, rotating biological contractors, and trickling filters, are also used effectively at a few plants and data from such plants was also used to develop BPT limitations.

The second BPT technology used in the OCPSF industry is a biological system followed by a polishing pond or filter. This biological/polishing combination demonstrates effective treatment of BOD and TSS. In some cases, plants originally installed biological systems that had inadequate retention times or were otherwise not designed and operated to optimally treat conventional pollutants. When these plants were required in the late 1970s to upgrade to meet BPT permit limits (established by permit writers in the absence of guidelines on a case-by-case basis, using their best engineering judgment), some chose to add polishing ponds or filters rather than to enlarge or otherwise improve their existing biological systems. The biological/polishing combination thus constitutes an alternative method to meet BPT.

As indicated previously, some plants rely exclusively upon end-of-pipe physical/chemical treatment. Some of these plants have low BOD and thus find physical/chemical treatment more effective in reducing TSS loadings. (Biological systems cannot function unless influent BOD is high enough to sustain their biota). Other plants have determined, based on an analysis of the types and volumes of pollutants that they discharge, that physical/chemical treatment is more economical, easier to operate, or otherwise more appropriate. Many of these plants can control conventional pollutants effectively without using the two recommended technologies discussed above. Some plants do not have any treatment in place at all; many of these have low BOD and TSS concentrations in their raw wastewaters.

Of the 16 plants in the data base that have no treatment at all and that have submitted TSS data, 11 already comply with the proposed TSS limitations. Of the 13 of these plants submitting BOD data, 8 already comply with proposed BOD limits. Of the 21 plants that use only physical/chemical treatment and that have submitted TSS data, 13 already comply. For BOD, 10 out of 21 comply. For plants that haven't already achieved the proposed BOD and/or TSS limits, compliance can be achieved by the installation of the recommended end-of-pipe BPT technologies. In some cases, especially where only TSS noncompliance exists, solids control by physical/chemical means may suffice. EPA has assumed for purposes of estimating BPT costs that plants that presently do not comply with the BOD limits alone or with both the BOD and TSS limits would install (the generally more expensive) biological treatment. For plants that comply with BOD but not with TSS, and presently have no biological treatment in place, EPA costed only additional, physical/chemical solids control. EPA invites comment on the suitability of its regulatory and costing approach for these plants.

After selecting the BPT technologies, EPA developed a statistical criterion to segregate the better designed and operated plants from the poorer performers. This was done to assure that the plant data relied upon to develop BPT limitations reflected the average of the best existing performers. The criterion selected was to include in the data base any plant with a biological treatment system that, on the average, (1) discharged 50 mg/l or less BOD after treatment, or (2) removed 95% or more of the BOD that entered the end-of-pipe treatment system. This criterion reflects the performance level that is generally achieved by well-operated plants in the OCPSF industry that use the recommended BPT technologies. A detailed explanation of the development of this statistical criterion is contained in Section VII of the Development Document.

Of the 139 plants that use the recommended technologies and submitted BOD data to EPA, 114 (82 percent) achieve 50 mg/l or less BOD after treatment or 95 percent or more BOD removal. Thus, only a small group of the relatively worst performers, 18 percent of the treatment systems, were deleted from the data base used to derive the long-term averages to develop effluent limitations.

EPA is giving serious consideration to recommending, and using as a basis for final TSS limitations, an additional technology for controlling solids. Approximately one-third of the plants in the BPT data base use post-biological treatment such as polishing ponds or multimedia filtration to further reduce solids. Thus, it may be appropriate to define "average-of-the-best" TSS control as biological treatment followed by effective solids control. If EPA decides to use this technology as the basis for final TSS limitations, it would do so by deleting from the BPT data base, for TSS purposes, those biological systems that are not followed by adequate physical/chemical solids control systems. Based upon the present data base on the performance of such biological/tertiary solids control systems, this approach would result in the following TSS limitations.

Subcategory (described below)	Daily maximum	30-day average
Plastics only	111	39
Oxidation:		
a. High water use	166	62
b. Low water use	166	62
Type I	106	40
Other discharges	103	38

A comparison of these values with the TSS limitations proposed today shows that the requirement of additional solids control would reduce TSS discharges substantially for the Oxidation subcategory and reduce them slightly for the other three BPT subcategories. (Subcategories are discussed immediately below). EPA invites comments on this approach and solicits data on the use and effectiveness of polishing ponds and filters in reducing TSS.

D. Subcategorization and Calculation of BPT Limitations

EPA determined whether different effluent limitations were appropriate for different segments of the OCPSF industry. The factors considered included: raw materials used, products manufactured, production processes employed, wastewater characteristics and treatability, plant size, location and age, and treatment costs. Detailed information on the basis for this subcategorization scheme is presented in Section IV of the BPT Development Document.

EPA has established four subcategories for the proposed BPT regulations. The subcategories are based upon the types of product/processes contributing to the discharge. The subcategories apply to discharges (i.e., single outfalls). Plants with more than one outfall could have their separate discharges assigned to different subcategories.

To establish subcategories, EPA examined the 41 major generic processes used in the OCPSF industry for their potential to generate BOD loadings. For example, the oxidation process generally produces a relatively high BOD loading; some plastics-producing processes produce relatively low BOD loadings. Since the BOD of the raw waste load influences the practicably achievable effluent BOD concentration, this factor was deemed appropriate for subcategorization. (TSS loadings could not be related in a similar manner to particular processes.) Information on the generic processes and product/processes is contained in Section III and Appendix A of the BPT Development Document. The subcategories are as follows:

1. *Subcategory 1—Plastics Only:* Discharge resulting from the manufacture of plastics and synthetic fibers only.

2. *Subcategory 2—Oxidation:* Discharges resulting from the manufacture of organic chemicals only, or both organic chemicals and plastics and synthetic fibers, that include wastewater from the oxidation process.

This subcategory is further divided into two groups based upon the factor of flow: a high-water-usage group (greater than or equal to 0.2 gallon per pound of total daily production) and a low-water-usage group.

3. *Subcategory 3—Type I:* Discharges resulting from the manufacture of organic chemicals only or, both organic chemicals and plastics and synthetic fibers, that include wastewater from any of the following generic processes (referred to in the BPT Development document as "Type I" processes) but not from the oxidation process:

Peroxidation
Acid Cleavage
Condensation
Isomerization (e.g., m-xylene to o- or p-xylene)
Esterification
Hydroacetylation
Hydration
Alkoxylation
Hydrolysis
Carbonylation
Hydrogenation (e.g., butyraldehyde to n-butanol)
Neutralization

4. *Subcategory 4—Other Discharges:* All OCPSF discharges not included in Subcategories 1–3.

Plant size, location and age were all examined and found not to be factors in subcategorization. Flow was also considered and used to subdivide Subcategory 2, as discussed above.

For each subcategory, EPA calculated the long-term average concentrations for BOD and TSS, using the data from those plants that had been selected under the criteria discussed above and that were included in the subcategory. Then, based on 12 months of daily data from 17 plants, EPA developed variability factors for all plants. The variability factors were applied to the long-term averages to calculate daily maximum concentrations and monthly maximum values for BOD and TSS for each subcategory.

The subcategorization scheme allows discharges that are somewhat different from each other to be included in a single subcategory. This occurs because the entire flow from an outfall will often be assigned to a subcategory based upon only part of the production processes contributing to the discharge. For example, a discharge that has both Type I and oxidation process effluents will be in the Oxidation subcategory regardless of the relative wastewater contributions of each process. As a result, for example, the data base for the Oxidation subcategory includes discharges that have only oxidation effluents (which tend to have higher BOD), discharges that have both oxidation and Type I effluents, and discharges that have both oxidation and non-Type I effluents (which tend to have lower BOD). The long-term average calculated for the subcategory reflects the effluent levels for all of these discharges in the subcategory.

For each subcategory, EPA has grouped for analysis those plants performing better than the subcategory medians and those performing worse. For each subcategory, EPA has found that both groups have similar mixes and numbers of generic processes, similar ranges in the number of specific product processes, similar raw waste concentration distributions, and similar contributions from secondary production of non-OCPSF products. Thus, it does not appear that different types of plants were improperly combined in a single subcategory. EPA welcomes comments on this conclusion.

Another effect of the subcategorization scheme that is related to the one discussed above is that the subcategory assignment of an entire plant's discharge can be shifted if a particular product/process contributing to the outfall is added to or deleted from its operations. For example, a plant's discharge in the Type I subcategory would be moved to the Oxidation subcategory (and be subject to less stringent limitations) if it added an oxidation process effluent to its outfall. If the same plant later closed its oxidation process, the discharge once again would become subject to the lower and more stringent Type I limitations.

Of course, if a plant adds or drops a production line that substantially changes the nature of its raw waste load, a change in its subcategory designation and hence its effluent limitations may well be appropriate. However, it would be somewhat anomalous to substantially change a plant's subcategory and limitations as the result of the addition or deletion of a process that contributed only a small portion of the plant's total process flow. EPA is uncertain whether, as a practical matter, such anomalies are likely to occur. We solicit comments on this matter.

EPA considered the option of designing each subcategory discretely to include only plastics, oxidation, Type I, and other operations, respectively. A discharge with more than one type of process effluent could then have its flow apportioned among the subcategories as appropriate. Since the end-of-pipe effluent data for each plant reflects combined treatment of different process waste streams fed to single outfalls, it is not practicable to separately determine the treatability of the various individual processes or groups of processes entering the end-of-pipe treatment system.

Another option, suggested by an industry trade association, is to subcategorize based upon the TSS and/or BOD levels in the influent to the end-of-pipe treatment system. It was further suggested that, for each subcategory, EPA set percent-reduction limits (around the end-of-pipe system) rather than concentration-based limitations. EPA has rejected this approval because it creates serious inequities and discourages good treatment. Subcategorization based on a raw-waste-load/percent-removal approach requires a determination of a sampling point for raw waste load. Raw waste loads are created by individual product/processes and are affected by process controls and in-plant treatment.

The industry's suggested approach would give no credit to plants practicing in-plant controls; on the contrary, it would actively discourage such highly desirable wastewater control practices. For example, a plant that significantly reduces BOD and TSS loads prior to end-of-pipe treatment would be required under the suggested approach to further reduce its BOD and TSS by the same percentage as a plant not using such controls. Indeed, no matter how effective a plant's internal controls or how clean its initial product/process discharges are, it would be required under that approach to obtain significant additional percent reduction.

EPA believes its proposed approach is more equitable than the suggested approach. First, it bases the subcategories on the product/processes that contribute raw waste loads of TSS and BOD, rather than looking at raw wastes prior to end-of-pipe treatment. Second, by setting concentration limitations at the end of the pipe, it gives full credit for any treatment or control taking place in the plant, regardless of where that treatment or control occurs. EPA welcomes comments on its adopted approach and on the suggested approach.

EPA is also considering simplifying its subcategorization scheme by combining certain subcategories. For example, it may be reasonable to combine subcategories 3 and 4 based on the similarities of treated effluents for discharges in these subcategories. EPA invites comment on this and other similar approaches.

Finally, in addition to continuing to consider various options for final subcategorization, EPA intends to collect more data on the performance of BPT technology. EPA believes that several of the proposed BPT limitations may be higher than warranted for the types of influent waste loads entering the BPT treatment systems. In particular, the proposed daily maximum limitations for TSS in the Oxidation subcategory are quite high. EPA solicits additional information on the performance of BPT systems, especially those used in the Oxidation subcategory, with respect to TSS.

E. Concentration-Based Limitations

The proposed BPT limitations (as well as other limitations and standards proposed today for the OCPSF industry) are expressed in terms of concentration rather than mass. In general, EPA has in the past preferred mass limitations, where feasible, to encourage flow reduction and to prevent the substitution of dilution for treatment. However, concentration-based limitations have been used where production and achievable wastewater flow could not be correlated (e.g., for the various mining industries). In the OCPSF industry, such correlations do not exist, as explained below, and accordingly, EPA is proposing concentration-based limitations.

In the OCPSF industry, production often varies from day to day or even hour to hour. This is particularly true in large integrated plants producing a large variety of products as well as plants employing batch processing. The treatment system, in contrast, has a retention time varying from approximately eight hours to two weeks or more. The average retention time in OCPSF plants is approximately 3 days. In fact, good waste treatment practice generally requires the smoothing out of variations in wastewater flow by the use of equalization basins, because biological treatment systems in particular are sensitive to sharp changes in influent flow or quality. Interception and mixing of a plant's combined flow from all of its product/processes plus the additional retention time in the balance of the treatment system results in a delay such that pollutants discharged by a given product/process often will not appear in a plant's final effluent until several days later.

In most industrial categories, a lag of several days between generation of pollutants and appearance in the final effluent does not prevent a correlation between production and effluent flow, because the production is consistent from day to day. In the OCPSF industry, the extensive variation of production prevents correlation.

The problems described above could only be mitigated if mass-based limits are set on individual process lines prior to biological treatment, with credit given for percent reductions across the biological system. However, such in-plant mass limits are inconsistent with the definition of BPT for this industry, which is based on end-of-pipe treatment and does not require inplant flow reduction or pollutant control. Furthermore, such an approach would require the development of separate mass limitations for each of hundreds or thousands of product/processes discharged by OCPSF, a monumental and infeasible task.

EPA believes that dilution of process wastewaters by non-process wastewaters can be minimized by requiring the permit writer to establish mass based limits in the permit. Therefore, the proposed regulations require that the permit writer set mass-based limits by multiplying the plant's combined end-of-pipe process wastewater flow by the concentration limitation established by the guideline. The other source of dilution, commingling different process wastewater streams that contain different pollutants, could not be prevented even by end-of-pipe mass limitations. It could only be prevented by setting separate limitations for each product/process stream prior to the biological system. As noted above, however, such an approach would be incompatible with the concept of end-of-pipe BPT treatment.

F. BPT Pollutant Reductions, Costs and Economic Impacts

EPA estimates that the proposed BPT Limitations would result in annual incremental removals of 149 million pounds of BOD and 102 million pounds of TSS. The estimated costs of removal are capital costs of 316 million and annual costs of 105 million. No closures or employment losses are anticpated. EPA has concluded that the proposed regulations is justified and consistent with the requirements of the Act.

VI. Best Conventional Technology Effluent Limitations

The 1977 amendments added Section 301(b)(2)(E) to the Act, establishing "best conventional pollutant control technology" (BCT) for discharges of conventional pollutants from existing industrial point sources. Section 304(a)(4) designated the following as conventional pollutants: BOD, TSS, fecal coliform, and pH. The Administrator designated oil and grease as "conventional" on July 30, 1979, 44 FR 44501.

BCT is not an additional limitation but replaces BAT for the control of conventional pollutants. In addition to other factors specified in Section 304(b)(4)(b), the Act requires that BCT limitations be assessed in light of a two part "cost-reasonableness" test. EPA published a methodology for determining BCT on August 29, 1979 (44 FR 50732). In *American Paper Institute* v. *EPA*, 660 F. 2d 954 (4th Cir. 1981), EPA was ordered to revise the cost-test.

The court held that EPA must apply a two-part test. The first test compares the cost for private industry to reduce its conventional pollutants with the costs to publicly owned treatment works for similar levels of reduction in their discharge of these pollutants. The second test examines the cost-effectiveness of additional industrial treatment beyond BPT. EPA must find that limitations are "reasonable" under both tests before establishing them as BCT. In no case may BCT be less stringent than BPT.

In response to the court order, EPA has proposed a revised BCT cost-reasonableness test at 47 FR 49176 (October 29, 1982). The proposed test provides that BCT is cost-reasonable if (1) the incremental cost per pound of conventional pollutant removed in going from BPT to BCT is less than $.27 per pound in 1976 dollars, and (2) this same incremental cost per pound is less than 143% of the incremental cost per pound associated with achieving BPT.

EPA has considered an incremental level of conventional pollutant control beyond BPT. The technology, which is already practiced to some degree by approximately one third of the plants in the industry, is additional solids control. This includes such technology as polishing ponds and filters, which reduce the TSS levels from those achieved by BPT.

To analyze whether this technology is cost-reasonable, EPA calculated the incremental (beyond BPT) conventional pollutant removals and the incremental costs associated with this technology. Based on this information, cost per pound ratios were calculated for each of the four BPT subcategories. The results of this analysis resulted in the following incremental costs per pound in 1979 dollars:

Subcategory 1: $14.09 per pound
Subcategory 2: $1.13 per pound for high water usage $1.77 per pound for low water usage
Subcategory 3: $0.46 per pound
Subcategory 4: $1.52 per pound

All of these were found to fail the first part of the cost-reasonableness test ($0.33 per pound in 1979 dollars). Therefore, EPA is proposing that BCT be set equal to BPT. A more complete discussion of the basis for decision is contained in Section X of the BPT Development Document.

Readers should note that the BCT cost-reasonableness test results depend heavily on the limits set for BPT. If the BPT limits in the final regulation are modified based upon comment and EPA review of the proposed BPT limitations, EPA will recalculate the cost-reasonableness test to determine whether BCT should equal BPT or be more stringent than BPT. EPA also requests comment on whether any other technology, or set of technologies, should be considered as a candidate BCT technology. Furthermore, if the general BCT cost-reasonableness test proposed on October 29, 1982, is modified, EPA will reevaluate the appropriateness of BCT for the OCPSF industry accordingly.

VII. Best Available Technology Effluent Limitations

A. Legal Criteria for Developing BAT

The factors considered in establishing the best available technology economically achievable (BAT) level of control include the age of process equipment and facilities, the process employed, process changes, the engineering aspects of applying various types of control techniques, the costs of applying the control technology, nonwater quality environmental impacts such as air pollution, solid waste generation and energy requirements, and such other factors as the Administrator deems appropriate. (Section 304(b)(2)(B)). In general, the BAT technology level represents, at a minimum, the best existing economically achievable performance among plants with shared characteristics. Where existing performance is uniformly inadequate, BAT technology may be transferred from a different subcategory or industrial category. BAT may also include process changes or internal controls which are not common industry practice.

The statutory assessment of BAT considers costs but does not require a balancing of costs against effluent reduction benefits (see *Weyerhaeuser* v. *Costle,* 590 F. 2d 1011, (D.C. Cir. 1978)). In assessing the proposed BAT, however, the Agency has given substantial weight to the reasonableness of costs. The Agency has considered the volume and nature of discharges expected after application of BAT, and the costs and economic impacts of the required pollution control levels.

Despite this consideration of costs, the primary determinant of BAT is the effluent reduction capability of the control technology. As a result of the Clean Water Act of 1977, the achievement of BAT has become the national means of controlling the discharge of toxic pollutants from direct discharging plants.

B. Technical Data Gathering Efforts for BAT

The technical data gathering efforts for this rulemaking have involved several extensive activities which are summarized briefly in this section and in detail in Section V of the BAT Development Document.

In general, data gathering efforts were conducted by three principal means: (1) Review of existing information in EPA's files relating to the OCPSF industry and procurement of additional information (through written surveys of the industry and contacts with representatives of governmental agencies and private research facilities); (2) solicitation of additional information through questionnaires under the authority of Section 308 of the Act; and (3) implementation of filed sampling and analysis programs (screening, verification, and industry self-monitoring). The data gathered in the development of the BPT regulations, including responses to the BPT questionnaire, were also used in the development of the BAT regulation.

Four questionnaires were mailed to OCPSF plants. First, as mentioned previously, two sets of general questionnaires were mailed to 556 OCPSF plants requesting information on product/processes, raw waste loads, discharges, and wastewater treatment. Two additional questionnaires were mailed to selected plants for specific information on the performance of carbon adsorption and steam stripping systems.

Thousands of organic compounds are produced and potentially discharged by this industry. To specify technically supportable methods for accurately and precisely measuring each of these compounds in wastewater and to collect data to define the treatability of each of these compounds would have been an unmanageable task within the available time for developing these rules. Therefore, EPA focused its data gathering effort on the list of 65 toxic pollutants and classes of pollutants designated in the Clean Water Act.

Even the list of 65 toxic pollutants and classes of pollutants includes potentially thousands of specific pollutants. To make the task more manageable, therefore, EPA has selected for study in this rulemaking (as well as other industry rulemakings) 126 specific compounds referred to as "priority" pollutants. The criteria for choosing these pollutants included the frequency of their occurrence in water, their chemical stability and structure, the amount of the chemical produced, and the availability of chemical standards for measurement.

EPA conducted four major sampling and analysis programs: (1) Screening; (2) verification; (3) longterm sampling of physical/chemical systems and (4) 5-plant, long-term sampling of biological treatment systems. The primary objective of these programs was to produce composite samples of wastewater from which determinations could be made of the concentration (weight per unit volume) and/or mass load (weight per unit time) of the pollutants present in OCPSF wastewaters before and after various stages of treatment.

The screening program was conducted in two phases. In the first phase, 131 manufacturing plants (including direct and indirect dischargers) that represented a cross-section of the OCPSF industry were studied. A one-day composite sample from each plant was analyzed by an EPA laboratory or an EPA contractor for the presence of priority pollutants. The wastewater samples were generally taken before end-of-pipe treatment, but sometimes after minimal preliminary end-of-pipe treatment (*e.g.*, primary sedimentation), depending on accessibility to the wastewater stream. Treated effluent samples were taken either following physical/chemical treatment (for indirect dischargers) or after biological or physical/chemical end-of-pipe treatment (for direct dischargers). EPA also sampled the raw water source (intake water) to determine the presence of pollutants prior to contamination by the manufacturing process.

These screening samples were analyzed for the presence of organic priority pollutants by gas chromatography/mass spectrometry (GC/MS) and for the presence of priority pollutant metals by atomic adsorption spectrophotometry (AAS), as detailed in *Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants* (EPA, Cincinnati, Ohio, April 1977). (Some metals data was collected by a method other than AAS and was not included in the data base because of analytical concerns). The development of these methods of analysis has been described in the preamble to the proposed regulation for the Leather Tanning Point Source Category, 40 CFR Part 425, 44 FR 38749, July 2, 1979. A summary of all priority pollutant analyses reported from the screening program is incorporated into Section VI of the BAT Development Document.

In the second screening phase, EPA sampled and analyzed 40 additional plants, including 13 direct dischargers and 24 indirect dischargers. This phase concentrated on smaller plants and plants producing specialty and relatively small-volume products.

The screening results have not been used as part of the data base for developing BAT limitations. Rather, they have been used to generally identify the pollutants of concern in a variety of plants, to confirm process chemistry predictions, to help identify candidate pollutants and processes for further study and to investigate subcategorization for BAT.

The verification program was designed to obtain 3 days of data from a representative sample of plants in the industry. In this program, EPA focused upon plants that manufacture (and thus are likely to discharge) priority pollutants and those that produce large-volume chemicals (and thus account for a major portion of the industry's discharge flow as well as the industry's economic activity).

The verification program included 37 plants. Of these, 30 are direct dischargers, 5 are indirect dischargers and 2 are zero dischargers (deep well disposal). Of the direct dischargers, 27 use at least some end-of-pipe biological treatment and 3 use only physical/chemical treatment. These plants produce 315 product/processes, including the major high-production processes, the processes used to manufacture priority pollutants, and many smaller-volume processes. These product/processes represent over 70 percent of total industry production and over 45 percent of total industry process wastewater flow.

The verification program was designed not only to study the performance of end-of-pipe systems, as in the screening program, but also to examine the nature and treatability of 176 individual product/process wastewater effluents and combinations of such effluents in the visited plants. At each plant, EPA sampled the raw waste load of individual production lines, determined the rate of production, and sampled the discharge from in-plant physical/chemical treatment systems used to treat those product/process effluents either singly or in combination with other product/process effluents.

Before sampling a verification plant, EPA first analyzed the product/processes at the plant and, through the use of process chemistry, determined which priority pollutants were likely to be discharged at the plant. A pollutant was determined to be likely to be discharged if it was the final manufactured product, used as a raw material or solvent, or commonly known or reported to be a by-product of the process reaction. In addition, EPA generally analyzed a grab sample at the plant, prior to taking 3 days of composite samples, to further identify the pollutants being discharged by the plant. Finally, EPA developed analytical methods that were specifically appropriate to measure those pollutants in the particular wastewater matrix being sampled.

The methods used by EPA were generally GC/CD (gas chromatography with conventional detectors, such as electron capture or flame ionization). The Agency used these techniques rather than GC/MS because: (1) They were commonly in use in the industry and were often being used by the sampled plants to monitor their process wastewater streams; (2) equipment to use these techniques was widely available; and (3) the costs of monitoring for a small number of targeted priority pollutants is lower for these techniques than for GC/MS. However, EPA's analytical program called for the use of GC/MS for as much as 10 percent of the samples to confirm the GC/CD results.

A discussion and summary of all priority pollutant analytical methods is contained in Appendix E of the BAT Development Document. A summary of results of the priority pollutant analyses is contained in Section V of the BAT Development Document.

In response to comments on the verification program from EPA's Science Advisory Board, EPA has carefully reviewed the analytical methods used to collect the verification data. Based upon our review, we have determined that some mistakes were made in collecting the data for some plants. For example, appropriate spiking levels were not used at six plants. As a result, EPA has deleted all of the data for 6 verification plants from the data base used to generate the BAT limitations. Furthermore, some data from other plants may be similarly deleted prior to final promulgation if warranted by further analysis. We believe that most of the data used to develop the proposed limitations are supported by adequate quality assurance/quality control (QA/QC) procedures and will be appropriate for use in the final regulation.

An additional data base assembled by EPA contains information on steam stripping, activated carbon and solvent extraction. Several full-scale systems were sampled for certain priority pollutants. Supplemental data were obtained from pilot studies, bench scale studies and laboratory studies, and engineering design models were used to allow extrapolation of the results to full scale systems.

This physical/chemical treatment data base has not been used to develop BAT limitations. However, by indicating the discharge levels achieved by variously sized and designed physical/chemical treatment systems, it has been used to help determine the costs of removing certain priority pollutants by physical/chemical means.

The last major data-collection activity was a long-term (approximately one month) sampling program at 5 plants (2 of which were also verification plants). The sampling was done on a cooperative basis among EPA, the Chemical Manufacturers Association and the 5 companies. The sampling was conducted around the end-of-pipe systems (which included biological treatment at each plant). Split samples were analyzed by EPA, CMA and, in most cases, the plants. Metals were not addressed in this study. In addition, the study did not analyze all of the organic priority pollutants.

Data from the 5-plant study, like the verification data, were used to develop the BAT limits. The five plants included an additional 16 product/processes that were not covered in the verification study. Thus the two combined data bases include 331 product/processes.

In addition to gathering data, EPA studied (using both process chemistry theory and empirical validation) the principal feedstocks (basic raw materials) and generic processes used in the OCPSF industry to determine the priority pollutants that are likely to be discharged from particular product/processes. This information has been and is continuing to be used in several ways, including: (1) Providing a theoretical understanding of the collected data; (2) identifying product/processes that have not get been sampled by EPA and are likely to discharge priority pollutants and thus are good candidates for future sampling and analysis; (3) indicating the extent to which the product/process and pollutant-discharge data in EPA's data base is representative of the entire industry; and (4) assisting permit writers and plants in determining the pollutants that are likely to be discharged and thus need to be treated and routinely monitored. A detailed discussion of this subject is contained in Section V of the BAT Development Document. EPA invites commenters to submit information to improve this discussion of priority pollutant pathways.

C. Need for BAT Regulation

The OCPSF industry is unique in that it is the only industry that intentionally manufactures large volumes of the majority of organic priority pollutants. This fact alone indicates that significant discharges of organic priority pollutants will likely occur in this industry. Several other significant sources of organic priority-pollutant discharges in the OCPSF industry are: (1) The use of priority pollutants as raw materials; (2) the use of priority pollutants as solvents; (3) the creation of priority pollutants as co-products in petrochemical processes; and (4) the presence of priority pollutants as contaminants in raw materials. Furthermore, many priority pollutant metals are used in various product segments as catalysts, oxidizing and reducing agents, reagents, reactants, raw materials, by-products and corrosion inhibitors and thus also may be expected to be discharged from OCPSF plants.

Actual data collected by EPA confirm the discharge of a wide variety of priority pollutants. Nearly every priority pollutant has been detected in at least 42 percent of the influent or effluent samples in the screening, verification and 5-plant studies. While most of these pollutants are attributable to OCPSF processes, some are not. For example, the pesticide priority pollutants found in end-of-pipe effluent cannot be attributed to OCPSF wastewaters because they are not used as raw materials or solvents, are not produced as products or co-products, and are unlikely to appear as raw material contaminants in OCPSF product/processes. They are most likely attributable to intake water used in the process or to pesticide formulations that were being applied around the plant grounds but are not related to production processes. Even after good biological treatment that meets the criteria set for the BPT data base (BOD less than 50 mg/l or better than 95% BOD reduction), the discharge of many priority pollutants is still significant and treatable.

Due to the huge process-wastewater flows that occur at many OCPSF plants, the total mass (flow times concentration) of discharged priority pollutants can be very high even at low concentrations. The total mass of discharged organic priority pollutants from this industry is the highest of any industry. EPA estimates that direct dischargers would discharge 668 million pounds of priority pollutants after achieving BPT. (The priority pollutant mass loading figures presented in the preamble are based on developing flow-weighted industry-wide priority pollutant loadings for the 176 selected product/process and then, on the basis of flow, extrapolating the loading to the entire industry).

Based upon the above information, EPA has concluded that priority pollutant discharges from the OCPSF industry are significant even after BPT treatment. Therefore, BAT limitations are necessary to control priority pollutant discharges.

D. BAT Technology Selection

Due to the diversity of priority pollutants in the OCPSF industry, a variety of treatment technologies are employed by OCPSF plants to control priority-pollutant (as well as nonconventional pollutant) discharges. Consequently, the selection of a particular set of "BAT" treatment technologies is plant-specific. Unlike other industries for which EPA has established BAT guidelines, the OCPSF industry is not amenable to the specification of a single model BAT technology.

The range of technologies used to control priority-pollutant discharges in the OCPSF industry encompasses virtually the entire range of industrial wastewater-treatment technology. Generally, as indicated previously, this technology is usually some combination of in-plant control, or treatment of specific wastestreams (from one or several product/processes) by any of a variety of physical/chemical methods, biological treatment of combined waste streams, and post-biological treatment.

Some of the controls or technologies preceding the biological segment of the treatment system are installed specifically to reduce priority pollutants. However, others are expressly designed into the treatment system to assure compliance with BPT by protecting the biological segment of the system from shock loads and other forms of interference. It is thus infeasible to specify that any particular technology is or is not a "BAT" technology or a "priority-pollutant control" technology in the OCPSF industry. Rather, each plant wishing to control its priority-pollutant discharges will employ some combination of controls and technologies (and, to some extent, dilution of some process wastewater by other process wastewater having lower concentrations of certain priority pollutants) that result in the desired reduction.

Based upon these considerations, EPA has refrained in this rulemaking from specifying a particular set of controls as the basis for BAT. Rather, EPA has based the proposed BAT limitations on the levels of priority pollutant control that are actually achieved at various OCPSF plants using differing treatment configurations. In doing so, EPA has carefully analyzed the plants in its BAT data base to assure that the data relied upon to develop BAT limitations represent the best available technology rather than simply an average of existing performance levels.

EPA has used certain existing rules to determine which plants are included in the data base used to develop BAT limitations. These rules are discussed in Section V of the BAT Development Document. EPA will continue to consider the appropriateness of the editing rules and invites comment on them.

E. Calculation of BAT Limitations

EPA considered two general options for developing BAT effluent limitations. The selected option is concentration-based limitations, based on end-of-pipe data that reflect total treatment system performance. The rejected option would have set mass-based (or, in a suboption, concentration-based) limitations, based primarily on an evaluation of the treatability of individual product/

process streams by in-plant process control, physical/chemical treatment, and biological treatment.

1. *Option 1: Mass-Based Limitations on Specific Product/Processes.* The Agency gave the rejected mass-based, product/process option very serious consideration throughout the development of these regulations. This option would have relied primarily on the data gathered in the verification program for the 176 product/processes and their treatability and also on the physical/chemical treatability data based. Based on this data, EPA would have determined what mass limitations could be achieved for each product/process through the use of in-plant control.

Under this option, each product/process would have been considered a separate subcategory, and the regulation would have contained separate mass-based limitations for each such subcategory. Monitoring would have been separately required for each product/process effluent. However, credit could have been provided for removals by an end-of-pipe (usually biological) treatment system if sampling before and after that system demonstrated a percent reduction through the biological segment of the system. This is similar to the use of removal credits in the Pretreatment program for indirect dischargers. (See 40 CFR 403.7, 46 FR 9404, January 28, 1981). See also the proposed amendments to 40 CFR 403.7, 47 FR 42698, September 28, 1982.

This option, if supported by sufficient technical information, provides some potential advantages over an end-of-pipe-based regulation:

a. By setting limits on individual product/processes, this option would assure treatment prior to the commingling of different process wastewaters. Thus, the dilution of one process wastewater containing only pollutants A–E by another process wastewater containing only pollutants F–J could not be used as a partial substitute for treatment.

b. This option could be expected, in practice, to result in an emphasis on process controls and in-plant physical/chemical treatment, thereby promoting the recycling and reuse of wastewater and by-products. Such an emphasis would result in a reduction of the overall pollutant release through various environmental media that might otherwise occur through a heavier reliance on end-of-pipe biological treatment. For example, biological treatment can, in some instances, cause the transfer of some volatile organic pollutants from the wastewater to the air, and the adsorption of some other organic pollutants, as well as metals, to the biological sludge, which is then disposed of through methods which may affect other media. While some in-plant physical/chemical controls may similarly transfer pollutants to other media (*e.g.*, precipitation of metals often results in the transfer of metals from wastewater to other media), other in-plant controls and treatments return at least some pollutants to the process, thereby minimizing total environmental releases.

Despite these theoretical advantages, EPA has concluded that this option is both technically and administratively infeasible. The difficulties with this option are outlined below:

a. EPA collected data characterizing 176 specific product/process effluents. This covers all of the high-volume products in the industry, and represents approximately 40 percent of the industry wastewater flow and approximately 65 percent of its production. Despite this extensive coverage, thousands of minor individual product/processes are left unaddressed. In implementing BAT regulations to issue a permit under this option, a permit writer would typically be faced with the arduous task of characterizing and developing effluent limitations for those product/processes at each plant that are not explicitly addressed by the regulation. The time and expertise needed by the States and EPA Regional offices to implement this approach would be enormous. It is thus likely that this approach would substantially delay the issuance of permits to, and the installation and operation of BAT controls by, OCPSF plants.

b. Calculating mass limits requires that for each product/process, EPA must calculate an F/P (flow divided by production volume) ratio representative of good industry practice. (Multiplying F/P by concentration yields a mass pollutant loading per unit of production.) For 146 of the 176 product/processes, EPA has F/P data with corresponding final effluent data at only one plant. Moreover, where we have data from two or three plants, wide variations in F/P ratios often occur. (In one case the variation is a factor of 74). Causes for these disparities could be a variety of differing process controls. To establish a BAT F/P ratio, EPA would practically have to set design and operating practices for each product/process in the industry. This is far beyond the reasonable scope of the BAT project.

c. Plants often combine the raw wastewater from several product/processes prior to in-plant treatment. The piping configurations often make it impossible to sample the isolated wastewater streams before they are combined. Undetermined mixes of several product/process effluents would confound attempts to attribute F/P ratios, raw waste loads or treatabilities to particular product/process effluents. This problem would similarly confront plants attempting to monitor individual product/process effluents in order to comply with permits implementing this option.

d. EPA's data indicating the day-to-day variability of physical/chemical-treatment-system performance is somewhat limited. Such information is available for some physical/chemical systems' day-to-day performance in treating particular priority pollutants in particular wastewater matrices. However, for others, only laboratory, pilot or bench scale data and/or theoretically based extrapolations exist. Obtaining additional full-scale data on many of the more important physical/chemical systems (e.g., steam stripping and activated carbon) would be enormously complicated. The systems must be sampled at time intervals much smaller than required for biological systems. Thus, the minimum number of samples to obtain a representative set of data, is very large, and the cost of performing such analyses for different physical/chemical treatment systems is correspondingly high.

e. Monitoring for compliance with individual product/process limitations would be enormously expensive. Sampling and analysis for organic pollutants, unlike analysis for conventional pollutants and metals, is very expensive. Monitoring on a routine basis for organic pollutants at many different points within the plant would be exceptionally expensive. For example, if a large plant monitored 15 sample points for priority pollutants once a week, the annual cost of monitoring alone could be as high as $663,000.

Although EPA has decided not to propose product/process oriented, mass-based BAT limitations, the product/process-related data have proved enormously useful to the Agency and are expected to be useful in the future. First, the information has helped EPA verify its theoretical understanding of the sources of priority pollutant discharges in the OCPSF industry. This helps assure the representativeness of the data used for the selected option and will assist permit writers in developing monitoring requirements. Second, as discussed below, the information has been crucial to EPA's analysis of the costs and economic impacts of the proposed BAT limitations.

2. *Option 2: The selected approach—End-of-Pipe Concentration Limitations.* EPA has decided to propose concentration-based BAT limitations for two separate subcategories based upon end-of-pipe data that reflect the best available technology, including combinations of process controls, in-plant physical-chemical treatment, and end-of-pipe (usually including biological) treatment. The data base includes the verification plants and the plants included in the 5-plant study. The use of concentration-based, end-of-pipe BAT limitations avoids the difficulties discussed above with respect to a mass-based approach. However, as in the case of BPT limitations, the permit writer would multiply the concentration limit by the plant's combined wastewater flow to set a mass limitation in the permit. In addition, the permit may limit flow, on a case-by-case basis using best engineering judgment, where water use is excessive and prevents effective reduction of priority pollutant loadings.

Prior to calculating concentration-based limitations, EPA considered whether the industry should be subcategorized for BAT purposes. We considered the types of factors discussed above with respect to BPT subcategorization. We concluded that two subcategories were appropriate for BAT. One subcategory consists of discharges resulting from the manufacture of plastics and synthetic fibers only ("Plastics Only" which corresponds to the BPT Plastics Only subcategory). They tend to have less significant levels of priority pollutants than the remaining discharges, all of which result from the manufacture of at least some organic chemicals ("Not Plastics-Only" subcategory which corresponds to the BPT oxidation, Type I and Other Discharges subcategories). Thus, as discussed below, relatively few priority pollutants require control in the Plastics Only subcategory while many priority pollutants require control in the Not Plastics-Only subcategory.

The designation of fewer subcategories for BAT than for BPT stems from the conceptual differences between BAT and BPT. BPT reflects the average of the best existing industry practice. The four BPT subcategories reflect the fact that the best practicable treatment technology results in differing practicably achievable BOD and TSS discharge levels for each subcategory. The data gathered by EPA for BAT show that plants in the 3 BPT subcategories other than Plastics Only can all achieve the same effluent limitations by installing the best available technology economically achievable. Age, size, location and flow were considered and found not to be factors in subcategorization. The BAT subcategorization is discussed in further detail in Section IV of the BAT Development Document.

EPA is considering establishing a separate subcategory, for BAT purposes, for discharges resulting from the manufacture of rayon. These discharges would otherwise be covered by the Plastics Only subcategory. An industry trade association has recently submitted raw waste load and treated effluent data for this subcategory. These data indicate that discharges from the manufacture of rayon differ dramatically from other plastics discharges. Concentrations of metals in other raw (untreated) waste loads are almost always less than 5 $\mu g/l$. Rayon raw waste discharges of zinc often exceed that figure by 100 times or more. Even after good treatment, it is reasonable to expect, as the data indicate, that rayon discharges cannot achieve the same level as other plastics discharges. EPA invites comments on the suitability of establishing a separate subcategory for discharges from rayon manufacturers.

Having established the BAT subcategories, EPA then established limitations for each subcategory. EPA first calculated long-term averages for each priority pollutant that was discharged above levels achievable by BAT (36 organics and 8 metals in the Not Plastics-Only subcategory, and 5 organics and 5 metals in the Plastics Only subcategory). The averages were then multiplied by variability factors to calculate daily maximum and 4-day average effluent limitations. The 99th and 95th percentiles of the long-term data distribution provide the basis for calculating the daily maximum and 4-day average variability factors, respectively. A detailed discussion of EPA's methodology in developing limitations is contained in Section IX of the BAT Development Document.

The 4-day averages are expressed as "average of daily values for 4 consecutive monitoring days." The actual monitoring frequency will vary from plant to plant (see the discussion in Section XI of this preamble). EPA feels that monitoring four times a month is a reasonable average frequency for some plants. For others, a different frequency (*e.g.,* once per month) may be more appropriate. In any case, the 4-day average would apply to any set of 4 consecutive samples, regardless of the period of time over which the samples were taken.

One issue that has arisen with respect to the effluent limitations for organic priority pollutants is the analytical variability associated with measurements for these pollutants, especially at low levels. The practical lower limit of detection for most of these pollutants, given the proper use of analytical procedures, is between 1 and 10 $\mu g/l$. If GC/CD is used with careful cleanup and other appropriate procedures, the practical detection limit is generally even lower (between 0.1 and 1 $\mu g/l$). At very low levels approaching the detection limit from above, unless great precautions are taken, analytical variability may substantially affect the process of quantification. EPA's statistical methodology for developing the BAT limits has been designed with this problem in mind. The methodology does not require the quantification of values below 10 $\mu g/l$.

EPA found that some pollutants known to be in raw waste loads were uniformly reduced to 10 $\mu g/l$ or less by plants in EPA's data base. For others, treatment uniformly reduced pollutant levels to not much higher than 10 $\mu g/l$. Appropriate statistical techniques yield low BAT limits (both daily maximum and 4-day average) for these pollutants (often less than or equal to 10 $\mu g/l$).

Low-level concentration data is viable for inclusion in a data base that reflects the range of performance of BAT systems. However, EPA feels that setting regulatory limits at 10 $\mu g/l$, even where warranted by appropriate statistical techniques applied to the data, will result in apparent violations that may occur due to analytical variability at this low level of detection. In such cases, the discharger and the pretreatment control or permitting authority would have to review the analytical procedures used, in order to determine if a violation actually occurred. Many disputes would arise concerning incidental analytical methods issues, diverting attention from the central issue: whether the appropriate set of BAT controls and treatments are being properly operated. EPA believes that sound regulatory policy dictates that levels be chosen that lessen the necessity for analytical disputes without being so high that inadequate treatment is allowed.

Consequently, a less stringent threshold of 50 $\mu g/l$ has been set for organic priority pollutant limitations. This level has been selected as the daily maximum limitation whenever the statistical methodology yields lower (less than 50 $\mu g/l$) concentrations. For pollutants whose daily maxima are proposed to be 50 μg/l (for the reasons described above), EPA is not setting 4-day average numbers. Based upon statistical techniques, these averages should be even lower than the daily maxima, which have been raised to 50 μg/l to avoid analytical method disputes. To be consistent, the 4-day averages would have to be raised to 50 μg/l for the same reasons. No purpose would be served by having average limits set at the same level as daily maxima. The daily maximum limitations of 50 μg/l will suffice for regulatory and enforcement purposes.

EPA will continue to consider the appropriateness of the 50 μg/l lower bound used in these proposed regulations. Given the extremely low levels of detection for most of the pollutants, the 50 μg/l level may be higher than necessary to avoid significant analytical methods disputes. Certainly, for the pollutants in question, substantially lower levels are both technically achievable and measurable, provided that adequate care is taken with respect to analytical techniques. EPA invites comments and analytical methods data that would shed further light on this issue.

A related issue raised by an industry trade association concerns the implementation aspects of low level limits once they have been established in the final regulation. The concern raised is that at any reasonably low level, analytical variability is sufficient to result in some cases, in apparent noncompliance caused solely by such variability. The industry association suggested an upward adjustment of such limitations to account for such variability or, alternatively, an EPA policy on how to interpret violations of a limit that are within a certain range of analytical variation from the limit.

EPA does not believe that the regulatory limits should be adjusted to address this concern. The data used to derive the limitations reflect the range of variability found in the industry, including analytical variability as well as product/process and treatment variability. Furthermore, statistical techniques used to derive the daily maximum limitations already account for analytical and other variability by multiplying the average long-term performance by variability factors. Finally, the other measures discussed above should reduce any remaining variability problems.

EPA agrees, however, that an enforcement program or a general policy that recognizes the problems of analytical variability could be useful. EPA intends to consider such an approach and welcomes comments on how best to develop and implement it.

F. Applicability of BAT Limitations

The two subcategories established for BAT, and the limitations established for each subcategory, apply to all plants that have discharges resulting form OCPSF manufacturing operations. Thus, they cover discharges of priority pollutants from thousands of product/processes.

The plants included in the BAT data base for the development of BAT limitations include 234 product/processes. These product/processes represent approximately 70 percent of industry production and approximately 45 percent of industry flow. Thus, EPA believes that they provide a fair representation of the entire industry with respect to achievable end-of-pipe concentrations.

In analyzing the BAT data base, EPA found that many plants already achieve low effluent concentrations for the pollutants covered by the BAT regulation even when those pollutants are at significant concentrations in the raw waste load. Indeed, well-operated plants are generally able to achieve low effluent levels regardless of any high loadings that may initially be generated by particular product/processes within the plants. In the case of plants that are discharging particular pollutants at higher levels than other plants in the data base, EPA has generally been able to identify a certain type of control or treatment (usually process controls or in-plant physical/chemical treatment) that is used by the better performers to treat that pollutant, but that is not being used by the poorer performers. These facts lead to the conclusion that a well-operated plant should be able to meet the BAT limitations regardless of this product/processes are being used at the plant, provided that appropriate technologies are applied. Thus, the proposed limitations based on our data base should be achievable by all plants in the industry, even when they use some product/processes that are not specifically covered by our data base.

The conclusion that the proposed BAT limitations are broadly applicable is strongly supported by an analysis of the sources of priority pollutants from a process chemistry perspective. As noted previously, priority pollutants are discharged from chemical processes generally as the result of one of the following five causes: (1) The pollutant is manufactured by the plant; (2) the pollutant is a co-product of the process reaction; (3) the pollutant is used as a raw material; (4) the pollutant is used as a solvent; or (5) the pollutant is a contaminant of a raw material.

EPA's data base includes most of the product/processes used to manufacture the priority pollutants that are produced in large volume. It includes almost all of the important types of generic chemical processes used in the OCPSF industry. Similarly, the inclusion of many different types of product/processes used in the industry ensures that the data reflect a good cross-section of the use of pollutants as raw materials or solvents. The final source of pollutants, contamination of raw materials, is largely variable even for a given product/process, depending on the plant's raw material source at a particular time. The plants and product/processes in the data base may be expected to provide a representative picture with respect to this factor as well.

EPA intends to gather more data from additional plants, including additional product/processes, to broaden the direct coverage of the data base and to confirm its representativeness of previously unsampled plants. In addition to gathering data on pollutants limited in the proposed regulation, we will be seeking data on pollutants that are not limited in the proposal, to further assure ourselves that significant discharges of these pollutants are not occurring. Based on this additional information, EPA may modify the proposed limitations or decide to limit additional pollutants. EPA's data-gathering plan is discussed in greater detail in Section XV below.

EPA invites comments on this issue. Specifically, do product/processes exist whose raw waste loads for particular priority pollutants are so high that their effluent loadings cannot be reduced to comply with the proposed BAT limitations by using the best available technology economically achievable? If so, what are the product/processes, what pollutants do they generate at what concentrations, and what difficulties preclude the achievability of the BAT limitations? Do certain product/processes discharge, at significant levels, priority pollutants that are not limited in the proposed BAT regulation? What product/processes are these, and what pollutants do they discharge at what levels?

G. BAT Removals of Priority Pollutants, Costs and Economic Impacts

EPA estimates that the proposed BAT regulation will result in the incremental removal (beyond that achieved by BPT) of 648 million pounds per year of priority pollutants. BAT is estimated to result in capital costs of $520 million and annual costs of $243 million. Five plant closures are anticipated. In addition, 9 process lines are expected to close, resulting in the loss of 377 out of 295,000 total jobs in the industry.

Based upon the above, EPA has concluded that the proposed BAT limitations are justified and consistent with the requirements of the Act.

VIII. New Source Performance Standards

The basis for new source performance standards (NSPS) under Section 306 of the Act is the best available demonstrated technology. At new manufacturing plants, the opportunity exists to design the best and most efficient processes and wastewater treatment facilities. Therefore, Congress directed EPA to consider the best demonstrated process changes, in-plant controls, and end-of-pipe treatment technologies that reduce pollution to the maximum extent feasible.

Priority pollutants proposed for control by this regulation include those listed for BAT. BOD and TSS which are regulated in BPT, are proposed for regulation under NSPS.

The technologies used to control conventional and priority pollutants at existing plants are fully applicable to new plants. Furthermore, EPA has not identified any technologies or combinations of technologies that are demonstrated for new sources that are different from those used to establish BPT and BAT limitations for existing sources. Therefore, EPA is establishing NSPS subcategories and proposing NSPS limitations that are identical to those proposed for BPT and BAT.

IX. Pretreatment Standards for Existing Sources

A. Legal Criteria in Developing Pretreatment Standards

Section 307(b) of the Act requires EPA to promulgate pretreatment standards for existing sources (PSES), which must be achieved within three years of promulgation. PSES are designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs. The legislative history of the 1977 Act indicates that pretreatment standards are to be technology-based, analogous to the best available technology for removal of toxic pollutants. The General Pretreatment Regulations which serve as the framework for the proposed pretreatment standards are in 40 CFR Part 403. (See 43 FR 27736, June 26, 1978; 46 FR 9404, January 28, 1981).

Before proposing pretreatment standards, the Agency examines whether the pollutants discharged by the industry pass through POTW or interfere with POTW operation or sludge disposal practices. In determining whether pollutants pass through a POTW, the Agency compares the percentage of a pollutant removed by POTWs with the percentage removed by direct dischargers applying BAT. A pollutant is deemed to pass through the POTW when the average percentage removed nationwide by well-operated POTWs (those meeting secondary treatment requirements) is less than the percentage removed by direct dischargers complying with BAT effluent limitations guidelines for that pollutant.

This approach to the definition of pass through satisfies two competing objectives set by Congress: That standards for indirect discharges be equivalent to standards for direct dischargers, and that the treatment capability and performance of the POTW be recognized and taken into account in regulating the discharge of pollutants from indirect dischargers. Rather than compare the mass or concentration of pollutants discharged by the POTW with the mass or concentration of pollutants discharged by a direct discharger, EPA compares the percentage of the pollutants removed by the plant with the POTW removal. EPA takes this approach because a comparison of mass or concentration of pollutants in a POTW effluent with pollutants in a direct discharger's effluent would not take into account the mass of pollutants discharged to the POTW from nonindustrial sources nor the dilution of the pollutants in the POTW effluent to lower concentrations from the addition of large amounts of nonindustrial wastewater.

B. Need for Pretreatment Standards

Indirect dischargers in the OCPSF industry, like the direct dischargers, use as raw materials and solvents, and produce as products or byproducts, many organic priority pollutants. Similarly, they use many priority pollutant metals in their manufacturing operations. Therefore, as in the case of direct dischargers, they may be expected to discharge many priority pollutants to POTWs at significant mass and concentration. Indeed, EPA estimates that indirect dischargers annually discharge 174 million pounds of priority pollutants to POTWs.

EPA has conducted a study of 50 well-operated POTWs that use biological treatment and meet the secondary treatment criteria to determine the extent to which priority pollutants are reduced by such POTW's. This study showed that the metals proposed for BAT regulation are typically removed at rates varying from 59 to 91 percent in POTWs. In contrast, BAT level treatment by direct dischargers in the OCPSF industry achieves removal of these metals in the range of 17 to 83 percent. While the ranges overlap in general, BAT removal exceeds POTW removal with respect to particular pollutants in only a few cases. EPA has found that one metal (lead), and cyanide discharged from the Plastics Only subcategory pass through POTWs, and 2 metals (chromium and mercury) from the Not Plastics-Only subcategory pass through.

For the organic priority pollutants proposed for BAT regulation, data from the 50 POTWs illustrate a wide range of removals for various pollutants, ranging from 45 to 98 percent reductions. BAT-level treatment by direct dischargers in the OCPSF industry also illustrates a wide range of removal. Removal data across OCPSF biological systems show a percent reduction range from 33 to greater than 99 percent. In many instances, the data on removals across biological systems understate, because of the location of the sampling points, the percent reduction across the entire BAT treatment system (including reductions across in-plant treatment). However, it is reasonable to assume that the precent reduction across an entire system would be higher than across the end-of-pipe treatment alone.

POTW percent reduction data are available for 27 of the 36 organic pollutants proposed for BAT limitations. BAT percent reductions are greater than POTW percent reductions for 11 priority pollutants. For 16 other priority pollutants, POTW removals are better than BAT removals (calculated only across the end-of-pipe portion of the BAT system, as mentioned above). Higher POTW removals for this latter group indicate the absence of pass-through with respect to the pollutants in that group. However, as noted in the above paragraph, the BAT removals may be understated by the available data.

Some of the 11 pollutants in the first group fall into a grey area. The data indicate that BAT percent reductions for 5 pollutants exceed POTW percent reduction by less than 5 percent. In light of the fact that EPA had less data in the POTW studies on organic priority pollutants than it had for the metals, and in light of the analytical variability for organic priority pollutants at the concentrations typically found in end-of-pipe biological systems at POTWs and OCPSF plants, EPA believes that differences of 5 percent or less between the OCPSF and POTW data for organic priority pollutant reductions may not reflect real differences in treatment efficiency. Therefore, EPA has determined that for the purposes of the proposed PSES regulation, these grey-area pollutants do not pass through POTWs. We solicit comments on this issue.

In addition to the pass-through problem, many of the pollutants in OCPSF wastewaters, at sufficiently high concentrations, can inhibit biodegradation in POTW operations. Indeed, in some cases, OCPSF discharges into POTWs have caused severe upsets at POTWs resulting not only in the pass-through of the OCPSF discharge but also in the partial or complete failure by the POTW to treat other wastes.

Finally, the high concentrations of priority pollutants in a POTW's sludge can limit the use of sludge management alternatives, including the beneficial use of sludges on agricultural lands or the codisposal of sludge with refuse for recovery of thermal energy. In particular, a high level of cadmium (which is discharged by some OCPSF plants) can result in a POTW's inability to comply with the specific limitations established under Section 405 of the CWA for land spreading of Cadmium containing wastes. See 40 CFR Part 257, 44 FR 53460, September 13, 1979. EPA is not proposing PSES standards for cadmium to address this concern because cadmium discharges from OCPSF plants occur infrequently and are not known to be causing a national problem for POTW sludges. If a particular POTW is having sludge problems due to an OCPSF discharge of cadmium into the POTW, that local problem should be addressed through the local pretreatment program. We request comments on the proposal not to set a national pretreatment standard for cadmium.

Based upon the above considerations, EPA has concluded that PSES regulations are necessary for a substantial number of pollutants in this industry. Accordingly, EPA is proposing pretreatment standards today for all of the pollutants included in the BAT regulation except for those which we have determined do not pass through POTWs as discussed above. Thus, there are pretreatment standards for 15 organic priority pollutants and 2 metal priority pollutants for the Not Plastics-Only subcategory. These include 9 pollutants without corresponding POTW data to make such a determination. EPA solicits comments on whether any additional pollutants should be subject to PSES standards to prevent interference with POTW operations or to prevent POTW's sludge disposal problems.

C. Technology Selection and Establishment of Limits

The selected technology for PSES is the same as for BAT: the combination of process controls, in-plant physical/chemical treatment and end-of-pipe treatment that is the best available to control priority pollutant discharges at each plant. The PSES limitations reflecting this technology are based upon the same data as the BAT limitations: the verification data and the five plant data. This ensures that those pollutants that were found to pass through POTWs are controlled in a manner that is analogous to BAT.

As discussed previously in the case of BAT, two subcategories have been established for pretreatment: Plastics Only and Not Plastics-Only. Fewer pollutants are regulated in the pretreatment standards, reflecting the fact that POTWs adequately remove some of the pollutants regulated by BAT. For the Plastics Only subcategory, 2 organic and 2 metals are limited. For the Not Plastics-Only subcategory, 15 organics and 2 metals are limited. Standards for these pollutants are concentration-based and are equal to the BAT limitations.

In some cases, EPA anticipates that plants will install biological systems as part of their total pretreatment systems. This will occur when the use of biological treatment is more cost-effective than the use of a purely physical/chemical system in meeting the standards. However, EPA anticipates that biological treatment will be used less frequently by indirect dischargers than by direct dischargers, because the pretreatment standards do not limit the conventional pollutants BOD and TSS. Therefore, indirect dischargers that can control priority pollutants by physical/chemical means will not need to install biological treatment to address BOD and TSS. Additionally, as discussed in the next section, some indirect dischargers may obtain credits for POTW removals, resulting in less stringent limitations which may eliminate the need for biological treatment.

As in the case of BPT and BAT, PSES standards are expressed in terms of concentration rather than mass. However, unlike direct dischargers, indirect dischargers are not issued permits (except where a POTW voluntarily chooses to adopt a permit system to implement a local pretreatment program). Therefore, the concentration-based PSES standards will generally not be converted into mass-based limits as in the case of BPT and BAT limitations. EPA solicits comments on whether, and how, EPA should develop an approach whereby concentration-based PSES standards are converted to mass-based standards.

D. Removal Credits

For many priority pollutants, POTWs do not remove the pollutants as efficiently as biological systems at OCPSF plants. This occurs for two main reasons. First, influent concentrations of these pollutants at an OCPSF plant are often higher than at a POTW (which dilutes pollutant-bearing wastewaters with other wastewaters); higher influent concentrations can in many cases be reduced more efficiently (*i.e.*, by a greater percentage) than can lower concentrations. Second, OCPSF biological systems are more likely to have biota that are better acclimated to the specific OCPSF wastes than are the POTW biota receiving such wastes.

Although some priority pollutants are not adequately treated by POTWs, they are removed by POTWs to at least some extent. Recognizing this fact, Congress amended the Clean Water Act in 1977 to allow POTWs to grant "removal credits" to indirect dischargers in appropriate circumstances. The decision whether to grant removal credits is made by the POTW. No POTW removal credit can be granted without approval of the POTW owner or operator.

Section 307(b)(1) of the CWA now provides that if a POTW removes all or part of a toxic pollutant discharge and the discharge from the POTW does not violate the limitation which would apply to the pollutant if it were discharged by a source other than a POTW (i.e., an industrial plant), and does not prevent sludge use or disposal by the POTW in accordance with Section 405 of the CWA, then the owner or operator of the POTW may, at his discretion, revise the pretreatment standards to reflect the POTW removal. EPA regulations implementing this statutory provision are contained in 40 CFR 403.07, 46 FR 9404 (January 28, 1981). Revisions of these rules were recently proposed to simplify procedures and encourage the use of such "removal credits" where appropriate. See 47 FR 42698 (September 28, 1982). The proposed rules would establish, for well-operated POTWs, uniform, nationally available removal credits for the metals regulated by today's pretreatment standards, ranging from 19 to 65 percent. The general pretreatment regulations currently allow a POTW to grant a removal credit for any pollutant for which the POTW demonstrates actual removal. Although EPA anticipates that many OCPSF plants will be granted removal credits by POTWs for metals and some will be granted removal credits for organic pollutants, EPA has assumed, for costing purposes, that OCPSF plants will not obtain removal credits and will be required to meet fully the proposed PSES limitations. This assumption may have resulted in a substantial overestimate of the costs and economic impact of the proposed PSES regulation.

E. Compliance Date

EPA is proposing a compliance date for PSES for the OCPSF category of 3 years from the date of promulgation. We believe that three years (the maximum compliance period allowed by law) are necessary for several reasons. First, many indirect dischargers presently have little or no treatment in place. Therefore, very substantial capital improvements will be required. Second, due to the complexity of OCPSF plant configurations, product mixes, and wastewater matrices, a substantial amount of engineering design work must precede the selection and installation of equipment. Third, biological systems typically require a substantial amount of startup time to acclimate the biota, attain equilibrium and achieve compliance with effluent limitations.

EPA solicits comments on the proposed compliance date for PSES.

F. PSES Priority Pollutant Removals Costs and Economic Impacts

EPA estimates that the proposed PSES regulation will result in the incremental removal of 165 million pounds per year of priority pollutants. PSES is estimated to result in capital costs of $880 million and annual costs of $404 million. Three plant closures are anticipated. In addition, 12 process lines are expected to close, resulting in the loss of 117 out of 295,000 jobs in the industry.

Based upon the above, EPA has concluded that the proposed PSES limitations are justified and consistent with the requirements of the Act.

X. Pretreatment Standards for New Sources

Section 307(c) of the Act requires EPA to promulgate pretreatment standards for new sources (PSNS) at the same time that it promulgates NSPS. These standards are intended to prevent the discharge of pollutants which pass through, interfere with or are otherwise incompatible with POTW. New indirect dischargers, like new direct dischargers, have the opportunity to incorporate the best available demonstrated technologies including process changes, in-plant control measures, and end-of-pipe treatment, and to use plant site selection to ensure adequate treatment system installation.

The priority pollutants selected for regulation by PSNS are the same as those selected for control by PSES. For the reasons discussed above, EPA has determined that these pollutants may pass through, interfere with or otherwise be incompatible with the POTW. The pretreatment standards selected as the basis for PSNS are also the same as those selected for PSES because EPA has not identified any technologies or combination of technologies that are demonstrated for new sources that are different from those used to establish PSES. These standards are the same as NSPS except that pollutants regulated by NSPS that do not pass through POTWs are not regulated by PSNS.

XI. Monitoring Requirements

The proposed regulations control a substantial number of priority pollutants, including many organic priority pollutants. To insure compliance with the proposed effluent limitations and standards, plants will be required to periodically monitor their discharges for the regulated pollutants. Permitting authorities generally must specify monitoring requirements in direct dischargers' permits, including type, intervals, and frequency sufficient to yield data that are representative of the monitored activity. See 40 CFR 122.11(b), 45 FR 33290, 33428, May 19, 1980. Similarly, today's proposed § 414.13(a) specifies that the pretreatment control authority must specify such monitoring requirements for indirect dischargers.

To date, EPA has not promulgated analytical methods for many of the organic priority pollutants. However, EPA has proposed both GC/MS and GC methods for these pollutants in 44 FR 69464 (December 3, 1979) and expects to promulgate them soon in 40 CFR Part 136. Plants will be required to use promulgated methods, or alternative methods approved by the EPA Administrator under 40 CFR 136.5, to comply with monitoring requirements.

As in the case of other industry regulations, today's proposed regulations do not specify monitoring frequency. The appropriate monitoring frequency for a particular plant depends not only on general categorical factors but also on plant-specific factors such as the size of the plant's flow and the nature of the local receiving waters. Thus, the specification of monitoring frequency is best determined locally on a case-by-case basis.

The proposed regulations do provide some guidance, however, on the appropriate range of monitoring frequencies. They include two sets of limitations; daily maxima and averages of daily values for 4 consecutive monitoring days. Although the regulations don't specify the period over which the 4 consecutive samples must be taken, the 4-day averages were concieved as replacements for the monthly averages that have typically been established in effluent guidelines and standards. EPA considers 4 times per month to be an appropriate frequency for many plants in the industry. A monitoring frequency lower than four times per month may, however, be more appropriate for smaller plants in the industry, given the relatively high cost of monitoring for organic priority pollutants. For metals, a frequency greater than four times per month may be appropriate in some cases.

EPA recognizes that some OCPSF plants do not generate some priority pollutants in their product/processes, and therefore do not discharge some of the priority pollutants that are subject to effluent standards and limitations in the proposed regulations. It would be unreasonable to require such plants to frequently monitor for these pollutants. Therefore, EPA has developed a procedure in proposed § 414.12 whereby the permitting authority (for direct dischargers) or the pretreatment control authority (for indirect dischargers) may reduce monitoring requirements for such pollutants to once per year. Two criteria must be met.

First, the Pollutant must not have been detected during the preceding year at a level exceeding 10 $\mu g/l$ if it has exceeded 10 $\mu g/l$, then it is reasonable to monitor for it frequently enough to assure that it is not being discharged at levels that would violate the applicable limits.

The monitoring data to be considered in making this assessment initially include the data submitted in the permit application (see 40 CFR 122.53, 45 FR 33290 and Form 2C, 45 FR 33516, May 19, 1981) for direct dischargers, and the initial reporting requirements for indirect dischargers (see § 403. 12(b)). Subsequently, plants seeking reduced monitoring requirements will need to submit compliance monitoring data so that the control authority can determine whether the first criterion for reduced monitoring is met. In addition, the plant must certify that the 10 $\mu g/l$ level has not been exceeded in any monitoring that it has performed.

The second criterion for granting reduced monitoring requirements is a finding, based upon the product/processes used at the plant, that the pollutant in question is not likely to be discharged above the concentration level set forth in the applicable effluent limitation or standard. This criterion is based upon the fact that at most OCPSF plants, the nature of the product/process mix and the resultant discharge do not remain constant. Even "representative" monitoring data, unless taken very frequently at considerable expense, will not indicate the full potential for priority pollutant discharges from the plant. An analysis of product/processes, based upon information provided by the plant, will assist the control authority in identifying the potential for priority pollutant discharges not revealed by the monitoring data available for the preceeding year. The proposed regulations also direct the permitting or control authority to separately consider which product/processes were operating when the monitoring data was gathered, thereby providing a better understanding of the potential sources of priority pollutant discharges at the plant.

The analysis of the likelihood of priority pollutant discharges above regulatory levels will be made not only by the permitting or pretreatment control authority, but also by the plant, through the submission of certification. It is of course essential that the appropriate authority review the relevant information and satisfy itself that such discharges are not likely to occur. However, the plant may have knowledge of additional facts not considered by the authority which indicate that such discharges will occur. An example of this is contaminants of raw materials. Plants are often aware of the general levels of particular priority pollutants that contaminate their raw materials. Such information may be obtained by sampling raw materials for quality control or by repeatedly obtaining raw materials from a sole source over and extended period of time. The authority would generally not be aware of such a potentially significant source of priority pollutant discharges at the plant.

EPA invites comment on its proposed monitoring reduction regulations, including the once-per-year minimum monitoring requirement, the likelihood that the reduction will result in undetected permit violations, and the efficiency and reasonableness of the certification requirement.

EPA has estimated the costs of monitoring to comply with the BAT and PSES regulations. EPA estimates that a uniform monitoring requirement of once per month for all direct and indirect dischargers would result in total annual costs of $5,400,000 for BAT and $8,800,000 for PSES. This estimate assumes a cost of $800 per sample. EPA has not included this cost in the cost summaries and economic impact analyses prepared for today's proposed regulations. (However, the monitoring costs per plant are relatively low and are not expected to create significant economic impacts). Prior to final promulgation, EPA intends to develop a reasonable monitoring scenario (*e.g.*, assuming that a certain percentage of plants will monitor four times per month, others twice per month, and others once per month). This will be used to develop monitoring costs to be included in the total cost estimates and economic impact analyses that will be prepared to support the final regulation. EPA solicits comments on reasonable scenarios for this costing exercise.

XII. Best Management Practices

Section 304(e) of the Clean Water Act authorizes the Administrator to prescribe "best management practices" ("BMPs"). EPA may develop BMPs that apply to all industrial sites or to a designated industrial category, and may offer guidance to permit authorities in establishing management practices required by unique circumstances at a given plant.

Although EPA is not proposing them at this time, future BMPs could require dikes, curbs or other measures to contain leaks and spills and could require the treatment of toxic pollutants in these wastes.

XIII. Regulatory Status of Pollutants

A. Priority Pollutants Regulated

The priority pollutants the Agency is proposing to regulate at BAT and NSPS for the Plastics Only and Not Plastics-Only subcategories are set forth in Appendix B to this preamble. The priority pollutants the Agency is proposing to regulate at PSES and PSNS are a subset of the pollutants regulated at BAT and NSPS and are indicated in Appendix B by asterisks.

B. Priority Pollutants Not Regulated

1. *Paragraph 8 Exclusions.* Paragraph 8 of the Settlement Agreement contains provisions authorizing EPA to exclude toxic pollutants and industry subcategories from regulation under certain circumstances. Paragraph 8(a)(iii) authorizes the Administrator to exclude from regulation: Toxic pollutants not detectable by Section 304(h) analytical methods or other state-of-the-art methods; toxic pollutants present in amounts too small to be effectively reduced by available technologies; toxic pollutants present only in trace amounts and neither causing nor likely to cause toxic effects; toxic pollutants detected in the effluent from only a small number of sources within a subcategory and uniquely related to only those sources; toxic pollutants that will be effectively controlled by the technologies upon which are based other effluent limitations and standards; or toxic pollutants for which more stringent protection is already provided under Section 307(a) of the Act. Appendix C to this preamble lists the 18 toxic pollutants proposed for exclusion from these regulations for the Plastics Only and Not Plastics-Only subcategories pursuant to these criteria. The 18 toxic pollutants proposed for exclusion from these regulations are pesticides which, as discussed previously, are not produced as products or co-products and are unlikely to appear as raw material contaminants in OCPSF product/processes. Therefore, they are not likely to be present in OCPSF process wastewater discharges. (As noted previously, they may occasionally appear in discharges that contain OCPSF effluents, but their appearance results from Non-OCPSF-process sources.)

2. Pollutants That Do Not Pass Through POTWs

Some pollutants were excluded from the PSES and PSNS regulations because they were determined not to pass through or interfere with, and are not otherwise incompatible with, the operation of POTWs. These 28 toxic pollutants are listed in Appendix D to this preamble.

3. Priority Pollutants of Concern

EPA is not proposing to regulate at this time the priority pollutants listed in Appendix E to this preamble because adequate data ar not avilable (64 pollutants in the Not Plastics-Only subcategory and 98 pollutants in the Plastics Only subcategory). Most of these pollutants have been detected in at least 42 percent of sampled influents or effluents in the screening, verification and 5-plant sampling progams. Furthermore, the industry operates a substantial number of product/processes that, on theoretical grounds relating to raw materials and process chemistry, would be expected to generate these pollutants in their process wastewaters. However, limited information exists on their concentrations in the industry. Therefore, EPA cannot yet establish uniform national standards and limitations controlling the discharge of these pollutants. Nor can EPA yet conclude that any of these pollutants is eligible under Paragraph 8 of the Settlement Agreement to be excluded from regulation.

EPA intends to gather additional data on at least some of these pollutants prior to final promulgation of these regulations. EPA specifically solicits comments from industry, states and the public on whether these priority pollutants are present, at what levels, and what treatment technology could be utilized to achieve effluent limitations and standards for these pollutants. EPA is considering regulating these priority pollutants in the future if warranted by the analysis of additional data.

C. Nonconventional and Nonpriority Pollutants Excluded

The proposed regulations do not address nonconventional pollutants. They also do not address some pollutants that may be covered by the list of toxic pollutants and classes of pollutants but are not specifically listed as priority pollutants. Given the variable mix of organic chemicals, plastics and synthetic fibers produced, and the complex process chemistry that are associated with the OCPSF industry, it is likely that many organic chemical compounds and other nonconventional pollutants are in OCPSF raw wastewaters and, in some cases, discharged. Some of these pollutants are known to be toxic and/or carcinogenic or mutagenic and, if discharged at significant levels, would be of concern. Indeed, some of these pollutants are discharged at significant levels by some plants.

Although EPA is concerned about the potential discharges of nonconventional and non-priority pollutants from OCPSF plants and their impacts on health and the environment, we have not been able to include them in the proposed regulation. As indicated by the foregoing discussion, the development of analytical methods and gathering of treatment data for the priority pollutants alone has been a large task. Addressing a greater list of pollutants than this priority list was beyond the feasible scope of this regulatory effort.

EPA believes that the installation and proper operation of treatment equipment to meet the BPT and BAT limitations for conventional and priority pollutants will, in may cases, be accompanied by reductions in the discharges of nonconventional and non-priority toxic pollutants to BAT levels. However, in cases where nonconventional and non-priority pollutants may be discharged at significant levels even if the proposed limitations are met, permit writers should limit these pollutants on a case-by-case basis. See Section XVII(c) below for a general discussion of case-by-case permit limitation. While EPA did gather some data on nonconventional and non-priority pollutants and parameters (e.g., chemical oxygen demand, total organic carbon and ammonia nitrogen), EPA did not focus upon creating a data base for these pollutants that could be used to establish effluent limitations. (See Section VI of the BPT and BAT Development Documents for further discussion).

D. Conventional Pollutants Excluded

Oil and grease and fecal coliform are not covered in this regulation. High-molecular weight fatty acids and other sources of oil and grease, and fecal coliform are not generally significant in OCPSF discharges.

The permit writing authority is encouraged to review plant data and, if necessary, include limitations for these pollutants in the permit on a case-by-case basis.

XIV. Costs, Economic Impacts, Cost Effectiveness, Regulatory Flexibility, Executive Order 12291, and Science Advisory Board

A. Costs and Economic Impacts

The cost and economic impacts analysis is set forth in the *Economic Analysis of Proposed Effluent Standards and Limitations for the Organic Chemicals and Plastics, Synthetics, and Fibers Industry,* EPA 440/2-83-004. This report details the investment and annual costs for the industry as a whole and for typical plants covered by the proposed regulation. Compliance costs are based on the engineering estimates of the capital requirements and annual operating and maintenance costs for the treatment technologies needed to comply with the proposed regulations.

The estimate BPT compliance costs, EPA modified existing cost curves for publicly owned treatment works (which use biological systems to treat BOD and TSS). Next, these unit treatment costs were combined in a building-block approach to yield the total plant treatment costs for 169 OCPSF facilities. Finally, the costs for the 169 facilities were used to estimate treatment costs for an additional 397 OCPSF direct dischargers.

To estimate BAT compliance costs, EPA developed treatment unit cost curves using standard engineering practice. However, EPA did not directly develop plant-specific treatment costs from these unit costs. Rather, the Agency used a modeling approach to characterize the types of wasteloads, treatment technologies, and compliance costs in the industry. EPA constructed 55 "generalized plant configurations" ("GPCs" are model plants which were configured to represent typical combinations of product/processes and corresponding combined raw wastewater loadings generally found in the OCPSF industry). Information collected on 176 product/processes in the 37 plant verification program provided the data to model combined pollutant loadings and to calculate investment and operating costs for the model facilities. EPA estimated compliance costs for real plants from these results. A detailed explanation of the cost methodology is contained in Section VIII and Appendix G of the BPT Development Document, Section VIII of the BAT Development Document, and Section 4 of the economic impact analysis.

PSES costs were generally developed in the same manner as BAT costs. The costing procedures took account of the fact that fewer pollutants are regulated at PSES than at BAT (since pollutants that do not pass through POTWs are not regulated at PSES).

EPA identified about 1500 facilities that manufacture organic chemicals or plastics, synthetics and fibers. Total investment for BPT, BAT, and PSES is estimated to be $1.7 billion with annual costs of $750 million, including depreciation and interest. These costs are expressed in 1982 dollars and are based on the determination that plants will move from existing treatment to BPT and BAT, from BPT to BAT or from existing treatment to PSES. (In a few instances, a plant may already meet BAT for its priority pollutants but require some expenditure to achieve BPT for its coventional pollutants). Twenty-one product/process closures are projected to occur as a result of these compliance costs. This represents about one percent of the total product/process lines in the industry. EPA estimates that 8 plants may close. These shut-downs and closures are expected to cause a decrease of 493 jobs. This is less than 0.2 percent of a total employment of 295,000. Price increases for the industry will average one percent. Balance of trade effects are insignificant.

The economic analysis assesses the impact of effluent control costs in terms of price changes, plant closures, process line closures, employment effects and balance of trade effects. Incremental impacts to facilities and major product groups were considered. The analysis estimated levels of prices and production volumes in 1985 without the proposed regulations. Impacts were measured as changes from this basis. The analysis also examined the effects of these proposed regulations on individual products and production processes. The Agency developed a model to reflect an important characteristic of the chemical industry: end products of some processes are often used as raw materials in other processes. Thus, the models were programmed so that a forecast for a particular chemical product could be related to forecasts for other chemical products that are upstream (raw material) or downstream (end-product) of that product in various manufacturing routes utilized by the industry.

BPT. A total of 405 facilities are estimated to incur compliance costs. Investment costs for BPT are $316 million with $105 million in annualized costs. There are no significant economic impacts projected as a result of BPT.

BAT. This regulation is estimated to affect 453 of 566 direct dischargers. Investment costs are $520 million and total annual costs $243 million. Five plants and 9 product/process lines are expected to close. Two hundred and thirty-six jobs would be lost due to plant closures and 140 jobs would be lost due to process line shutdowns.

PSES. This regulation is estimated to affect 913 indirect dischargers. Investment costs are $880 million and total annual costs are $403 million. Twelve product/process lines and 3 plants are expected to close. These colusures would result in the loss of 117 jobs.

NSPA/PSNS. The requirements for new sources are identical to those for existing sources. Regulation for new sources will not generate incremental costs or impacts.

These compliance costs are large. As discussed in the Public Comment Summary, several commenters suggested that EPA has underestimated costs of the technologies studied in this regulation. However, the Agency wishes to point out that the aggregate capital and annual cost estimates are possibly overestimated for the reasons discussed below.

First, the technology basis for PSES cost estimation is equivalent to that for BAT. It is possible that many facilities that discharge to POTWs would not use biological treatment for their process wastewater. This could occur for two reasons. Removal credits in individual locations may allow achievement of these proposed standards without the recommneded technology. In addition, less expensive physical/chemical treatment properly designed and operated for specific waste streams could, in many cases, achieve these priority pollutant limitations without relying upon biological treatment. (No PSES standards are set for conventional pollutants, which often require biological treatment).

Second, the incremental cost estimates are based on information supplied to EPA in questionnaires in the late 1970's as to treatment in place. However, the industry has installed a great deal of wastewater treatment equipment since the plants submitted the information. For example, in 1978–1980 alone, capital investments for wastewater treatment in the industry are estimated to be 580 million dollars. Clearly, less incremental treatment will be needed to achieve BAT and PSES than assumed. We will be gathering more information, as discussed in Section XV of this preamble, to improve our estimates of treatment in place.

Third, EPA used very conservative (on the high side) assumptions in developing costs for indirect dischargers. EPA assumed that any plant in our data base that is not known to be a direct discharger is, therefore, an indirect discharger. Since some of these plants actually discharge no process wastewaters, this overestimates total industry costs for pretreatment. EPA expects to collect more information to refine its analysis in this area.

One possible source of potential underestimation of total industry costs is the fact that some plants may have discharges from OCPSF operations of which EPA is unaware. This may occur where OCPSF operations are ancillary to other operations.

B. Cost effectiveness

EPA has conducted an analysis of the incremental removal cost per pound-equivalent for each of the proposed technology-based options. A pound-equivalent is calculated by multiplying the number of pounds of pollutant discharged by a weighting factor for that pollutant. The weighting factor is equal to the aquatic life water-quality criterion for a standard pollutant (copper), divided by the aquatic life water-quality criterion for the pollutant being evaluated. The use of "pound-equivalent" gives relatively more weight to removal of more highly toxic pollutants. Thus for a given expenditure, the cost per pound-equivalent removal would be lower when a highly toxic pollutant is removed than if a less toxic pollutant is removed. This analysis is included in the record of the Organic Chemicals and Plastics and Synthetic Fibers Category. EPA invites comments on the methodology used in this analysis.

C. Regulatory Flexibility Analysis

Public Law 96–354 requires that a Regulatory Flexibility Analysis (RFA) be prepared for regulations proposed after January 1, 1981 that have a significant impact on a substantial number of small entities. The analysis may be done in conjunction with, or as part of, any other analysis conducted by the Agency.

A small business analysis is included in the economic impact analysis. This analysis shows that there will not be a significant impact on any segment of the industry, large or small. Number of employees is the variable used to distinguish firm size. Firms with less than fifty employees were defined as small businesses. The Agency invites comment on this size definition. No significant differential impacts were estimated for small businesses; therefore a formal Regulatory Impact Analysis is not required.

D. Executive Order 12291

Executive Order 12291 requires EPA and other agencies to perform regulatory impact analyses of major regulations. Major rules impose an annual cost to the economy of $100 million or more or meet other economic impact criteria. The proposed regulation for the Organic Chemicals, Plastics and Synthetic Fibers Industry exceeds $100 million annually and thus is a major rule. EPA has prepared a preliminary regulatory impact analysis (RIA) which may be obtained at the address listed at the beginning of this preamble.

The RIA contains an analysis of the effect of the proposed regulations on existing water quality. The analysis has two parts.

The first part of the RIA projects, based upon a modeling approach, water quality impacts for 50 plants located on 40 stream segments across the country. EPA's published water quality criteria for priority pollutants are used to assess water quality impacts. The analysis indicates that existing violations of water quality criteria will be reduced by about 50 percent by the proposed regulations.

The second part of the RIA attempts to assess the specific health and environmental benefits that may result from the proposed regulations in a few selected locations. To date, only two stream segments have been investigated. Neither of these segments has drinking water intakes. The first segment is part of the Kanawha River in West Virginia. Recreational and other non-health benefits are estimated to be in the range of $2.3 to 9.7 million, versus a projected cost for OCPSF plants on that segment of about $5.8 million. The second segment is the Houston Ship Channel. Recreational and commercial fishing benefits are estimated at less than $1 million, versus costs of about $25 million. However, this segment is considered to present a worst-case scenario in terms of benefits due to its heavy use by ocean-going vessels, its physical characteristics, and the fact that OCPSF plants are not the major sources of pollution within the area. In both areas, reduction in human health risks from commercial fishing and volatilization of organic compounds has been estimated to be quite small. However, some additional reduction in human health risks due to subsistence fishing along the channel's lateral bays is anticipated but could not be quantified in the study. EPA expects to study at least two additional stream segments prior to final promulgation. In particular, EPA hopes to analyze the effect of the regulation upon human health risks caused by drinking water taken from the receiving water bodies.

This regulation was submitted to the Office of Management and Budget for review, as required by Executive Order 12291. Any comments from OMB to EPA and any EPA response to those comments are available for public inspection at the EPA Public Information Reference Unit at the address listed above in this preamble.

E. Science Advisory Board

Pursuant to the provisions of the Environmental Research, Development and Demonstration Authorization Act (ERDDAA) of 1978, 42 U.S.C. 4365, EPA's Science Advisory Board has reviewed certain technical aspects of these proposed regulations. The SAB is currently reviewing these technical issues and is preparing a report to the Administrator. Copies of this report will be made publicly available.

XV. Collection of Additional Data

As explained at various points throughout this preamble, EPA has expended considerable resources to characterize the OCPSF industry in terms of product/process operations, raw waste loads, technologies in place, effectiveness of technologies, unit and plant costs to meet target limits, economic impacts, and other relevant factors. The industry is large and complex and EPA has attempted to obtain data that is representative of the industry with respect to these many factors and to appropriately characterize the industry.

Throughout the development of this rulemaking, members and representatives of the regulated industry have expressed concern that, despite extensive data gathering, the data base is incomplete and fails to adequately address certain types of plants and discharges. While the Agency believes that the data base is adequate to support the proposed regulation, the Agency welcomes the submission of any data that confirm, supplement or contradict elements of our data base.

To further assure the regulated community that the final regulations will be supported by an adequate and representative date base, EPA will gather additional data from OCPSF plants under the authority of Section 308 of the CWA. This effort will consist of two parts: a sampling and analysis of a limited number of plants to supplement our technical data base, and a questionnaire soliciting information to supplement our data base on costs and potential economic impacts.

The sampling and analysis program will be designed to enhance EPA's technical data base. It will cover the following areas:

1. Supplemental end-of-pipe data on regulated pollutants to increase the number of data points reflecting BAT treatment.

2. Data on unregulated priority pollutants and on several nonconventional pollutant parameters such as TOC, COD, ammonia and certain other parameters believed to be discharged in significant amounts, to determine whether any of these parameters are in fact discharged in significant amounts and need to be regulated and, if so, to establish appropriate limitations.

3. Raw waste load data and treated effluent data for plants using product/processes not previously sampled by, EPA.

4. Data on raw waste loads from product/processes not covered by the verification study.

5. Additional data on physical/chemical treatment system performance, both in-plant and end-of-pipe (*e.g.*, as used by many indirect dischargers).

6. Additional long-term (at least 15 days) data to obtain additional information to be used to develop variability factors for both organic and metal priority pollutant concentrations in treated effluents.

EPA has already selected some plants for future study. Some important criteria for plant selection include: The potential to discharge priority pollutants (based upon a review of product/processes used) for which additional information is sought; the proper operation of appropriate treatment technologies for those pollutants; the use of physical/chemical systems known to be effective in treating those pollutants; and the operation of product/processes not previously sampled, but which have some potential for generating priority pollutants. A major consideration is whether a plant combines several of these criteria, thereby providing a maximum amount of information per plant visit.

The questionnaire will be directed at factors that affect technology and costs to comply with the limitations and the impact of those costs. It would update information received in response to the previous BAT questionnaire as well. The questionnaire would validate or update existing information with basic questions concerning current discharge status (direct, indirect or zero), flows, end-of-pipe influent and effluent loadings, operation characteristics (e.g., number of production days annually), and treatment in place. This information would be used to update and broaden our data base on the costs to be incurred by plants to comply with the BAT regulations. Indirect discharges would also be asked to set forth the user fees that they now pay to POTWs to provide a complete picture of their wastewater treatment costs.

The questionnaire would also request information that is relevant to predicting economic impacts. This would include plant size, product mix, production levels, volume of sales, and product prices. It would also cover new capital investment for production and for pollution control, capacity utilization and employment.

As mentioned previously, EPA believes that our current estimates of costs and resulting economic impacts are significantly overestimated. Additional information of the type outlined above should reduce such overestimates.

The Agency requests that comments on the additional data collection activities be submitted as soon as possible for immediate use in program planning activities.

XVI. Non-Water Quality Environmental Impacts

The elimination or reduction of one form of pollution may create or aggravate other environmental problems. Therefore, sections 304(b) and 306 of the Act require EPA to consider the non-water quality environmental impacts (including energy requirements) of certain regulations. In compliance with these provisions, EPA has considered the effect of these regulations on air pollution, solid waste generation, and energy consumption.

The following are the non-water quality environmental impacts associated with the proposed regulations:

A. *Air Pollution*—The effect of BPT, if viewed alone, would likely be a moderate increase in concentrations of hazardous air pollution in the immediate vicinity of some OCPSF industry plants. This would be the result of plants installing or upgrading the performance of aerated lagoons, activated sludge basins and neutralization basins and thus more effectively driving off volatile organic compounds. This effect would be more than offset, however, by moving to BAT, because we expect many plants to comply with the BAT Limits by installing in-process controls that effectively remove volatile organic compounds before they reach the end-of-pipe controls. Thus, we expect a net decrease in both air loadings and concentrations of volatile organic compounds from BPT and BAT combined, and we expect similar effects as a result of PSES as well.

B. *Solid Waste*—EPA has considered the effect these proposed reguations would have on the accumulation of solid waste, including hazardous waste defined under Section 3001 of the Resource Conservation and Recovery Act (RCRA). EPA estimates that the total solid waste, including hazardous waste, generated as a result of the proposed regulations will increase insignificantly compared to current levels.

EPA's Office of Solid Waste has analyzed the hazardous waste management and disposal costs imposed by the RCRA requirements and has published some results in 45 FR 33066 (May 19, 1980). Additional cost estimates for land disposal of hazardous wastes were published in 47 FR 32274 (July 26, 1982). Thirty solid waste streams currently generated at OCPSF plants have been listed as hazardous under Section 3001 of RCRA (See 40 CFR Part 261.32). Other waste streams not listed may be hazardous by virtue of possessing characteristics of ignitability, corrosivity, reactivity or toxicity (see 40 CFR 261.21-.24, 45 FR 33066, May 19, 1980). The annual increase in RCRA costs due to these proposed reguations is estimated to be $9 million, or approximately one percent of the total current estimated annual cost for the industry.

C. *Energy Requirements*—EPA estimates that the attainment of proposed BPT, BAT, NSPS, and PSNS will increase energy consumption by a small increment over present industry use.

Further details are set forth in Sections VIII and IX of the BPT Development Document and Sections VIII and IX of the BAT Development document.

XVII. Regulatory Implementation

A. Upset and Bypass Provisions

A recurring issue is whether industry limitations and standards should include provisions authorizing noncompliance with effluent limitations duirng periods of "upset" or "bypass." An upset, sometimes called an "excursion," is an unintentional noncompliance occurring for reasons beyond the reasonable control of the permittee. EPA believes that upset provisions are necessary because such upsets will inevitably occur due to limitations in control technlolgy. Because technology-based limitations can require only what technology can achieve, it is claimed that liability for such situations is improper. When confronted with this issue, courts have been divided on the question of whether an explicit upset or excursion exemption is necessary or whether upset or excursion incidents may be handled through EPA's exercise of enforcement discretion. Compare *Marathon Oil Co.* v. *EPA*, 564 F.2d 1253 (9th Cir. 1977) with *Weyerhaeuser* v. *Costle*, 590 F.2d 1011 (D.C. Cir. 1978). See also *American Petroleum Institute* v. *EPA*, 540 F.2d 1023 (10th Cir. 19176); *CPC International, Inc.* v. *Train*, 540 F.2d 973 (4th Cir. 1976)); *FMC Corp.* v. *Train*, 539 F.2d 973 (4th Cir. 1976).

While an upset is an unintentional episode during which effluent limits are exceeded, a bypass is an act of intentional noncompliance during which waste treatment facilities are circumvented in emergency situations.

EPA has both upset and bypass provisions in NPDES permits, and has promulgated NPDES reguations which include upset and bypass permit provisions. (See 45 FR 33290, 33448; 40 CFR 122.60(g)(h), May 19, 1980). The upset provision establishes an upset as an affirmative defense to prosecution for violation of technology-based effluent limitations. The bypass provision authorizes bypassing to prevent loss of life, personal injury, or severe property damage. Since permittees in the OCPSF industry will be entitled to upset and bypass provisions in NPDES permits, these proposed regulations do not specifically repeat these provisions.

B. Variances and Modifications

Upon the promulgation of these regulations, the numerical effluent limitations for the appropriate subcategory must be applied in all Federal and State NPDES permits issued to direct dischargers in the OCPSF industry. In addition, the pretreatment standards are directly applicable to indirect dischargers.

For the BPT effluent limitations, the only exception to the binding limitations is EPA's "fundamentally different factors" variance. (See *E. I. duPont de Nemours and Co.* v. *Train*, 430 U.S. 112 (1977)). This variance recognizes factors concerning a particular discharger which are fundamentally different from the factors considered in this rulemaking. Although this variance clause was set forth in EPA's 1973-1976 industry regulations, it is now included in the NPDES regulations and not the specific industry regulations. (See the NPDES regulations at 40 CFR Part 125 Subpart D; 44 FR 32854, 32893 (June 7, 1979) for the text and explanation of the "fundamentally different factors" variance).

Discharges subject to the BAT limitations proposed in these regulations also are subject to EPA's "fundamentally different factors" variance. In addition, BAT limitations for nonconventional pollutants may be modified under Section 301(c) and 301(g) of the Act. Under Section 301(1) of the Act, these statutory modifications are not applicable to "toxic" or conventional pollutants.

Discharges subject to pretreatment standards for existing sources are subject to the "fundamentally different factors" variance and credits for pollutants removed by POTWs (See 40 CFR 403.7 and 403.13; 46 FR 9404 (January 28, 1981)). Discharges subject to pretreatment standards for new sources are subject only to the credit provision (See 40 CFR 403.7; 46 FR 9404 (January 28, 1981)). New sources subject to NSPS are not eligible for EPA's "fundamentally different factors" variance or any statutory or regulatory modifications. (See *duPont* v. *Train*, *supra*).

C. Relationship to NPDES Permits

The BPT and BAT limitations and NSPS in this regulation will be applied to individual plants through NPDES permits issued by EPA or approved State agencies under Section 402 of the Act. The preceding section of this preamble discussed the binding effect of this regulation on NPDES permits, except when variances and modifications are expressly authorized. This section adds more detail on the relationship between this regulation and NPDES permits.

One subject of interest is the scope of NPDES permit proceedings when effluent limitations and standards do not exist. Under current EPA regulations, States and EPA regions that issue NPDES permits before regulations are promulgated must do so on a case-by-case basis. This regulation provides a technical and legal base for new permits.

Another issue is how the regulation affects the authority of those that issue NPDES permits. EPA has developed the limitations and standards in this regulation to cover the typical facility for this point source category. In specific cases, the NPDES permitting authority may have to establish permit limits on pollutants that are not covered by this regulation. The regulation does not restrict the power of any permit-issuing authority to comply with law or any EPA regulation, guideline, or policy. For example, if this regulation does not control a particular pollutant, the permit issuer may still limit the pollutant on a case-by-case basis, when such action conforms with the puposes of the Act. Similarly, although this regulation does not set a national limit to require flow reduction due to insufficient data, a permit writer may set a limit for flow where required to achieve effective removals of priority pollutants. In addition, if State water quality standards or other provisions of State or Federal law require limits on pollutants not covered by this regulation (or require more stringent limits on covered pollutants), the permit-issuing authority *must* apply those limitations. (See the detailed discussion immediately below).

A final topic of concern is the operation of EPA's NPDES enforcement program, many aspects of which have been considered in developing this regulation. The Agency emphasizes that although the Clean Water Act is a strict liability statute, the initiation of enforcement proceedings by EPA is discretionary (*Sierra Club* v. *Train*, 557 F. 2d 485, (5th Cir., 1977). EPA has exercised and intends to exercise that discretion in a manner that recognizes and promotes good-faith compliance.

D. Relationship of the Proposed Technology-Based Regulations to the Water Quality and Hazardous Waste enforcement Actions

As discussed throughout this preamble, the regulations proposed today are uniform technology-based limits for the OCPSF industry. In some situations, however, local water quality or other environmental factors may, under a variety of legal authorities, require more stringent limitations to be set for OCPSF process wastewater discharges as well as other discharges resulting initially from OCPSF operations (*e.g.*, discharges of chemical wastes from landfills and lagoons, or discharges by POTWs that receive wastewater from OCPSF operations). In these cases, limitations may be set in permits, judicial decrees or other legally binding documents that are lower (*i.e.*, more stringent) than the limits set forth in these proposed BPT, BAT and pretreatment standards. In a number of hazardous waste enforcement actions, EPA has sought, pursuant to various statutory authorities, to abate the migration of substances that may create an "imminent and substantial endangerment" to the public health or the environment in particular locations. Statutory authorities used to bring such actions include Section 504 of the Clean Water Act, 33 U.S.C. 1364, Section 7003 of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. 6973, Section 106 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. 9606 and Section 1431 of the Safe Drinking Water Act, 42 U.S.C. 300i. Many of the chemicals of concern in these cases are priority pollutants that are subject to limitations in today's proposed regulations. In these cases, EPA is often seeking (and in some cases has already obtained in judicial decrees) limits that are lower that those contained in today's proposed regulation. These lower limits are based on unique site-specific determinations of the nature and degree of local endangerment of human health, water quality and other environmental effects.

The remedies that EPA has obtained in these cases vary from site to site and the limits on the chemicals may vary depending upon the toxicity of the chemical, the presence of other chemicals, the degree of exposure and other relevant information. Such site-specific determinations are based on a substantial amount of site-specific information, including often the presence of a definable population at risk. In such cases, these determinations, rather than today's proposed regulations, will be used to develop appropriate limits for the discharges in question.

Another authority for more stringent limits than those proposed today is water quality standards, which are generally established by States under Section 303 of the Clean Water Act, 33 U.S.C. 1302. A water quality standard limits the ambient concentration of a particular chemical that is permitted in a particular water body. The purpose of water quality standards is to protect the public health or welfare, ehance the quality of water and generally serve the purposes of the Act. Based on water quality standards, NPDES permits may contain effluent limits that are more stringent than the guideline limits. Other legal authorities may compel consideration of water quality in determining discharge limits, as discussed immediately below.

The most significant and comprehensive example of the need to make such site specific water quality determinations is EPA's onging Niagara Frontier Agenda. Concerns about the discharges of toxic chemicals to the Niagara River have been noted since 1973. International Joint Commission, Special Report on the Niagara River at 3 (1981).

In response to specific problems along the Niagara, EPA initiated litigation, *e.g.*, *United States et al.* v. *The City of Niagara Falls*, Civ. Act. No. 81-363 (W.D.N.Y., May 6, 1981) and *United States et al.* v. *Hooker Chemicals & Plastic Corp. et al. (Hyde Park Landfill)*, Civ. Act. No. 79-989 (W.D.N.Y., Dec. 20 1979). (A consent decree settling this case was entered April 30, 1982.) EPA has also used CERCLA to investigate or remedy other problems, as in the case of the Love Canal CERCLA remedial action program.

In recognition of the potential for area-wide effects along the Niagara River and in Lake Ontario and the need to co-ordinate regulatory responses, EPA and the State of New York, in consultation with the government of Canada, have initiated the Niagara Frontier Agenda. This effort is designed to more accurately identify the source and quantities of toxic chemicals entering the Niagara River and, utilizing the best scientific information available, reduce the discharges of toxic chemicals as required by law.

In addition to the domestic statutes that govern the discharge of substances to the Niagara River, the 1909 Treaty Between the United States and Great Britain Relating to Boundary Waters, and Questions Arising Between the United States and Canada (1909 Boundary Waters Treaty) requires that boundary waters "shall not be polluted on either side to the injury of the health or property of the other." Article IV of the 1909 Boundary Waters Treaty. The United States "has standing * * * also to carry out treaty obligations [pursuant to the 1909 Boundary Waters Treaty] to a foreign power bordering upon some of the Lakes concerned * * *" *Sanitary District* v. *United States*, 266 U.S. 405, 425–6 (1924).

In addition, the 1978 Agreement Between the United States and Canada on Great Lakes Water Quality (1978 Great Lakes Agreement) sets out specific and general water quality objectives for the boundary waters and requires that any regulations promulgated by either country "shall be consistent with the achievement of the General and Specific Objectives." Article V of the 1978 Great Lakes Agreement. The treaty and international agreement indicate the unique character of the Niagara River as an international water body.

The Niagara Frontier Agenda provides a concrete example of how site-specific factors may require more stringent effluent limits, as well as how the unique international status of a water body may require additional obligations.

In regard to the above considerations, it should be noted that although today's proposed regulations use a floor of 50 μg/l for organic priority pollutant limits for a variety of reasons, detection limits for most organic priority pollutants are in the range of 0.1 to 10 μg/l, depending on the method used. Indeed, limitations at very low μg/l ranges have been agreed to by several chemical companies in hazardous waste consent decrees, *e.g., United States* v. *Fike Chemical Inc., et al.*, Civ. Act. No. 80–2497 (S.D.W.Va., entered Nov. 16, 1982) and *United States et al.* v. *Hooker chemicals & Plastics Corp. et al. (Hyde Park Landfill)*, Civ. Act. No. 79–989 (W.D.N.Y., entered April 30, 1982). Careful attention to detail in performing analyses (*e.g.*, the use of appropriate sample cleanup procedures and of confirmatory techniques to resolve interferences) should result in acceptable precision and accuracy even at these low levels. Where necessary to protect the public health and the environment, consent decrees in such enforcement actions may appropriately require the detection of organic chemicals in low concentrations.

XVIII. Summary of Public Participation

In December, 1981 the Agency circulated a draft contractor's report describing the data gathering efforts in support of today's proposed BPT regulations. The report was distributed to trade associations, environmental groups, individual companies in the OCPSF industry, states and EPA regions.

In April, 1982 the Agency similarly distributed a draft contractor's report describing the data gathering efforts in support of the proposed BAT, NSPS, PSES, and PSNS regulations.

In addition the agency has conducted public seminars on its analytical methods. The Agency has also conducted workshops concerning the special problems of incorporating these proposed regulations into NPDES permits.

The Agency has met frequently with representatives of the industry and environmental groups.

Written comments were solicited concerning the draft contractor's reports. Additional written comments have been received by the Agency. A summary of major comments received to date is presented in Appendix F to this proposed regulation.

XIX. Solicitation of Technical and Economic Data and Comment on Other Aspects of this Proposed Regulation

EPA invites and encourages public participation in this rulemaking. The Agency asks that any deficiencies in the record of this proposal be pointed to with specificity and requires that suggested revisions or corrections be supported by relevant data.

Throughout this preamble, EPA has requested data and comments with respect to a variety of technical and policy issues. We reiterate those requests here. Set forth below is a summary of the major areas in which additional comments and information are solicited. Supporting data should be submitted wherever appropriate.

(1) EPA is considering, as a basis for final TSS limitations, an additional BPT technology for solids control (i.e. defining "average-of-the best" TSS control as biological treatment followed by effective solids control). If EPA decides to use this technology, those biological systems that are not followed by adequate physical/chemical solids control systems would be deleted from the BPT TSS data base. The Agency invites comments on this approach and solicits data on the use and effectiveness of polishing ponds, filters and other treatment technologies used to reduce TSS loadings from biological treatment systems.

(2) EPA has concluded that its BPT subcategorization will not, in practice, improperly group together plants that cannot practicably achieve the required limitations. EPA requests comment on this conclusion.

(3) EPA requests comments on the likelihood that some plants will shift subcategories by adding or deleting particular product/processes. For which specific plants is this a significant possibility?

(4) EPA's BPT subcategorization approach bases subcategories on the product/processes that contribute raw waste loadings of BOD, and sets concentration limitations at the end of the pipe, giving full credit for any treatment or control taking place prior to that point. An alternative suggested approach would subcategorize based on BOD and/or TSS levels in the influent to the end-of-pipe treatment system, and set percent reduction limits. The Agency invites comments on the advantages and disadvantages of these approaches.

(5) EPA invites comments on its consideration of simplifying the BPT subcategorization scheme by combining certain subcategories.

(6) EPA solicits comments regarding its unit costs (*i.e.*, CAPDET municipal treatment model modified to reflect OCPSF unit costs). EPA used this model to estimate compliance costs for proposed BPT limitations. Alternative unit costs were offered without an explanation of their basis. The Agency solicits specific actual costs, how they were calculated, what assumptions were used in the calculations, and what they were incurred for.

(7) EPA invites comments identifying OCPSF plants that experience significant difficulties meeting the BPT limitations and standards because ambient temperatures are too high (specifically, detailed explanations as to how high ambient temperatuare makes meeting the proposed limitations infeasible).

(8) EPA solicits comments on the suitability of its regulatory and costing approach for plants that presently comply with BOD but not with TSS, and presently have no biological treatment in place.

(9) EPA solicits additional information on the performance of BPT systems in the Oxidation subcategory with respect to TSS.

(10) EPA devised a method to determine which priority pollutants are likely to be discharged from particular product/processes. This method was used to assist EPA in technical data gathering efforts for the proposed BAT limitations. The Agency solicits information to improve its priority pollutant pathway scheme.

(11) EPA seeks information on existing product/processes having raw wasfe loadings for particular priority pollutants so high that achieving the proposed BAT limitations is infeasible economically. Specifically, what are these product/processes, what concentrations of what pollutants are being generated, and what difficulties

prelude the achievability of the proposed BAT limitations?

(12) EPA solicits information on product/processes discharging, at significant levels, priority pollutants that are not limited in the proposed BAT regulations. Specifically, what are these product/processes, and what priority pollutants do they discharge, at what levels?

(13) EPA solicits comments on its determination that, for the OCPSF industry, some priority pollutants do not pass through POTWs.

(14) EPA invites information on additional pollutants that the public or industry believes should be subject to PSES standards to prevent interference with POTW operations. EPA also invites comment on whether cadmium PSES standards are necessary to prevent interference with particular POTWs' chosen sludge disposal practices.

(15) EPA welcomes comment on the proposed PSES compliance date of three years from the date of promulgation.

(16) EPA solicits information on priority pollutants not regulated—whether they are present, and at what levels. The Agency would also like suggestions as to what treatment technologies could be utilized to achieve effluent standards and limitations for these pollutants.

(17) EPA invites comments on the methodology used in its analysis of the incremental removal cost per pound equivalent for these limitations and standards. (This analysis is included in the record of the OCPSF Category.)

(18) EPA invites comments on its size definition (firms with less than fifty employees were defined as small businesses). EPA's economic impact analysis shows that there will not be a significant impact on any segment of the industry, large or small. The Agency solicits information from small plants that would suffer economically from the proposed regulations (including factual reasons as to why they would suffer)

(19) EPA invites industry to submit data that would fill any gaps that they believe still remain in the data base. EPA also solicits additional data on variability to supplement the existing data base.

(20) If any information submitted to EPA is not now representative of a particular facility, EPA specifically solicits comments and additional information more representative of current practice.

(21) EPA solicits data that would contribute to the improvement of its modeling effort evaluating the performance of treatment technologies, as well as to the design of the generalized plant configurations. EPA welcomes the submission of additional biological treatment K-rate data by industry.

(22) EPA solicits operating and analytical information on powdered activated carbon performance in removal of toxic pollutants.

(23) EPA welcomes the submission of additional data to make possible a review of the technical assumptions of the model describing the performance of activated carbon, steam stripping, and ion exchange.

(24) EPA solicits data from the regulated industry (particularly from any plants that have installed any of the technologies evaluated as BAT) to be used in further cost curve development. The data should include details of design, unit costs, labor, any assumptions in calculating costs of capital, and other information of the type used in EPA's present cost modeling.

(25) EPA continually solicits data and product/process waste loads and toxic waste loads that could be added to the computed master process file catalogue. Data should be submitted showing the waste sampled, their source, the analytical method used, the compounds analyzed for, the compounds detected, and a quantitative measure of the compounds detected.

(26) EPA solicits comments and analytical methods data on the appropriateness of the 50 $\mu g/l$ lower limit used in the proposed regulation.

(27) EPA welcomes comments on whether and how to develop and implement a compliance program or a general policy that recognizes the problems of analytical variability.

(28) EPA invites comment on the proposed monitoring reduction strategy, including the once-per-year minimum monitoring requirement, the likelihood that the reduction will result in undetected permit violations, and the efficiency and reasonableness of the certification requirement.

(29) To determine the economic impact of this regulation, the Agency has calculated the cost of installing BPT, BAT, PSES, NSPS and PSNS for model plants and each manufacturing facility for which data was available. The details of the estimated costs and economic impacts are presented in the Technical Development Document and in the Economic Impact Analysis. The Agency estimates that no significant economic impacts will result from the proposed regulation. Much of the data used in the analysis is from publicly available information, independent estimates from private sources, and technical data submitted to the agency. Because the Agency did not have plant specific data on production costs, costs of capital, sales and prices and other financial measures, the Agency used industry averages, ranges, or analytical results to estimate compliance costs and economic impacts. The agency invites comments, supported by appropriate data, on these analyses. The Agency particularly seeks comments on whether the incremental costs are achievable, especially at small or secondary producers of organic chemicals. Commenters are requested to address not only the potential for plant closure or process shut downs, but also the effects of the regulation on capacity expansion, production costs, cost of capital for environmental control, product prices, and profitability. We solicit specific data on these factors.

(30) The Agency requests comments and suggestions on the economic impact analysis methodology. In particular, we solicit specific comments concerning the product/process supply-demand analysis, the closure methodologies, and estimation of treatment costs for facilities.

The reporting provisions in this rule will be submitted for approval to the Office of Management and Budget under Section 3504(h) of the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 et seq. Any final rule will explain how its reporting provisions respond to any Office of Management and Budget or public comments.

List of Subjects in 40 CFR Part 414

Chemicals, Waste treatment and disposal, Water pollution control.

Dated: February 28, 1983.

Anne M. Burford,

Administrator.

Appendix A—Abbreviations, Acronyms, and Other Terms Used in this Notice

Act—The Clean Water Act.

Agency—The U.S. Environmental Protection Agency.

BAT—The best available technology economically achievable, applicable to effluent limitations to be achieved by July 1, 1984, for industrial discharges to surface waters, as defined by Section 304(b)(2)(B) of the Act.

BAT Development Document—Development Document for Proposed Effluent Limitations Guidelines and Standards for the Organic Chemicals and Plastics and Synthetic Fibers Point source Category, Vol. II (BAT), EPA 440/1–83/009–b.

BCT—The best conventional pollutant control technology, applicable to discharges of conventional pollutants from existing industrial points sources, as defined by Section 304(b)(4) of the Act.

BMP—Best management practices, as defined by Section 304(e) of the Act.

BPT—The best practicable control technology currently available, applicable to effluent limitations to be achieved by July 1, 1977, for industrial discharges to surface waters, as defined by Section 304(b)(1) of the Act.

BPT Development Document—Development Document for Proposed Effluent Limitations Guidelines and Standards for the Organic Chemicals and Plastics and Synthetic Fibers Point Source Category, Vol. I (BPT) EPA 440/1–83/009–b.

Clean Water Act—The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1251 et seq.), as amended by the Clean Water Act of 1977 (Pub. L. 95–217).

Consent Decree—See Settlement Agreement.

Conventional Pollutants—Constituents of wastewater as determined by Section 304(a)(4) of the Act, including, but not limited to, pollutants classified as biochemical oxygen demand, suspended solids, oil and grease fecal coliform, and pH.

Direct Discharger—An industrial discharger that introduces wastewater to a receiving body of water with or without treatment by the discharger.

Economic Analysis—*Economic Analysis of Proposed Effluent Standards and Limitations for the Organic Chemicals and Plastics, Synthetics, and Fibers Industry,* EPA 440/2–83–004.

Effluent Limitation—A maximum amount, per unit of time, production or other unit, of each specific constituent of the effluent that is subject to limitation from an existing point source. Allowed pollutant discharge may be expressed as a concentration in milligrams per liter (mg/l) or micrograms per liter (μg/l).

End-of-Pipe Treatment (EOP)—Refers to those processes that treat a combined plant wastestream for pollutant removal prior to discharge. EOP technologies covered are classified as primary (physical separation processes), secondary (biological processes), and tertiary (treatment following secondary) processes. Different combinations of these treatment technologies may be used depending on the nature of the pollutants to be removed and the degree of removal required.

GPCs—Generalized plant configurations, used for costing purposes, defined as model plants which were configured to represent typical combinations of product/processes and corresponding generally found in the OCPSF industry.

Indirect Discharger—An industrial discharger that introduces wastewater into a publicly owned treatment works.

In-plant Control or Treatment Technologies—Controls or measures applied within the manufacturing process to reduce or eliminate pollutant and hydraulic loadings of raw wastewater. Typical in-plant control measures include process modification, instrumentation, recovery of raw materials, solvents, products or by-products, and water recycle.

Nonconventional Pollutants—Parameters selected for use in developing effluent limitation guidelines and new source performance standards which have not been previously designated as either conventional pollutants or toxic pollutants.

Non-Water Environmental Quality Impact—Deleterious aspects of control and treatment technologies applicable to point source category wastes, including, but not limited to air pollution, noise, radiation, sludge and solid waste generation, and energy used.

NPDES—National Pollutant Discharge Elimination System, a Federal program requiring industry and municipalities to obtain permits to discharge plant effluents to the nation's water courses, under Section 402 of the Act.

NSPS—New source performance standards, applicable to industrial facilities whose construction is begun after the publication of the proposed regulations, as defined by Section 306 of the Act.

OCPSF—Organic chemicals, plastics, and synthetic fibers manufacturing point source category.

Point Source Category—A collection of industrial sources with similar function or product, established by Section 306(b)(1)(A) of the Federal Water Pollution Control Act, as amended for the purpose of establishing Federal standards for the disposal of wastewater.

POTW—Publicly owned treatment works, facilities that collect, treat, or otherwise dispose of wastewaters, owned and operated by a village, town, county, authority, or other public agency.

Pretreatment Standard—Industrial wastewater effluent quality required for discharge to a publicly-owned treatment works.

Product/Process— A product definition specifying both the raw material and the generic process by which it is produced.

PSES—Pretreatment Standards for existing sources of indirect discharges, under Section 307 (b) of the Act.

PSNS—Pretreatment standards for new sources of indirect discharges, under Section 307 (b) and (c) of the Act.

RCRA—Resources Conservation and Recovery Act (Pub. L. 94–580) of 1976 Amendments to Solid Waste Disposal Act.

Revised Settlement Agreement—A rewritten form of the Settlement Agreement which described provisons authorizing the exclusion from regulation, in certain industries, of toxic pollutants and industry subcategories.

Settlement Agreement—Agreement entered into by EPA with the Natural Resources Defense Council and other environmental groups and approved by the U.S. District Court for the District of Columbia on June 7, 1976. One of the principal provisions of the Settlement Agreement was to direct EPA to consider an extended list of 65 classes of toxic pollutants in 21 industrial categories in the development of effluent limitations and guidelines and new source performance standards.

SIC—Standard Industrial Classification, a numerical categorization scheme used by the U.S. Department of Commerce to denote segments of industry.

Toxic Pollutants—All compounds specifically named or referred to in the Settlement Agreement, as well as recommended specific compounds representative of the nonspecific or ambiguous groups or compounds named in the agreement. This list of pollutants was developed based on the use of criteria such as known occurrence in point source effluents, in the aquatic environment, in fish, in drinking water, and through evaluations of carcinogenicity, other chronic toxicity, bioaccumulation, and persistence.

Zero Discharger—A plant that does not discharge wastewaters to either POTWs or to surface water bodies. Methods of zero discharge include: deep well injection, contract hauling, offsite treatment, incineration, evaporation, impoundment, and land disposal.

Appendix B—Toxic Pollutants Regulated

Note.—This table sets forth 46 toxic pollutants regulated at BAT and NSPS for the Plastics-Only (denoted by P) and/or Not Plastics-Only (denoted by O) subcategories. The 21 toxic pollutants regulated at PSES and PSNS are denoted by an asterisk.

Pollutant or pollutant property	Not plastics only	Plastics only
2,4,6-trichlorophenol	O*	
2-chlorophenol	O*	
2,4-dichlorophenol	O*	
2,4-dimethylphenol	O*	

Pollutant or pollutant property	Not plastics only	Plastics only
2-nitrophenol	O*	
2-nitrophenol	O*	
2,4-dinitrophenol	O*	
pentachlorophenol	O	
phenol	O	P.
acenaphthene	O	
1,2,4-trichlorobenzene	O	
1,2-dichlorogenzene	O	
isophorone	O*	
bis(2-ethylhexyl)phthalate	O	P.
di-n-butyl phthalate	O	
diethyl phthalate	O	
dimethyl phthalate	O*	
acenaphthylene	O*	
fluorene	O*	
phenanthrene	O*	
acrolein		P*.
benzene	O	
carbon tetrachloride	O	
1,2-dichloroethane	O*	
1,1,1-trichloroethane	O	
1,1-dichloroethane	O	
1,1,2-trichloroethane	O	
chloroethane	O*	
chloroform	O	
1,1-dichloroethylene	O	
ethylbenzene	O	P.
methylene chloride	O	
methyl chloride	O	
methyl bromide	O*	
dichlorobromomethane	O	
toluene	O	
trichloroethylene	O	
vinyl chloride		P*.
antimony	O	
cadmium	O	P.
chromium	O*	P.
copper	O	P.
mercury	O*	
zinc	O	
lead	O	P*.
cyanide	O	P*.

Appendix C—Toxic Pollutants Excluded Under Paragraph 8

Note. This table sets forth 18 toxic pollutants excluded from these proposed regulations for both the Plastics Only and Not Plastics Only subcategories under Paragraph 8 authority

Pollutant or Pollutant Property

aldrin
dieldrin
chlordane
4,4'-DDT
4,4'-DDE
4,4'-DDD
alpha-endosulfan
beta-endosulfan
endosulfan sulfate
endrin
endrin aldehyde
heptachlor
heptachlor epoxide
alpha-BHC
beta-BHC
gamma-BHC
delta-BHC
toxaphene

Appendix D—Pollutants Not Regulated by PSES or PSNS

Note.—This table sets forth 28 toxic pollutants excluded from PSES and PSNS regulations because they were determined not to pass through or interfere with the operation of POTWs.

Pollutant or pollutant property	Not plastics only	Plastics only
pentachlorophenol	O	
phenol	O	P.
acenaphthene	O	
1,2-4-trichlorobenzene	O	
1,2-dichlorobenzene	O	
bis (2-ethylhexyl) phthalate	O	P.
di-n-butyl phthalate	O	
diethyl phthalate	O	
benzene	O	
carbon tetrachloride	O	
1,1,1-trichloroethane	O	
1,1-dichloroethane	O	
1,1,2-trichloroethane	O	
chloroform	O	
1,1-dichloroethylene	O	
ethylbenzene	O	P.
methylene chloride	O	
methyl chloride	O	
dichlorobromomethane	O	
toluene	O	
trichloroethylene	O	
antimony	O	
cadmium	O	P.
chromium		P.
copper	O	P.
zinc	O	
lead	O	
cyanide	O	

Appendix E—Toxic Pollutants Not Regulated*

Note.—This table sets forth the 64 pollutants for Not Plastics-Only subcategory and the 98 toxic pollutants for the Plastics Only subcategory which are not proposed for regulation at this time generally due to lack of adequate data. The letters O (Not Plastics-Only) and P (Plastics-Only) indicate in which subcategory a pollutant is not regulated.

Pollutant or pollutant property	Not plastics only	Plastics only
2,4,6-trichlorophenol		P.
p-chloro-m-cresol	O	P.
2-chlorophenol		P.
2,4-dichlorophenol		P.
2,4-dimethylphenol		P.
2-nitrophenol		P.
4-nitrophenol		P.
2,4-dinitrophenol		P.
4,6-dinitro-o-cresol	O	P.
pentachlorophenol		P.
acenaphthene		P.
benzidine	O	P.
1,2,4-trichlorobenzene		P.
hexachlorobenzene	O	P.
hexachloroethane	O	P.
bis(2-chloroethyl)ether	O	P.
2-chloronaphthalene	O	P.
1,2-dichlorobenzene		P.
1,3-dichlorobenzene	O	P.
1,4-dichlorobenzene	O	P.
3,3'-dichlorobenzidine	O	P.
2,4-dinitrotoluene	O	P.
2,6-dinitrotoluene	O	P.
1,2-diphenylhydrazine (as azobenzene)	O	P.
fluoranthene	O	P.
4-chlorophenyl phenyl ether	O	P.
4-bromophenyl phenyl ether	O	P.
bis(2-chloroisopropyl) ether	O	P.
bis(2-chloroethoxy) methane	O	P.
hexachlorobutadiene	O	P.
hexachlorocyclopentadiene	O	P.
isophorone		P.
naphthalene	O	P.
nitrobenzene	O	P.
N-nitrosodimethylamine	O	P.
N-nitrosodiphenylamine	O	P.
N-nitrosodi-n-propylamine	O	P.
butyl benzyl phthalate	O	P.
di-n-butyl phthalate		P.
di-n-octyl phthalate	O	P.
diethyl phthalate		P.
dimethyl phthalate		P.
benzo(a)anthracene	O	P.
benzo(a)pyrene	O	P.
3,4-benzofluoranthene	O	P.
benzo(k)fluoranthene	O	P.
chrysene	O	P.
acenaphthylene		P.
anthracene	O	P.
benzo(ghi)perylene	O	P.
fluorene		P.
phenanthrene		P.
dibenzo(a,h)anthracene	O	P.
ideno(1,2,3-cd)pyrene	O	P.
pyrene	O	P.
2,3,7,8-tetrachlorodibenzo-p-dioxin	O	P.
acrolein	O	
acrylonitrile	O	P.
benzene		P.
carbon tetrachloride		P.
chlorobenzene	O	P.
1,2-dichloroethane		P.
1,1,1-trichloroethane		P.
1,1-dichloroethane		P.
1,1,2-trichloroethane		P.
1,1,2,2-tetrachloroethane	O	P.
chloroethane		P.
2-chloroethylvinyl ether	O	P.
chloroform		P.
1,1-dichloroethylene		P.
1,2-trans-dichloroethylene	O	P.
1,2-dichloropropane	O	P.
1,3-dichloropropylene	O	P.
methylene chloride		P.
methyl chloride		P.
methyl bromide		P.
bromoform	O	P.
dichlorobromomethane		P.
chlorodibromomethane	O	P.
tetrachloroethylene	O	P.
toluene		P.
trichloroethylene		P.
vinyl chloride	O	
PCB-1242	O	P.
PCB-1254	O	P.
PCB-1221	O	P.
PCB-1232	O	P.
PCB-1248	O	P.
PCB-1260	O	P.
PCB-1016	O	P.
antimony		P.
arsenic	O	P.
asbestos	O	P.
beryllium	O	P.
mercury		P.
nickel	O	P.
selenium	O	P.
silver	O	P.
thallium	O	P.
zinc		P.

*Each of 126 toxic pollutants of the 129 priority pollutants listed in the Consent Decree are accounted for in Appendices B through E. Three have been removed from the original group of 129. These are bis(chloromethyl) ether (deleted 46 FR 10723 2/4/81), and trichlorofluoromethane and dichlorofluoromethane (deleted 46 FR 2266 1/8/81).

Appendix F.—Public Comment Summary

A. BAT

1. *Comment:* It cannot be inferred from available information that different product/processes using the same generic process produce pollutant loads that have similar treatabilities.

Response: EPA's grouping of product/processes under several generic process headings is simply for convenience in sorting out the manufacturing methods of the industry as a whole. It has not been used to develop treatability data for use in the regulation. While a generic process may be common to a number of product/processes, the subset of priority pollutants that is associated with a particular product/process is usually dependent on, and generically related to, the raw material used. For example, chlorination of benzene will lead to a different subset of priority pollutants than the chlorination of ethylene. Thus, the EPA agrees that the subset of priority pollutants likely to be in the effluent cannot be inferred from the generic process alone; rather the generic process and raw material must both be considered.

EPA hypothesized, when it began its BAT studies, that subsets of generically related priority pollutants, regardless of product/process origin, have an inherent treatability. Since such subsets are specifically related to product/processes, it follows that the combined wastewaters from similar mixes of product/processes will have similar treatability. The data EPA has collected across treatment systems operating at different plants within the OCPSF industry shows good and consistent reduction of priority pollutants coming from a variety of product/process mixes. These empirical results suggests that the concept that a generic subset of priority pollutants has an inherent treatability, regardless of product/process origin, is general to most of the major product/process mixes represented within the OCPSF industry.

2. *Comment:* EPA's grouping of product/processes into generic groups and predicting expected pollutant loadings from reaction chemistry and other scientific methods is qualitative not quantitative and, therefore, has no place in the establishment of effluent limitations for product/processes not characterized under EPA's study program.

Response: EPA agrees that the predictive scheme is qualitative. It is useful for identifying, but not predicting precise levels of, those priority pollutants that are likely to be found in the combined wastewater at a plant. For that very reason, the proposed effluent limitations have not been derived from the predictive scheme.

As used by EPA in its study program of the OCPSF industry, the term "product/process" defines a manufacturing method in terms of the product, its raw material and a generic process. Through an understanding of the chemistry of a product/process, generically related subsets of priority pollutants likely to be associated with that product/process are predictable. The EPA generally confirmed the expected predictability by sampling and analyzing the individual wastewater effluents of over 170 major product/processes of the OCPSF industry.

EPA's studies further suggest that many higher order product/processes (using simpler organic compounds to manufacture more complex organic compounds), beyond those that were specifically characterized, are not significant sources of priority pollutants. These findings support the concept that only certain raw material-generic process combinations have any significant potential to generate priority pollutants, and explain why priority pollutants often fail to show up in the effluents of many of the higher order product/processes.

3. *Comments:* EPA's displays of analytical data in tables should not be carried out to significant figures representative of thousandths of a part per billion. This could give a misleading impression of the precision of the analytical methods to a reader who is not familiar with the limitations of the method.

Response: This preamble discussion and the effluent limitations and standards set forth in the regulations are consistent with the comment. Computer-calculated averages, provided in the Development Document, are sometimes carried to decimal points generated by the algorithms and not rounded off in the data presentations. However, discussions of analytical variability in the document should ensure that the reader understands the limitations of analytical methods. Numerical values presented in the record for this proposed rulemaking are of two types: the laboratory reported individual analytical sample results, or statistics calculated from these sample results. The Agency reports the individual sample results as they were reported by the laboratory that analyzed the samples. Statistics generated from individual analytical results represent a summary of these values. EPA agrees that an excessive number of significant figures resulting from such calculations does not represent a measure of the precision of the analytical methodology.

4. *Comment:* Because of inherent variability in the analytical data, EPA should not display or use that data as numerical values, but instead should display and use them as ranges.

Response: As previously noted, EPA is aware of the inherent variability of analytical results. Regardless of the substance or material, (*e.g.*, pollutants in the environment, tensile strength of a metal, length of life of an electrical product, etc.) a measured value is the result of many sources of variation. That is, any value resulting from measurement has uncertainty associated with it. However, the fact that uncertainty exists in a reported value does not preclude the pragmatic reporting of specific laboratory results. Furthermore, EPA's statistical procedures include analytical variability, as well as other sources of variability, in the mathematical computations for determining the numerical limitations based on the data. As previously described in this preamble, and as done in the case of other industry regulations, EPA has used such procedures in its computations of the proposed OCPSF effluent guidelines limitations. Using such procedures that account for variability—both analytical and other types—makes the display and use of that data as numerical values a valid procedure.

5. *Comment:* At concentrations below 100 parts per billion (ppb) the variability of analytical results becomes much more pronounced. As concentrations approach 10 ppb even the identification of compounds becomes suspect. These limitations should be considered in any use of the data.

Response: EPA has considered limitations inherent in the analytical methods in using the data to support today's proposed guidelines and standards.

EPA did not analyze verification samples for all priority pollutants. It only analyzed for compounds that were detected in a preliminary screening, or those with a high probability of occurrence based on an understanding of the process chemistry. Knowledge of expected pollutants enabled EPA to focus its analytical resources on those pollutants that were ascertained to be in each sample.

Most samples were analyzed by compound specific methods based on gas chromatography with conventional detectors (GC/CD). As will be discussed further in comment 10, EPA believes that these very sensitive detectors produce accurate quantitative results, particularly in the low concentration ranges. Properly used, GC/CD procedures often have detection limits in the range of 0.1 to 1 μg/l. Thus, in many cases, GC/CD results were reported in the data base at concentrations below 10 ppb. Other data are based on analysis with gas chromatography with identification and quantification by mass spectrometer (GC/MS). GC/MS has a detection limit of less than 10 ppb for nearly all priority pollutants. The assertion that pollutants cannot be identified by GC/MS with confidence when they are present at levels approaching 10 ppb is incorrect.

In analyzing its data base, EPA has treated all values reported below 10 ppb from either method as 10 ppb. EPA selected this criterion as a conservative measure to avoid potential problems concerning the variability of numbers in the data base that were reported at less than 10 $\mu g/l$.

The concentration limitations and standards proposed today contain no requirements lower than 50 ppb. These are based on data indicating long to term achievable concentrations in the 10 to 20 ppb range and lower, and are associated with relatively low calculated variability factors. Thus, a wide range of potential analytical error is accounted for in the regulation.

EPA believes that the above procedures have insured that the special problems of measurement at the limits of analytical detection have been fairly considered in setting limitations. The resulting limitations are well within the recognized analytical capability of available monitoring technology.

6. *Comment:* EPA's calculation of mass loadings for certain product/processes appears, in some cases, to be based on only one observation and is, therefore inappropriate for characterizing OCPSF industry wastewater.

Response: As discussed earlier in this preamble, EPA has shifted the focus of this proposed regulation from a mass-based regulation applied to specific product/processes, to a concentration-based regulation applied to the plant discharge. Thus, the focus of the characterization of OCPSF wastewaters has shifted from data such as that criticized by the commenter to end-of-pipe data. The criticized data were, however, used in estimating the cost of compliance. The criticism as it relates to the cost analysis will be discussed below as a part of comments relating to the cost estimating methodology.

7. *Comment:* EPA's verification sampling program covered only 37 plants of 1,217 in the industry and 176 product/processes of over 2,500 used in the industry. Those samples are not sufficiently representative of the industry to permit characterization of the entire industry. The data are particularly unrepresentative of batch and complex second generation product/processes.

Response: EPA has collected data that we believe, based on process chemistry, are representative of the entire industry. The product/process effluents that the EPA elected to characterize are those of high-volume products and of products that, either are priority pollutants, or are expected to be associated with them. The priority pollutants observed in each of these effluents were found to be generally consistent with the raw materials, solvents, process chemistry and coproducts of the corresponding product/processes. Moreover, plant effluent data, on which these proposed regulations are based, include the combined and treated wastewater discharges from product/processes other than the 176 that were explicitly characterized. Among these others were higher order product/processes, often manufactured by a batch process (rather than a continuous process). Thus, the EPA has collected data that it believes is representative of the entire industry. As discussed in Section XV of the preamble, EPA expects to collect additional data to further confirm the representativeness of the data base.

As in the response to the previous comment, EPA notes that product/process data are used mainly for treatment cost estimations.

Further, the commenter is contradicted by its own report on the 5-plant sampling program. This report concludes, "these (5) manufacturing sites and their respective treatment systems are a representative sample from the organic chemicals industry." Elsewhere it states, "(t)his comparison supports the conclusion that the participating biological treatment plants in the five plant study generally can be considered representative of the median level of performance obtained by biological treatment of organic chemicals industry wastewater." EPA has used the data from the CMA/EPA Five-Plant sampling program. It has also used data from 37 verification plants (2 of which were included in the CMA/EPA study). EPA believes that inclusion of data from 35 additional plants can only increase the representativeness of the data base.

Finally, we continue to invite the commenter and all other persons with relevant data to submit such data to EPA.

8. *Comment:* EPA's use of a three-day sampling period at most plants is too short, ignoring variability in raw wasteloads and making the data useless for calculating long term averages or variability.

Response: EPA's data base includes, on the one hand, data collected over a 24 to 30-day period at each of 5 plants. The use of 3-day verification data, on the other hand, allowed EPA to include a greater number of plants and product/processes than would otherwise have been feasible. EPA believes that this dual approach is pragmatic and rational. Furthermore, OCPSF plants generally use flow equalization and biological treatment systems with retention times sufficient to smooth out wasteload variations. EPA made every effort to ensure that the product/processes considered representative of the industry were in fact operating when plants were sampled. Thus, EPA believes that the three day sampling period provided results that are characteristic of long-term averages of priority pollutants in treated plant effluent discharges.

Variability in the data derives from a number of sources. These include process variation, sampling variation, and variation in the practices of analytical methods between and within laboratories. EPA's data base reflects all of these sources of variability.

9. *Comment:* The most extensive and best long-term (4 to 6 weeks) data base was generated by the EPA/CMA five-plant sampling program. This data base is supported wtih a comprehensive QA/QC program and can provide EPA with an understanding of biological treatability and uncertainty associated with analytical methods for organic priority pollutants. EPA's verification phase data base, generated with a site specific analytical methodology that essentially was not validated, is suspect.

Response: EPA agrees that the EPA/CMA five plant sampling program is a good source of data to support this proposed regulation. EPA does not agree, as the comment seems to imply, that it should be used to the exclusion of the verification data base. As noted in responses to other comments, we believe that the verification data are valid, and therefore will be used by EPA.

Furthermore, EPA notes that placing sole reliance on the five-plant data would result in significant gaps in the data base. The five-plant analytical effort included none of the metals and only some of the organic priority pollutants that are characteristic of the OCPSF industry. EPA's study of the verification results suggests that some pollutants, not covered by the 5 plant sampling program, are discharged at significant and treatable levels, even when a plant has installed a well designed and operated biological treatment system. For these reasons, reliance on the 5-plant data alone would be inappropriate.

EPA concludes that a data base resulting from a combination of the verification and the five plant sampling efforts is reliable and representative data upon which to base today's proposed effluent limitations and standards. EPA invites the industry to submit additional data on long-term performance and on variability to supplement the existing data base.

10. *Comment:* Most of the verification sampling results were obtained by gas chromatography with conventional detectors (GC/CD). Only about 10 percent of the results were confirmed using gas chromatography with a mass spectrophotometer for detection (GC/MS). Use of GC/CD analysis increases the risk of false positive and false negative compound identification.

Response: EPA believes that GC/CD and GC/MS are both excellent techniques for analyzing organic priority pollutants in wastewater. Both methods are commonly used by OCPSF plants to routinely monitor process and end-of-pipe wastewater. EPA has in fact proposed both GC/CD amd GC/MS methods for such analyses and expects to promulgate them in the near future.

The use of GC/CDS can increase the risk of false positives (*i.e.*, the risk of "identifying" a compound that is not actually present in the sample being analyzed), but the likelihood of any false negatives (*i.e.*, the failure to detect a compound that is actually present in the analyzed sample) is extremely small with the use of GC/CD. A false positive can occur if the compound of interest is so-eluted from the gas chomatograph with a second ("interfering") compound. The risk of such an occurrence can be minimized by employing certain procedures. Such procedures were used by EPA and its contractors, as described below.

First, proper cleanup procedures prior to injecting the sample into the chromatograph will reduce the number of potential interferences. Second, interferences can be reduced by selection of a GC column with appropriate column conditions. Third, selective detectors (i. e., detectors sensitive only to certain compounds, exclusive of others present) may be employed.

Finally, GC/MS can be used for interferences that still remain. EPA authorized its contract laboratories to run up to 10 percent of their samples on GC/MS. The laboratory analysts were given the discretion to determine when to use GC/MS. This approach, as opposed to a rigid schedule for systematic use of GC/MS, assured that the GC/MS could be run in precisely those situations where it was needed to resolve interferences and confirm GC/CD results. Furthermore, at some plants, GC/MS was run prior to the GC/CD analyses to identify the compounds present. In total, GC/MS was actually used for approximately 15 percent of all samples analyzed in the verification program.

EPA's program and, in most cases, its laboratory practices, followed the above procedures. As mentioned in the preamble, EPA has deleted some data that do not meet its rigorous quality criteria and will continue to examine the remaining data to assure that it is valid.

Qualitatively (i. e., with respect to identifying compounds), the GC/CD methods used by EPA in its verification program are similar to the GC/CD methods which EPA has been developing under Section 304(h) of the Clean Water Act. EPA's effort under that statutory provision is intended to promulgate both GC/MS and GC/CD methods as valid analytical procedures for organic priority pollutants.

11. *Comment:* The QA/QC program used during verification "should have, but did not include, an adequate level of quantitative GC/MS to validate the GC/CD analytical concentration."

Response: EPA disagrees. The QA/QC program for the analysis of wastewater samples from the OCPSF industry included GC/CD quantitation by both replicate analysis and analysis of spiked samples. GC/CD quantitation is known to be more accurate than GC/MS quantitation, because some of the conventional detectors are more sensitive (detection limit is lower) than the mass spectrometer. Therefore, quantitative validation of GC/CD measured concentrations by GC/MS generally is unnecessary.

12. *Comment:* The GC/CD methods should have been validated at the start of the verification program prior to sample collection, by an independent methodology such as GC/MS.

Response: The commenter appears to be suggesting that EPA should have conducted a "round-robin" validation program, incorporating the analysis of many samples from many wastewaters by many laboratories, prior to gathering any of the data needed to develop effluent guidelines and standards for the OCPSF industry. Such a program typically takes several years to complete. Indeed, EPA has been conducting a validation program for the 600-series methods proposed on December 3, 1979, and this program has taken several years.

As discussed above in the preamble, EPA has been subject to a Settlement Agreement, modified by subsequent court orders, that has required the proposal and promulgation of effluent guidelines and standards for many industries, including the OCPSF industry, by dates set forth in the agreement. For all industrial categories subject to the Settlement Agreement, EPA has recognized that compliance with that agreement required the collection of necessary data, whether by GC/MS or GC/CD, prior to conducting validation programs for these analytical methods. In all cases, EPA used then-existing state-of-the-art methods for GC/MS and/or GC/CD to develop the data needed to comply with its legal obligations under the court-sanctioned agreement.

Although the GC/CD methods that were used to analyze OCPSF wastewaters were not validated on a uniform national basis prior to their use in collecting data, they were validated on a case-by-case basis as the data was collected. By using appropriate QA/QC (quality assurance/quality control), including such procedures as duplicate analysis and spiked samples, EPA validated each method for the precise wastewater sample being measured. This approach had the advantage of ensuring a valid methodology for the specific wastewater matrix being analyzed.

13. *Comment:* EPA adjusted the verification values by using recovery values. These are obtained by injecting a known quantity of a pollutant into water and determining the percent of the known amount measured. Such factors are not technically supportable.

Response: EPA does not agree as a general proposition that use of recovery values are technically unsupportable. EPA does agree, however, that the results of this study are better represented as unadjusted for recovery. EPA has, therefore, based these proposed regulations on unadjusted values in the data base.

14. *Comment:* EPA deviated from its sampling protocol in some cases in ways that could affect the reliability of some results.

Response: EPA has conducted a thorough review of its data base to determine which values could be affected by such errors as excessive lag between sample collection and analysis as well as other departures from the sampling protocol. Some data has been deleted as a result of this review. If the commenter or other members of the public are aware of other values that have not been properly evaluated, EPA solicits specific comments identifying which samples are involved, what variations occurred and how the variation may have affected the reliability of the data.

15. *Comment:* Some of the data EPA is using is as much as five years old and may not be representative of current OCPSF industry practice.

Response: As described in the body of this preamble and in the technical support documents, the development of these proposed effluent limitations guidelines involved a massive and often sequential data gathering effort. Technical questionnaires requesting information under section 308 of the Act had to be prepared, returned and evaluated before a significant sampling effort could begin.

EPA is particularly aware that some plants have upgraded their treatment technology and has attempted to account for these improvements in its technical and costing analyses. If any member of the public, particularly the regulated industry, believes that the information they submitted to EPA is not now representative of their facility, EPA specifically solicits comments and additional information that would make the previously submitted information more representative of current practice. It is noted that the use of outdated data tends to yield higher (less stringent) effluent limitations and to overstate the impacts of the regulation. Thus, any error is in favor of the industry.

16. *Comment:* Some of the effluent targets evaluated by EPA appear to be water-quality-based and not technology based as required by the Act.

Response: EPA has evaluated a number of effluent target levels simply for the purpose of identifying the costs associated with those levels. Some were set very low to determine whether available technology could achieve them and what cost would be associated with those options. The effluent limitations in the regulation reflect real world data demonstrating the actual performance of available technology practiced in the industry and are not based upon target levels, or water quality criteria.

17. *Comment:* EPA considers 64 priority pollutants to be significant for BAT regulation. These pollutants were selected by applying a selection criterion. If the pollutant occurred in more than 50 percent of the plants sampled, it was considered significant. Alternatively, if the mean or median concentration across all plants exceed 100 ppb, it was considered significant. These criteria are arbitrary. They are particularly unfair when the mean is used as a selection criterion, since a few plants with high concentrations could result in a mean over 100 ppb resulting in regulation of that pollutant for the whole industry rather than for the few discharging it.

Response: EPA has modified its criteria for selecting pollutants to be controlled by this proposed regulation. EPA has examined plants employing BPT treatment technology—those meeting the criteria of 95 percent removal of BOD or a final effluent concentration of 50 mg/l or less of BOD. Pollutants discharged from these plants for which we have adequate data are covered in the proposed regulation. Only 46 pollutants are covered.

EPA is sensitive to the commenter's concern that industry-wide regulation of a significant number of toxic pollutants could result in unnecessary monitoring requirements of certain pollutants by individual plants. As discussed in Section XI of this preamble, EPA has developed a program to avoid unnecessary monitoring requirements.

18. *Comment:* The modeling effort outlined by EPA for evaluating the performance of treatment technologies is seriously flawed by such factors as inaccurate kinetic co-efficients, invalid model components, and a lack of model verification. However, if corrected for these deficiencies, the model has potential value for estimating incremental costs associated with different levels of treatment. The modeling approach is not suitable for purposes of establishing effluent limitations based on a given treatment train.

Response: EPA is not proposing effluent limitations based on its modeling effort. Today's proposed effluent limitations guidelines are based on statistical analysis of data from actual treatment systems that EPA believes are representative of the industry.

EPA's modeling effort was, however, used to estimate the cost of complying with these proposed regulations. The comments appear to suggest that EPA should design the most cost-effective treatment system for each plant in the industry and calculate its cost. For example, one "flaw" alleged by the commenter is the model's failure to account for local topography in calculating pumping costs.

While cost is a factor considered by the Administrator in selecting BAT technology, EPA does not believe that the Act requires detailed analysis of every single plant with the precision implied by many of the commenter's suggestions (discussed below). EPA's use of a computer modeling system for 55 model plants (called generalized plant configurations, GPC's) to develop a reasonable estimate of plant costs is sufficient under the Act.

EPA believes that these 55 GPC's represent a reasonable cross-section of the industry. Using the costs generated for complying with BAT effluent limitations, EPA has calculated an estimate of the compliance cost throughout the industry. Such a modeling approach is permitted by the Act. Indeed, when an industrial category is as large and diverse as the OCPSF industry, it is the only reasonable way to calculate toxic pollutant reduction costs. While this approach does not generate costs with the precision advocated by the commentor, EPA believes that it does estimate cost with sufficient accuracy to permit EPA to properly consider cost and to evaluate economic impacts in its selection of BAT technology. EPA solicits data that would contribute to the improvement of the model, as well as to the design of the GPC's.

19. *Comment:* A major technical flaw in the model is that its kinetic co-efficients do not consider competing modes of removal in activated sludge systems such as biooxidation, volatilization, and adsorption. The model itself however, does consider removal by volatilization and adsorption. This causes the model to "remove" pollutants "twice" in the activated sludge system. The model will, thus, generally predict superior performance in activated sludge systems than is actually achievable.

Response: EPA believes that the model has been properly adjusted to consider removal by adsorption and volatilization as well as biooxidation. EPA will, however, continue to evaluate the model. EPA's sampling efforts have contained a large number of activated sludge systems. Those data do not support the commenter's contention that activated sludge cannot reduce effluents to the degree assumed by the model.

20. *Comment:* EPA's comprehensive model should be reevaluated in the light of more recent, available data.

Response: EPA is continually seeking data that will make this rulemaking as technically sound as is possible. We solicit additional detailed technical information that would improve the model. EPA will thoroughly review its model in light of all available data before promulgation.

21. *Comment:* The K factors (factors used to determine rates of biodegradability of wastestreams) used in EPA's model are based on insufficient data and, thus, only are accurate to an order of magnitude.

Response: This commentor appears to arise out of the commentor's concern (discussed previously) that the model would be used to calculate effluent limitations. As stated in previous responses, EPA is using the model for treatment cost purposes only. Furthermore, EPA has compared the effluent quality predicted by the model with that of actual activated sludge effluents and finds that they are sufficiently comparable for use in cost estimating. Of course, EPA welcomes the submission of additional K-rate data.

22. *Comment:* EPA's model estimates BOD removal in activated sludge systems by determining the BOD contribution of individual product/processes and calculating a weighted K factor based on these contributions. This approach is subject to large amounts of error, and is not likely to produce a true representation of BOD removal in an activated sludge system.

Response: Weighting the K factors for the contributions by various product/processes of biodergradable materials to the activated sludge system is a valid means of deriving an appropriate K-rate for the combined waste streams. Comparison of GPC modeled removals in activated sludge systems with removals in actual systems sampled by EPA do not reveal large discrepancies in BOD removal. The model appears to estimate BOD removal well within the acceptable range for the model's objective of estimating costs of compliance.

23. *Comment:* The model sets maximum influents for activated sludge of total dissolved solids (TDS) and mixed liquor volatile suspended solids (MLVSS) are 10,000 mg/l and 4,000 mg/l, respectively. These values are well below levels encountered in some OCPSF industry waste treatment plants which are successfully operating. For actual systems capable of operating at higher TDS and MLVSS the model will add additional treatment technology that might be more economically deleted by operating the activated sludge system at higher TDS and MLVSS rates.

Response: These technology-based regulations are based on technology which EPA concludes can be used throughout the industry. EPA recognizes that with some plants' wastewater matrices, the same effluent quality can be more economically achieved by using technlolgy. These proposed regulations would not require industry to install the model technology. Industry is free to use any technology, including operating activated sludge at higher TDS and MLVSS values than assumed for the model technology. The only requirement would be that industry achieve the proposed effluent quality. These comments indicate that the industry's cost to comply with the proposed limitations will be lower than EPA's estimates.

24. *Comment:* EPA has not evaluated the effectiveness of powdered activated carbon (PAC) enhancement of activated sludge. PAC, although expensive, may be cost effective if the alternatives are tertiary treatment with granular activated carbon, or resin adsorption, or pretreatment by steam stripping, solvent extraction, etc.

Response: EPA did not believe it had sufficient data on actual operation of PAC on toxic pollutants to evaluate it and include it in the model treatment catalogue. If particular plants believe they can more economically achieve the final effluent limitations using PAC, they are, of course, free to do so.

EPA solicits operating and analytical information on PAC performance removing toxic pollutants that would permit it to include PAC in its treatment catalogue.

25. *Comment:* The removal of heavy metals due to adsorption on biological solids in the activated sludge process is not considered by the model.

Response: EPA has recognized this error, which would have overstated the cost of complying with the proposed BAT limitation for metals, and has corrected the model results to reflect heavy metals removal in the activiated sludge system.

26. *Comment:* If phenol concentrations exceed 300 mg/l, a solvent extraction system is designed in the computer model prior to activated sludge to minimize potential toxicity problems. The arbitrary 300 mg/l cut off point should be deleted, since well acclimated biological treatments systems can biologically treat higher phenol concentrations. In addition, specification of a solvent extraction system under these circumstances will overstate costs associated with treatment.

Response: EPA agrees that some biological treatment systems can and will adequately treat phenol concentrations in excess of 300 mg/l. However, since some systems will require solvent extraction and others will not, the model was conservatively designed to specify and cost that treatment on an industry-wide basis.

27. *Comment:* The model sometimes designs unrealistic activitated sludge systems. In one case, it designed one with a 15-minute detention time. Such systems are not practical and allowing the model to design such systems significantly understates costs.

Response: Such impractical designs are a consequence of the system logic, which attempts to upgrade biological treatment to presumed BCT levels. EPA will review and attempt to correct the model to avoid such anomalies. For estimating BAT compliance costs, the model's assumed starting point is well-designed and operated biological treatment. With such a floor, it is unlikely that BAT compliance costs will be significantly understated. Since the model adds other treatment processes to the basic biological segment of the treatment system to achieve a selected final effluent target level for *all* pollutants inthe GPC raw waste load, it is more likely that BAT compliance costs will be overstated.

28. *Comment:* The comment designs a separate nitrification unit for ammonia concentrations in the range of 10 mg/l to 2000 mg/l as N. Such systems are often unnecessary in the OCPSF industry, since operating parameters of the activated sludge system can often be adjusted to treat ammonia in these ranges.

Response: Although operating characteristics of individual activated sludge units can be adjusted to obviate the need for special treatment to remove ammonia, EPA does not believe that the need for separate nitrification units can be eliminated in all cases simply by adjusting the operating parameters of activated sludge systems. Thus, in estimating costs, EPA has conservatively assumed that the installation of additional treatment would be required.

29. *Comment:* EPA's questionnaire for carbon adsorption technology was deficient. The results are therefore suspect. The Chemical Manufacturer's Association offered an alternative questionnaire requesting more information, which was rejected by EPA. The items that differ between the two questionnaires should be evaluated to determine whether additional information should be obtained.

Response: EPA, of course, has already evaluated CMA's alternative questionnaire, reviewing both the information sought and that not sought, in the light of its modeling needs. EPA believes that the additional information suggested by CMA would be useful for an exhaustive study of activated carbon performance. However, EPA does not believe it was appropriate for the purpose of developing model costs.

30, *Comment:* Some of the technical assumptions used in the model describing the performance of activated carbon, steam stripping and ion exchange are incorrect.

Response: EPA has reviewed these technical assumptions and will continue to do so in light of available information to insure that these assumptions reflect the best available theoretical foundations. We welcome the submission of additional data.

31. *Comment:* The basis for selecting cadmium, chromium, cyanide, and mercury as removable pollutants using

activiated carbon has not been demonstrated.

Response: The proposed limitations are based on data from a variety of plants using different treatment configurations. No single technology was selected by EPA to remove any particular pollutants.

32. *Comment:* Other technologies contained in the treatment file used by the model do not yield the most cost efficient treatment train for a given plant's unique wastewater characteristics.

Response: As discussed in previous comments, EPA's model technology approach sometimes errs on the high side in developing costs for its model plants. This approach benefits industry by assuming that potential economic impacts will be fully addressed.

33. *Comment:* EPA's Master Process File (MPF) contains pollutants for each product/process found in raw wastewaters during verificaion sampling. The MPF is the starting point in designing treatment systems for the purpose of cost estimating. Some pollutants occur in the MPF that are not predicted by EPA's generic methodology. They should be dropped as extraneous since the system may design and cost treatment for them.

Response: The data in the MPF are actual sampling data. EPA's generic methodology is a useful tool to predict likely priority pollutant coproducts from various raw material/generic process combinations. EPA does not contend that the generic methodology will predict every conceivable pollutant from every source. One of it several useful purposes is to conceptually characterize the industry's potential for generating priority pollutants, to ensure that EPA has collected data from a representative cross section of the industry. It is technically erroneous to conclude that a measured pollutant is extraneous simply because the generic methodology did not identify it as an anticipated pollutant. It is possible, however, that some of the pollutants listed for certain product/processes in the MPF, but not predicted by the generic methodology, are false positives (i.e., analytical anomalies). EPA has reviewed the master process file and tried to identify and remove such pollutants. If any remain, they will result in overestimating costs, rather than an understanding.

34. *Comment:* The cost curves used by the computer model to estimate cost for model plants appear to underpredict capital costs. In particular, the other two cost estimating manuals published by EPA generally give higher capital cost estimates for comparable units.

Response: The cost curves used by the EPA model were developed by using actual cost estimates prepared by EPA's contractor, after considering the particular applications of the OCPSF industry. The cost estimating manuals referenced by the commenter are more general estimating guides. The estimates from one appear reasonably consistent with those predicted by the model. The other predicts much higher costs. EPA will examine this discrepancy prior to final promulgation.

EPA solicits data from the OCPSF industry with which the most accurate cost curves possible can be developed. EPA specifically solicits data from any plants in the OCPSF industry that have already installed any of the technologies evaluated as BAT technology. Data should be in sufficient detail to allow it to be used in developing generalized cost curves and should not be merely total costs of installation. Data should include details of design, unit costs, labor costs, any assumptions in calculating costs of capital, and other information of the type included in EPA's present cost modeling.

35. *Comment:* EPA did a benchmark analysis of its costing model by comparing modeled costs with acutal costs incurred for seven plants in the OCPSF industry. While the costs generally agree on an overall basis, costs of individual treatment show considerably less agreement. This points to deficiencies in the model.

Response: EPA disagrees. As the commenter has pointed out in other comments, specific facilities designed to treat a specific wasterwater will have a treatment system tailored to that wastewater. Designers may find that increasing the biological treatment system with less in-plant control will result in a more cost effective treatment system at that site or vice versa. EPA's costing model uses more generalized design parameters and, thus, result in a more standardized design for costing purposes. For example, as discussed in an earlier comment, the model assumes that influent phenol should be reduced to 300 ppb to protect the treatment system. The commenter argued that some biological systems treating some wastewaters could be designed to treat higher concentrations of phenol. In this case the model would design in-plant treatment for phenol followed by biological treatment. The real plants may have no in-plant treatment, but perhaps a more expensive biological treatment system.

Because model systems designs were being compared with specific treatment systems, EPA believes it properly evaluated the more generalized total cost of treatment when benchmarking the model.

36. *Comment:* The cost-estimating model designs a treatment system based on the average raw wasteload contained in the master process file. If instead costs were estimated based on the maximum and minimum wasteloads, the estimated costs would differ by an order of magnitude. This analysis shows that the cost estimating procedure is sensitive to variations in raw wasteload from plant to plant. The model therefore cannot be used to estimate total cost of compliance but only incremental costs from the technology to technology.

Response: EPA is estimating the cost of compliance of this proposed regulation by calculating the costs of compliance of 55 representative plant configurations (called GPC's). These model plants were configured to represent typical combinations of product/processes and corresponding raw wasteloads found in the OCPSF industry. Therefore, EPA believes it properly used average concentration, rather than maximum or minimum because the average is more representative of the industry.

Large errors in the average concentrations (and loadings) would create large errors in costs estimated for compliance. EPA believes, however, that it has made a scientifically valid survey of the industry by sampling a representative cross section of product/process of the industry. EPA continually solicits additional data, however, to insure that the average wasteloads are representative of the industry. EPA specifically solicits any data the regulated industry may have on toxic pollutant wasteloads that could be added to the MPF catalogue. Data should be submitted showing the wasteloads sampled, their source with particularity, the analytical method used, the compounds analyzed for, the compounds detected and a quantitative measure of the compounds detected.

Summary of Comments-BPT

37. *Comment:* The data collected to support BPT are now six years old and were gathered before many BPT permits were effective. They might not be reflective of current OCPSF plants' treatment performance (comment submitted in July 1982). However, in comments submitted recently, the same commenter criticized EPA's reliance on plant performance data gathered after 1977, when most plants were complying with permits, based upon permit writers' best engineering judgment of BPT, saying that this unrealistically distorts the data and results in limitations

requiring far better treatment than the Act contemplated for BPT limitations (comment submitted in January, 1983 by the same commenter).

Response: The industry has, as late as July, 1982, criticized EPA on the ground that its data did not reflect the true treatment potential of well operated and designed biological treatment systems. In part as a response to these comments, EPA has solicited and obtained more current data on well operated biological treatment systems and included them in its data base. Some data is as recent as 1981 but most reflects treatment in place in the mid 1970's.

Industry has recently changed its stance on this issue. It now contends that EPA should not use post 1977 data unless EPA includes *all* plants, whether or not they are properly designed and operated. In short, they now ask EPA to set limits reflecting average performance, rather than the "average of the best" performance, in defining BPT.

EPA rejects this last argument. The definition of BPT, as explained in the preamble, is the average-of-the-best control of conventional pollutants by end-of-pipe treatment systems, preceded by necessary in-plant controls to assure that the end-of-pipe systems function effectively and consistently. The selected end-of-pipe technologies have been widely practiced within the industry for years, and the selection of them for BPT is fully consistent with the Act.

The criteria for selecting plants for inclusion in the data base were those that reflect proper design and operation of end-of-pipe systems. Any plant that meets such criteria is a useful example of proper biological treatment and deserves to be included in the data base, thereby assuring a broad and fully representative data base. As noted in the preamble, 82 percent of all plants compared against these criteria met them. In other words, in defining "average-of-the-best", we included 82 percent of all plants as representing the "best" treatment, on the basis of which a long-term average was computed. This confirms the representativeness of the data included in the BPT data base and the appropriateness of using the selection criteria and all available data on well designed and operated treatment systems.

38. *Comment:* Guideline limits should be based on concentrations rather than a mass per unit of production. Many treatment systems are arranged to treat a variety of influent flows, some nonregulated under effluent guidelines. A production-based limit makes it very difficult to properly allocate pollutant loadings for each process flow in order to achieve the combined discharge limit.

Response: As discussed in Section V of this preamble, EPA has decided to propose concentration-based limits rather than mass-based ones.

39. *Comment:* A production-based limit does not accurately address treatment efficiencies or capabilities during process outages, startups or treatment upsets.

Response: The effects of normal variations in treatment efficiencies are accounted for in statistically derived variability factors based on actual plant data. Abnormal excursions or treatment upsets are addressed by permit upset and bypass provisions discussed earlier in this preamble.

40. *Comment:* Both BPT and BAT guidelines should allow flexibility for case-by-case permitting considering such factors as plant age, size, and location.

Response: All relevant factors, including plant age, size and location were considered in deriving these proposed regulations. In cases where existing plants have factors fundamentally different than those considered in setting the effluent limitation guideline or standard and where those factors significantly affect a plant's ability to attain the limit, a variance may be considered on a case-by-case basis. These fundamentally different factors (FDF) variances are discussed earlier in this preamble.

41. *Comment:* If the existing data are not the sole basis for writing effluent guidelines, there should be an opportunity for public comment regarding any additional data used in writing effluent guidelines.

Response: As described earlier in this preamble, EPA does expect to gather additional data. EPA intends to release any new data it expects to use in establishing effluent limitations for public comment.

42. *Comment:* Plants that do not discharge wastewater to POTWs or directly to surface water are grouped under a classification called "zero discharge." This includes plants that dispose of wastewaters by deep well injection, contract hauling, and other methods. Use of the term "zero discharge" to describe these plants is misleading and implies that they either do not generate wastewater or practice total recycle. A term such as "alternative discharge" would better describe these plants.

Response: EPA believes it has adequately defined the term "zero discharge" to remove any implication that it applies only to plants generating no wastewater or practicing total recycle. This term has been similarly used throughout the history of the effluent guidelines regulatory program.

43. *Comment:* In attempting to subcategorize the OCPSF industry, EPA contends that there is no correlation between the age of the process and its impact on effluent flow or treatability. Clearly a plant designed and built after the Federal Water Pollution Control Act of 1972 has a significantly smaller flow of aqueous wastes.

Response: As discussed above, EPA is proposing concentration-based effluent limitations and standards. Thus, an older plant's flow relative to a newer plant's lower flow is not necessarily a significant factor. The chief factor for subcategorization for the concentration-based regulation is the use of product/processes that contribute high or low raw concentrations of BOD. Age is not a significant factor in this regard. Furthermore, age is an amorphous concept in the OCPSF industry, since most plants have both old and new processes contributing to a combined end-of-pipe discharge. Finally, EPA's data base does not reveal any differences in achievable effluent concentrations that are attributable to age.

44. *Comment:* The BPT report makes reference to an assumption that non-contact cooling water makes no contribution to the pollutant load of a treatment plant. Such water can exert a significant BOD and TSS load.

Response: EPA has based these proposed regulations on end-of-pipe discharge data which are expressed in concentration units. Where EPA could separately attribute concentrations to process wastewater, it did so. Where it could not, it assumed that commingled cooling water was uncontaminated. This assumption results in a slightly higher raw waste concentration for process wastewater. This conservative assumption is not likely to introduce substantial error, and any error would favor industry.

45. *Comment:* The capital and operating costs are expressed in 1979 dollars. This inappropriately understates the incumbent financial obligations associated with the construction, operation, and maintenance of the treatment facilities in question. One especially troublesome area that is ignored in this analysis is the dramatic increase in the cost of capital over the last three years. There are fairly standard and simple means of converting capital cost that should be applied here.

Response: EPA has used 1982 costs for today's proposed effluent guidelines and standards.

46. *Comment:* EPA used the CAPDET municipal treatment model to estimate costs of compliance. OCPSF treatment plants are not analogous to municipal systems and require significantly higher unit costs for such things as labor, building, excavation, etc. The commenter provides recommended unit costs as much as 7 times those used by EPA.

Responses: EPA believes that CAPDET, appropriately modified to reflect OCPSF unit costs, is technically sound costing approach. EPA solicits specific comments on the accuracy of the unit costs it used. The commenter, however, simply offered alternative costs without explaining the basis for them. Such conclusory data cannot be properly evaluated to determine whether the costs EPA used are in fact too low. EPA, therefore, solicits specific comments regarding its unit costs including specific actual costs, how they were calculated, what assumptions were used, and for what they were incurred.

47. *Comment:* EPA evaluated TSS effluent targets of 20, 30, and 50 mg/l. EPA did not evaluate a TSS target level of 100 mg/l on the basis that such a level would be deleterious to the receiving waters. The report fails to justify that conclusion. In any event it is irrelevant to a technology-based regulation.

Response: EPA evaluated long-term target levels of 20, 30 and 50 mg/l of TSS for costing purposes only and believes them to be reasonable target levels for available technology in the industry. Technology-based analyses have been conducted and are the basis of today's proposed effluent limitations and standards.

48. *Comment:* The BPT report inappropriately equates TSS with BOD.

Response: The evaluation leading to TSS and BOD limitations for four subcategories was not based on that assumption. Instead separate, actual BOD and TSS data were evaluated. Thus the limits proposed today do not rest on any assumption about TSS/BOD correlation.

49. *Comment:* The effluent target limits failed to adequately address ambient temperature effects on biological treatment system efficiency. Use of heating degree days is an inappropriate variable for assessing those effects since it ignores poor system performance at very high temperatures. Moreover, use of State boundaries to determine heating degree days is inappropriate in that it ignores climatological variations within a state.

Response: EPA used heating degree days to assess whether locations should be a factor in subcategorizing the OCPSF industry. In particular, EPA wanted to assess whether plants in generally colder climates should be subcategorized to reflect poorer system performance. The analysis was limited to whether generally colder climates would have a significant effect on a plant's ability to achieve the limitations and standards proposed today. For such an analysis EPA believes consideration by states, rather than by even smaller geographical subdivisions, is appropriate. Temperature was not found to be a significant factor in determining a plant's ability to treat conventional pollutants. If temperature had been found to be a significant factor, a more detailed analysis such as recommended by the commenter might be appropriate. EPA is not aware of OCPSF plants that experience significant difficulties meeting the limitations and standards proposed today because ambient temperature is too high. If such plants exist, EPA invites comments identifying those plants and explaining in detail how high ambient temperature makes meeting today's proposed limitations and standards infeasible.

50. *Comment:* Some OCPSF plants discharge into water-quality limited stream segments. Permits, and resulting treatment, were designed to meet water quality limitations, not technology-based limitations. Inclusion of these plants in the technology-oriented data base is, therefore, inappropriate.

Response: EPA has reviewed the data submitted by the industry regarding these plants with treatment systems designed to meet water quality limits. Several plants that included treatment not considered BPT were deleted from the BPT data base. In many of the plants, the treatment that was allegedly installed to meet water quality based requirements consisted simply of well designed and operated BPT systems. As such, EPA believes that the data are relevant to determine PBT limits.

51. *Comment:* No single effluent target should be set throughout the industry. The industry should be subcategorized based on product/process, influent loadings, and size of the treatment unit.

Response: EPA has conducted a thorough review of the industry and concluded that subcategorization based on four broad groups of product/processes is appropriate. For this concentration-based regulations, EPA believes that these categories adequately describe significant differences in waste generation and consequent influent loadings throughout the industry. EPA does not believe that size of the treatment unit is a relevant factor in defining subcategories. Size of an existing treatment system may become relevant in considering the cost of compliance. Where existing treatment is inadequate, EPA has calculated incremental costs associated with upgrading the treatment system to meet proposed limitations or standards and has evaluated their associated economic impacts.

For the reasons set out in the preamble, 40 CFR Parts 414 and 416 are amended as set forth below.

PART 416—[REMOVED]

1. 40 CFR is amended by removing Part 416.

2. 40 CFR Part 414 is revised to read as follows:

PART 414—ORGANIC CHEMICALS, PLASTICS, AND SYNTHETIC FIBERS

Subpart A—General

Subpart B—Plastics Only Subcategory

Subpart C—Oxidation Subcategory

Subpart D—Type I Subcategory

Subpart E—Other Discharges Subcategory

Authority: Secs. 301, 304 (b), (c), (e), and (g), 306 (b) and (c), 307 and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, as amended by the Clean Water Act of 1977) (the "Act"); 3 U.S.C. 1311, 1314 (b), (c), (e) and (g), 1316 (b) and (c), 1317 (b) and (c), and 1361; 86 Stat. 816, Pub. L. 92-500; 91 Stat. 1567, Pub. L. 95-217.

Subpart A—General

§ 414.10 General definitions.

As used in this part:

(a) Except as provided in this regulation, the general definitions, abbreviations and methods of analysis set forth in Part 401 of this chapter shall apply to this part.

(b) "Pretreatment control authority" means: (1) The POTW if the POTW's submission for its pretreatment program has been approved in accordance with the requirements of 40 CFR 403.11, or (2) the Approval Authority if the submission has not been approved. "Priority pollutants" means the toxic pollutants listed in 40 CFR 401.15.

§ 414.11 Applicability.

The provisions of this part are applicable to discharges resulting from the manufacture of synthetic organic chemicals, plastics and synthetic fibers, except that they do not apply to any such discharges for which a different set of effluent limitations guidelines and standards in Parts 405 through 699 of this subchapter apply. They also do not apply to any discharges from the extraction of organic chemical compounds from natural materials.

§ 414.12 Compliance date for Pretreatment Standards for Existing Sources (PSES).

All dischargers subject to PSES in this part must comply with the standards no later than three years after promulgation of this regulation.

§ 414.13 Monitoring requirements.

(a) The pretreatment control authority shall specify monitoring type, intervals and frequency requirements for each industrial user for all pollutants controlled by the applicable categorical pretreatment standard (PSES) or (PSNS) in this part. The frequency shall be sufficient to yield data that are representative of the monitored activity.

(b) The permitting authority or pretreatment control authority may reduce the monitoring frequency for a particular pollutant to once per year if:

(1) The pollutant has not been detected during the preceding year at a level exceeding 10 $\mu g/l$;

(2) Based upon a review of all product/processes used at the plant whose effluents contribute to the discharge, the authority determines that the pollutant is not likely to be discharge above the concentration level set forth in the applicable effluent limitation or standard. In reviewing the product/processes used, the control authority shall separately review:

(i) All product/processes in operation when monitoring occurred, and

(ii) All other product/processes that are regularly scheduled to operate periodically; and

(3) The facility seeking a reduction in monitoring submits a certification by an authorized employee stating that:

(i) The certifier has knowledge of the information contained in the certification, based upon personal examination of the information or upon inquiry of those individuals immediately responsible for obtaining the information;

(ii) The facility has monitored the discharge for the pollutant one or more times during the twelve-month period preceding the submission of the certification, and the pollutant has in no case been detected at a level exceeding 10 $\mu g/l$; and

(iii) Based upon a review of the raw materials and raw material contaminants, generic processes and solvents used, products manufactured, and other information known by the certifier, the certifier concludes that the pollutant is unlikely to be discharged above the concentration level set forth in the applicable effluent limitation or standard.

Subpart B—Plastics Only Subcategory

§ 414.20 Applicability; description of the plastics only subcategory.

The provisions of this subpart are applicable to discharges resulting from the manufacture of plastics and synthetic fibers only.

§ 414.21 Specialized definitions.

For the purpose of this subpart:

Except as provided in 40 CFR 414.10(e) or below, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR Part 401 shall apply to this subpart.

§ 414.22 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable pollutant control technology (BPT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

SUBPART B

Pollutant or pollutant property	BPT effluent limitations [1] Maximum for any 1 day	Maximum for monthly average
BOD5	49	22
TSS	117	36
pH	(2)	(2)

[1] All units except pH are milligrams per liter.
[2] Within the range of 6.0 to 9.0 at all times.

§ 414.23 Effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

SUBPART B

Pollutant or pollutant property	BPT effluent limitations [1]	
	Maximum for any 1 day	Maximum for monthly average
BOD5	49	22
TSS	117	36
pH	(²)	(²)

[1] All units except pH are milligrams per liter.
[2] Within the range of 6.0 to 9.0 at all times.

§ 414.24 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

SUBPART B

Pollutant or pollutant property	BAT effluent limitations [1]	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
Phenol	50	—
bis (2-ethylhexyl) phthalate	100	50
Acrolein	50	—
Ethylbenzene	50	—
Vinyl Chloride	50	—
Cadmium	30	20
Chromium	110	60
Copper	120	60
Lead	40	20
Cyanide	50	20

[1] All units are micrograms per liter. A dash (—) signifies no limitation.

§ 414.25 New source performance standards (NSPS).

Any new source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

SUBPART B

Pollutant or pollutant property	NSPS effluent limitations [1]	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
Phenol	50	—
bis(2-ethylhexyl) phthalate	100	50
Acrolein	50	—
Ethylbenzene	50	—
Vinyl Chloride	50	—
Cadmium	30	20
Chromium	110	60
Copper	120	60
Lead	40	20
Cyanide	50	20

SUBPART B—Continued

[1] All units except pH, BOD5 and TSS are micrograms per liter. BOD5 and TSS are milligrams per liter. A dash (—) signifies no limitation.

Pollutant or pollutant property	Maximum for any 1 day	Maximum for monthly average
BOD5	49	22
TSS	117	36
pH	(²)	(²)

[2] Within the range of 6.0 to 9.0 at all times.

§ 414.26 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works (POTWs) must comply with 40 CFR Part 403 and achieve the following pretreatment standards for existing sources (PSES):

SUBPART B

Pollutant or pollutant property	Pretreatment standards for existing sources [1]	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
Vinyl chloride	50	—
Acrolein	50	—
Cyanide	50	20
Lead	40	20

[1] All units are micrograms per liter. A dash (—) signifies no limitation.

§ 414.27 Pretreatment standards for new sources (PSNS).

Except as provided in 40 CFR 403.7 any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS):

SUBPART B

Pretreatment standards for new sources [1]	Pollutant or pollutant property	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
Vinyl chloride	50	—
Acrolein	50	—
Cyanide	50	20
Lead	40	20

[1] All units are micrograms per liter. A dash (—) signifies no limitation.

Subpart C—Oxidation Subcategory

§ 414.30 Applicability; description of the oxidation subcategory.

The provisions of this subpart are applicable to discharges resulting from the manufacture of organic chemicals only or both organic chemicals and plastics and synthetic fibers that include wastewater from the oxidation generic process.

§ 414.31 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided in 40 CFR 414.10(e) or below, the general definitions, abbreviations, and methods of analysis set forth in 40 CFR 401 shall apply to this subpart.

(b) "High water-use" means a plant at which wastewater discharge is greater than or equal to 0.2 gallon per pound of total daily production.

(c) "Low water-use" means a plant at which wastewater discharge is less than 0.2 gallon per pound of daily production.

(d) "Daily production" means the annual production divided by the number of operating days in the year. Production shall be determined for each plant based upon past production practices, present trends, or committed growth.

§ 414.32 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable pollutant control technology (BPT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

(a) *High Water Use.*

SUBPART C(a)

Pollutant or pollutant property	BPT effluent limitations [1]	
	Maximum for any 1 day	Maximum for monthly average
BOD5	106	42
TSS	246	84
pH	(2)	(2)

[1] All units except pH are milligrams per liter.
[2] Within the range of 6.0 to 9.0 at all times.

Low Water Use.

SUBPART C(b)

Pollutant or pollutant property	BPT effluent limitations [1]	
	Maximum for any 1 day	Maximum for monthly average
BOD5	146	58
TSS	353	120
pH	(2)	(2)

[1] All units except pH are milligrams per liter.
[2] Within the range of 6.0 to 9.0 at all times.

§ 414.33 Effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

(a) *High Water Use.*

SUBPART C(a)

Pollutant or pollutant property	BCT effluent limitations [1]	
	Maximum for any 1 day	Maximum for monthly average
BOD5	106	42
TSS	246	84
pH	(2)	(2)

[1] All units except pH are milligrams per liter.
[2] Within the range of 6.0 to 9.0 at all times.

(b) *Low Water Use.*

SUBPART C(b)

Pollutant or pollutant property	BCT Effluent Limitations [1]	
	Maximum for any 1 day	Maximum for monthly average
BOD5	146	58
TSS	353	120
pH	(2)	(2)

[1] All units except pH are milligrams per liter.
[2] Within the range of 6.0 to 9.0 at all times.

§ 414.34 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

SUBPART C

Pollutant or pollutant property	BAT effluent limitations [1]	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
2, 4, 6-trichlorophenol	175	100
2-chlorophenol	75	50
2, 4-dichlorophenol	200	100
2, 4-dimethylphenol	50	—
2-nitrophenol	100	75
4-nitrophenol	500	325
2, 4-dinitrophenol	150	100
pentachlorophenol	100	50
phenol	50	—
acenaphthene	50	—
1, 2, 4-trichlorobenzene	225	125
1, 2-dichlorobenzene	250	125
isophorone	50	—
bis (2-ethylhexyl) phthalate	350	150
di-n-butyl phthalate	300	150
diethyl phthalate	275	125
dimethyl phthalate	375	175
acenaphthylene	50	—
flourene	50	—
phenanthrene	50	—
benzene	125	75
carbon tetrachloride	50	—
1, 2-dichloroethane	150	100
1, 1, 1-trichloroethane	50	—
1, 1-dichloroethane	225	125
1, 1, 2-trichloroethane	75	50
chloroethane	50	—
chloroform	75	50
1, 1-dichloroethylene	125	75
ethylbenzene	275	150
methylene chloride	50	—
methyle chloride	50	—
methyl bromide	50	—
dichlorobromomethane	50	—
toluene	225	125
trichloroethylene	75	50
antimony	780	370
cadmium	70	40
chromium	190	90
copper	150	70
lead	70	40
mercury	90	50
zinc	210	100
cyanide	410	180

[1] All units are micrograms per liter. A dash (—) signifies no limitation.

§ 414.35 New source performance standards (NSPS).

Any new source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

SUBPART C

Pollutant or pollutant property	NSPS effluent limitations [1]	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
2, 4, 6-trichlorophenol	175	100
2-chlorophenol	75	50
2, 4-dichlorophenol	200	100

SUBPART C—Continued

Pollutant or pollutant property	NSPS effluent limitations [1]	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
2, 4-dimethylphenol	50	—
2-nitrophenol	100	75
4-nitrophenol	500	325
2, 4-dinitrophenol	150	100
pentachlorophenol	100	50
phenol	50	—
acenaphthene	50	—
1, 2, 4-trichlorobenzene	225	125
1, 2-dichlorobenzene	250	125
isophorone	50	—
bis(2-ethylhexyl) phthalate	350	150
di-n-butyl phthalate	300	150
diethyl phthalate	275	125
dimethyl phthalate	375	175
acenaphthylene	50	—
fluorene	50	—
phenanthrene	50	—
benzene	125	75
carbon tetrachloride	50	—
1, 2-dichloroethane	150	100
1, 1, 1-trichloroethane	50	—
1, 1-dichloroethane	225	125
1, 1, 2-trichloroethane	75	50
chloroethane	50	—
chloroform	75	50
1, 1-dichloroethylene	125	75
ethylbenzene	275	150
methylene chloride	50	—
methyl chloride	50	—
methyl bromide	50	—
dichlorobromomethane	50	—
toluene	225	125
trichloroethylene	75	50
antimony	780	.370
cadmium	70	40
chromium	190	90
copper	150	70
lead	70	40
mercury	90	50
zinc	210	100
cyanide	410	180

Pollutant or pollutant property	Maximum for any 1 day	Maximum for monthly average
High Water Use:		
BOD5	106	42
TSS	246	84
pH	(2)	(2)
Low Water Use:		
BOD5	146	58
TSS	353	120
pH	(2)	(2)

[1] All units except pH, BOD5 and TSS are micrograms per liter. BOD5 and TSS are milligrams per liter. A dash (—) signifies no limitation.
[2] Within the range of 6.0 to 9.0 at all times.

§ 414.36 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works (POTWs) must comply with 40 CFR Part 403 and achieve the following pretreatment standards for existing sources (PSES).

SUBPART C

Pollutant or pollutant property	Pretreatment standards for existing sources [1]	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
2,4,6-trichlorophenol	175	100
2-chlorophenol	75	50
2,4-dichlorophenol	200	100
2,4-dimethylphenol	50	—
2-nitrophenol	100	75
4-nitrophenol	500	325
2,4-dinitrophenol	150	100
isophorone	50	—
dimethyl phthalate	375	175
acenaphthylene	50	—
fluorene	50	—
phenanthrene	50	—
1,2-dichloroethane	150	100
chloroethane	50	—
methyl bromide	50	—
chromium	190	90
mercury	90	50

[1] All units are micrograms per liter. A dash (—) signifies no limitation.

§ 414.37 Pretreatment standards for new sources (PSNS).

Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS).

SUBPART C

Pollutant or pollutant property	Pretreatment standards for new sources [1]	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
2,4,6-trichlorophenol	175	100
2-chlorophenol	75	50
2,4-dichlorophenol	200	100
2,4-dimethylphenol	50	—
2-nitrophenol	100	75
4-nitrophenol	500	325
2,4-dinitrophenol	150	100
isophorone	50	—
dimethyl phthalate	375	175
acenaphthylene	50	—
fluorene	50	—
phenanthrene	50	—
1,2-dichloroethane	150	100
chloroethane	50	—
methyl bromide	50	—
chromium	190	90
mercury	90	50

[1] All units are micrograms per liter. A dash (—) signifies no limitation.

Subpart D—Type I Subcategory

§ 414.40 Applicability; description of Type I subcategory.

The provisions of this subpart are applicable to discharges resulting from the manufacture of organic chemicals only or both organic chemicals and plastics and synthetic fibers that include wastewater from any of the following ("Type I") generic processes but not from the oxidation generic process.

Peroxidation	Hydration
Acid Cleavage	Alkoxylation
Condensation	Hydrolysis
Isomerization	Carbonylation
Esterification	Hydrogenation
Hydroacetylation	Neutralization

§ 414.41 Specialized definitions.

For the purpose of this subpart: Except as provided in 40 CFR § 414.10(e) the general definitions, abbreviations, and methods of analysis set forth in 40 CFR Part 401 shall apply to this subpart.

§ 414.42 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable pollutant control technology (BPT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

SUBPART D

Pollutant or pollutant property	BPT effluent limitation [1]	
	Maximum for any 1 day	Maximum for monthly average
BOD5	100	40
TSS	137	47
pH	(2)	(2)

[1] All units except pH are milligrams per liter.
[2] Within the range of 6.0 to 9.0 at all times.

§ 414.43 Effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

SUBPART D

Pollutant or pollutant property	BCT effluent limitation [1]	
	Maximum for any 1 day	Maximum for monthly average
BOD5	100	40
TSS	137	47
pH	(2)	(2)

[1] All units except pH are milligrams per liter.
[2] Within the range of 6.0 to 9.0 at all times.

§ 414.44 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT)

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

SUBPART D

Pollutant or pollutant property	BAT effluent limitations [1]	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
2,4,6-trichlorophenol	175	100
2-chlorophenol	75	50
2,4-dichlorophenol	200	100
2,4-dimethylphenol	50	—
2-nitrophenol	100	75
4-nitrophenol	500	325
2,4-dinitrophenol	150	100
pentachlorophenol	100	50
phenol	50	—
acenaphthene	50	—
1,2,4-trichlorobenzene	225	125
1,2-dichlorobenzene	250	125
isophorone	50	—
bis(2-ethylhexyl) phthalate	350	150
di-n-butyl phthalate	300	150
diethyl phthalate	275	125
dimethyl phthalate	375	175
acenaphthylene	50	—
fluorene	50	—
phenanthrene	50	—
benzene	125	75
carbon tetrachloride	50	—
1,2-dichloroethane	150	100
1,1,1-trichloroethane	50	—
1,1-dichloroethane	225	125
1,1,2-trichloroethane	75	50
chloroethane	50	—
chloroform	75	50
1,1-dichloroethylene	125	75
ethylbenzene	275	150
methylene chloride	50	—
methyl chloride	50	—
methyl bromide	50	—
dichlorobromomethane	50	—
toluene	225	125
trichloroethylene	75	50
antimony	780	370
cadmium	70	40
chromium	190	90
copper	150	70
lead	70	40
mercury	90	50
zinc	210	100
cyanide	410	180

[1] All units are micrograms per liter. A dash (—) signifies no limitation.

§ 414.45 New source performance standards (NSPS).

Any new source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

SUBPART D

Pollutant or pollutant property	NSPS effluent limitations [1]	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
2,4,6-trichlorophenol	175	100
2-chlorophenol	75	50
2,4-dichlorophenol	200	100
2,4-dimethylphenol	50	—
2-nitrophenol	100	75
4-nitrophenol	500	325
2,4-dinitrophenol	150	100

SUBPART D—Continued

Pollutant or pollutant property	NSPS effluent limitations [1] maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
pentachlorophenol	100	50
phenol	50	—
acenaphthene	50	—
1,2,4-trichloroobenzene	225	125
1,2-dichlorobenzene	250	125
isophorone	50	—
bis(2-ethylhexyyl) phthalate	350	150
di-n-butyl phthalte	300	150
diethyl phthalate	275	125
dimethyl phthalate	375	175
acenaphthylene	50	—
fluorene	50	—
Phenanthrene	50	—
benzene	125	75
carbon tetrachloride	50	—
1,2-dichloroethane	150	100
1,1,1-trichloroethane	50	—
1,1-dichloroethane	225	125
1,1,2-trichloroethane	75	50
chloroethane	50	—
choloroform	75	50
1,1-dichloroethylene	125	75
ethylbenzene	275	150
methylene chloride	50	—
methyl chloride	50	—
methyl bromide	50	—
dichlorobromomethane	50	—
toluene	225	125
trichloroethylene	75	50
antimony	780	370
cadmium	70	40
chromium	190	90
copper	150	70
lead	70	40
mercury	90	50
zinc	210	100
cyanide	410	180

Pollutant or pollutant property	Maximum for any 1 day	Maximum for monthly average
BOD5	100	40
TSS	137	47
pH	(1)	(1)

[1] All units except pH, BOD5 and TSS are micrograms per liter. BOD5 and TSS are milligrams per liter. A dash (—) signifies no limitation.

§ 414.46 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works (POTWs) must comply with 40 CFR Part 403 and achieve the following pretreatment standards for existing sources (PSES).

SUBPART D

Pollutant or pollutant property	Pretreatment standards for existing sources [1] Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
2,4,6-trichlorophenol	175	100
2-chlorophenol	75	50
2,4-dichlorophenol	200	100
2,4-dimethylphenol	50	—
2-nitrophenol	100	75
4-nitrophenol	500	325
2,4-dinitrophenol	150	100
isophorone	50	—
dimethyl phthalate	375	175
acenaphthylene	50	—
flourene	50	—
phenanthrene	50	—
1,2-dichloroethane	150	100
chloroethane	50	—
methyl bromide	50	—
chromium	190	90
mercury	90	50

[1] All units are micrograms per liter. A dash (—) signifies no limitation.

§ 414.47 Pretreatment standards for new sources (PSNS).

Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS).

Subpart D

Pollutant or pollutant property	Pretreatment standards for new sources [1] Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
2,4,6-trichlorophenol	175	100
2-chlorophenol	75	50
2,4:dichlorophenol	200	100
2,4:dimethylphenol	50	—
2-nitrophenol	100	75
4-nitrophenol	500	325
2,4-dinitrophenol	150	100
isophorone	50	—
dimethyl phthalate	375	175
acenaphthylene	50	—
fluorene	50	—
phenanthrene	50	—
1,2-dichloroethane	150	100
chloroethane	50	—
methyl bromide	50	—
chromium	190	90
mercury	90	50

[1] All units are micrograms per liter. A dash (—) signifies no limitation.

Subpart E—Other Discharges Subcategory

§ 414.50 Applicability; description of other discharges subcategory.

The provisions of this subpart are applicable to discharges resulting from the manufacture of organic chemicals only or both organic chemicals and plastics and synthetic fibers that are not subject to subparts B, C and D of this part.

§ 414.51 Specialized definitions.

For the purpose of this subpart:

Except as provided in 40 CFR 414.10(e) the general definitions, abbreviations, and methods of analysis set forth in 40 CFR Part 401 shall apply to this subpart.

§ 414.52 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable pollutant control technology (BPT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

SUBPART E

Pollutant or pollutant property	BPT effluent limitations [1] Maximum for any 1 day	Maximum for monthly average
BOD5	69	28
TSS	115	39
pH	(2)	(2)

[1] All units except pH are milligrams per liter.
[2] Within the range of 6.0 to 9.0 at all times.

§ 414.53 Effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

SUBPART E

Pollutant or pollutant property	BCT effluent limitations [1] Maximum for any 1 day	Maximum for monthly average
BOD5	69	28
TSS	115	39
pH	(2)	(2)

[1] All units except pH are milligrams per liter.
[2] Within the range of 6.0 to 9.0 at all times.

§ 414.54 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR § 125.30 through 125.32, any existing point source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

SUBPART E

Pollutant or pollutant property	BAT effluent limitations [1]	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
2,4,6-trichlorophenol	175	100
2-chlorophenol	75	50
2,4-dichlorophenol	200	100
2,4-dimethylphenol	50	—
2-nitrophenol	100	75
4-nitrophenol	500	325
2,4-dinitrophenol	150	100
pentachlorophenol	100	50
phenol	50	—
acenaphthene	50	—
1,2,4-trichlorobenzene	225	125
1,2-dichlorobenzene	250	125
isophorone	50	—
bis(2-ethylhexy) phthalate	350	150
di-n-butyl phthalate	300	150
diethyl phthalate	275	125
dimethyl phthalate	375	175
acenaphthylene	50	—
fluorene	50	—
phenanthrene	50	—
benzene	125	75
carbon tetrachloride	50	—
1,2-dichloroethane	150	100
1,1,1-trichloroethane	50	—
1,1-dichloroethane	225	125
1,1,2-trichloroethane	75	50
chloroethane	50	—
chloroform	75	50
1,1-dichloroethylene	125	75
ethylbenzene	275	150
methylene chloride	50	—
methyl chloride	50	—
methyl bromide	50	—
dichlorobromomethane	50	—
toluene	225	125
trichloroethylene	75	50
antimony	780	370
cadmium	70	40
chromium	190	90
copper	150	70
lead	70	40
mercury	90	50
zinc	210	100
cyanide	410	180

[1] All units are micrograms per liter. A dash (—) signifies no limitation.

§ 414.55 New source performance standards (NSPS).

Any new source subject to this subpart must achieve discharges not exceeding the quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

SUBPART E

Pollutant or pollutant property	NSPS effluent limitations [1]	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
2,4,6-trichlorophenol	175	100
2-chlorophenol	75	50
2,4-dichlorophenol	200	100
2,4-dimethylphenol	50	—
2-nitrophenol	100	75
4-nitrophenol	500	325
2,4-dinitrophenol	150	100
pentachlorophenol	100	50
phenol	50	—
acenaphthene	50	—
1,2,4-trichlorobenzene	225	125
1,2-dichlorobenzene	250	125
isophorone	50	—
bis(2-ehthylhexyl phthalate	350	150
di-n-butyl phthalate	300	150
diethyl phthalate	275	125
dimethyl phthalate	375	175
acenaphthylene	50	—
fluorene	50	—
phenanthrene	50	—
benzene	125	75
carbon tetrachloride	50	—
1,2-dichloroethane	150	100
1,1,1-trichloroethane	50	—
1,1-dichloroethane	225	125
1,1,2-trichloroethane	75	50
chloroethane	50	—
chloroform	75	50
1,1-dichloroethylene	125	75
ethylbenzene	275	150
methylene chloride	50	—
methyl chloride	50	—
methyl bromide	50	—
dichlorobromomethane	50	—
toluene	225	125
trichloroethylene	75	50
antimony	780	370
cadmium	70	40
chromium	190	90
copper	150	70
lead	70	40
mercury	90	50
zinc	210	100
cyanide	410	180

Pollutant or pollutant property	Maximum for any 1 day	Maximum for monthly average
BOD5	69	28
TSS	115	39
PH	([2])	([2])

[1] All units except pH, BOD5 and TSS are micrograms per liter. BOD5 and TSS are milligrams per liter. A dash (—) signifies no limitation.
[2] Within the range of 6.0 to 9.0 at all times.

§ 414.56 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart that introduces pollutants into a publicly owned treatment works (POTWs) must comply with 40 CFR Part 403 and achieve the following pretreatment standards for existing sources (PSES):

SUBPART E

Pollutant or pollutant property	Pretreatment standards for existing sources [1]	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
2,4,6-trichlorophenol	175	100
2-chlorophenol	75	50
2,4-dichlorophenol	200	100
2,4-dimethylphenol	50	—
2-nitrophenol	100	75
4-nitrophenol	500	325
2,4-dinitrophenol	150	100
isophorone	50	—
dimethyl phthalate	375	175
acenaphthylene	50	—
fluorene	50	—
phenanthrene	50	—
1,2-dichloroethane	150	100
chloroethane	50	—
methyl bromide	50	—
chromium	190	90
mercury	90	50

[1] All units are micrograms per liter. A dash (—) signifies no limitations.

§ 414.57 Pretreatment standards for new sources (PSNS).

Except as provided in 40 CFR 403.7, any new source subject to this subpart that introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS):

SUBPART E

Pollutant or pollutant property	Pretreatment Standards for New Sources [1]	
	Maximum for any 1 day	Average of daily values for 4 consecutive monitoring days
2,4,6-trichlorophenol	175	100
2-chlorophenol	75	50
2,4-dichlorophenol	200	100
2,4-dimethylphenol	50	—
2-nitrophenol	100	75
4-nitrophenol	500	325
2,4-dinitrophenol	150	100
isophorone	50	—
dimethyl phthalate	375	175
acenaphthylene	50	—
fluorene	50	—
phenanthrene	50	—
1,2-dichloroethane	150	100
chloroethane	50	—
methyl bromide	50	—
chromium	190	90
mercury	90	50

[1] All units are micrograms per liter. A dash (—) signifies no limitation.

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