ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 414 and 416

[FRL 3230-5]

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

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This regulation establishes effluent limitations guidelines and standards that limit the discharge of pollutants into navigable waters and publicly owned treatment works (POTWs) by existing and new sources in the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) industrial category. The Clean Water Act and a consent decree require EPA to issue this regulation.

The regulation establishes effluent limitations guidelines attainable by the application of the "best practicable control technology currently available" (BPT) and the "best available technology economically achievable" (BAT), pretreatment standards applicable to existing and new dischargers to POTWs (PSES and PSNS, respectively), and new source performance standards (NSPS) attainable by the application of the "best available demonstrated technology."

DATES: In accordance with 40 CFR Part 23 (50 FR 7268, February 21, 1985), this regulation shall be considered issued for purposes of judicial review at 1:00 p.m. Eastern time November 19, 1987. These regulations shall become effective December 21, 1987.

The compliance date for PSES is November 5, 1990. The compliance date for NSPS and PSNS is the date the new source begins operation. Deadlines for compliance with BPT and BAT are established in permits.

Under section 509(b)(1) of the Clean Water Act, judicial review of this regulation can be had only by filing a petition for review in the United States Court of Appeals within 120 days after the regulation is considered issued for purposes of judicial review. Under section 509(b)(2) of the Clean Water Act, the requirements in this regulation may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

ADDRESSES: The basis for this regulation is detailed in four major documents. See Section XV—Availability of Technical Information for information on those documents. Copies of the technical and economic documents may be obtained from the National Technical Information Service, Springfield, Virginia 22161 (Phone: (703) 487-4600). For additional technical information, contact Mr. Elwood H. Forsht, Industrial Technology Division (WH-552), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460 (Phone: (202) 382-7190). For additional economic information, contact Ms. Kathleen Ehrensberger, Analysis and Evaluation Division (WH-586), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460 (Phone: (202) 382-5397).

On January 11, 1988, the complete public record for this rulemaking, including the Agency's responses to comments received during rulemaking, will be available for review in EPA's Public Information Reference Unit, Room 2404 (Rear) (EPA Library), 401 M Street, SW., Washington, DC. The EPA public information regulation (40 CFR Part 2) provides that a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Elwood H. Forsht at (202) 382-7190.

SUPPLEMENTARY INFORMATION:

Overview

This preamble describes the legal authority, background, the technical and economic bases, and other aspects of the final regulation. The abbreviations, acronyms, and other terms used in the Supplementary Information sections are defined in Appendix A to this notice.

Organization of This Notice

I. Legal Authority

This regulation is promulgated under the authority of sections 301, 304, 306, 307, 308, and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, as amended (33 U.S.C. 1251 *et seq.*)), also referred to as "the Act." It is also promulgated in response to the decree in *Natural Resources Defense Council, Inc* v. *Train*, 8 ERC 2120 (D.D.C. 1976), *modified*, 12 ERC 1833 (D.D.C. 1979), *modified* by Orders dated October 26, 1982, August 2, 1983, January 6, 1984, July 5, 1984, January 7, 1985, April 24, 1986, and January 8, 1987.

II. Scope of This Rulemaking

This final regulation establishes effluent limitations guidelines and standards for existing and new organic chemicals, plastics, and synthetic fibers

(OCPSF) manufacturing facilities. It applies to process wastewater discharges from these facilities.

For the purposes of this regulation, OCPSF process wastewater discharges are defined as discharges from all establishments or portions of establishments that manufacture products or product groups listed in the applicability sections of this regulation, and are included within the following U.S. Department of Commerce Bureau of the Census Standard Industrial Classification (SIC) major groups:

(1) SIC 2865—Cyclic Crudes and Intermediates, Dyes, and Organic Pigments,

(2) SIC 2869—Industrial Organic Chemicals, not Elsewhere Classified,

(3) SIC 2821—Plastic Materials, Synthetic Resins, and Nonvulcanizable Elastomers,

(4) SIC 2823—Cellulosic Man-Made Fibers, and

(5) SIC 2824—Synthetic Organic Fibers, Except Cellulosic.

The OCPSF regulation does not apply to process wastewater discharges from the manufacture of organic chemical compounds solely by extraction from plant and animal raw materials or by fermentation processes.

The OCPSF regulation covers all OCPSF products or processes whether or not they are located at facilities where the OCPSF covered operations are a minor portion of and ancillary to the primary production activities or a major portion of the activities.

The OCPSF regulation does not apply to discharges from OCPSF product/process operations which are covered by the provisions of other categorical industry effluent limitations guidelines and standards if the wastewater is treated in combination with the non-OCPSF industrial category regulated wastewater. (Some products or product groups are manufactured by different processes and some processes with slight operating condition variations give different products. EPA uses the term "product/process" to mean different variations of the same basic process to manufacture different products as well as to manufacture the same product using different processes.) However, the OCPSF regulation does apply to the product/processes covered by this regulation if the facility reports OCPSF products under SIC codes 2865, 2869, or 2821, and its OCPSF wastewaters are treated in a separate treatment system at the facility or discharged separately to a municipal treatment system.

For example, some vertically integrated petroleum refineries and pharmaceutical manufacturers discharge wastewaters from the production of synthetic organic chemical products that are specifically regulated under the Petrochemical and Integrated Subcategories of the Petroleum Refining Point Source Category (40 CFR Part 419, Subparts C and E) or the Chemical Synthesis Products Subcategory of the Pharmaceuticals Manufacturing Point Source Category (40 CFR Part 439, Subpart C). The principles discussed in the preceding paragraph apply as follows: The process wastewater discharges by petroleum refineries and pharmaceutical manufacturers from production of organic chemical products specifically covered by 40 CFR Part 419 Subparts C and E and Part 439 Subpart C, respectively, that are treated in combination with other petroleum refinery or pharmaceutical manufacturing wastewater, respectively, are not subject to the OCPSF regulation no matter what SIC code they use to report their products. However, if the wastewaters from their OCPSF production are separately discharged to a POTW or treated in a separate treatment system, and they report their products (from these processes) under SIC codes 2865, 2869, or 2821, then discharges from these manufacturing operations are subject to regulation under the OCPSF regulation, regardless of whether the OCPSF products are covered by 40 CFR Part 419, Subparts C and E and Part 439, Subpart C.

Today's OCPSF category regulation applies to plastics molding and forming processes when plastic resin manufacturers mold or form (e.g., extrude and pelletize) crude intermediate plastic material for shipment off-site. This regulation also applies to the extrusion of fibers. Plastics molding and forming processes other than those described above are regulated by the Plastics Molding and Forming effluent guidelines and standards (40 CFR Part 463).

Public comments requested guidance relating to the coverage of OCPSF research and development facilities. Stand-alone OCPSF research and development, pilot plant, technical service, and laboratory bench scale operations are not covered by the OCPSF regulation. However, wastewater from such operations conducted in conjunction with and related to existing OCPSF manufacturing operations at OCPSF facilities is covered by the OCPSF regulation because these operations would most likely generate wastewater with characteristics similar to the commercial manufacturing facility. Research and development, pilot plant, technical service, and laboratory operations which are unrelated to existing OCPSF plant operations, even though conducted on-site, are not covered by the OCPSF regulation because they may generate wastewater with characteristics dissimilar to that from the commercial OCPSF manufacturing facility.

Finally, as described in the following paragraphs, this regulation does not cover certain production that has historically been reported to the Bureau of Census under a non-OCPSF SIC subgroup heading, even if such production could be reported under one of the five SIC code groups covered by today's regulation.

The Settlement Agreement (see Section III.A) requires the Agency to establish regulations for the Organic Chemicals Manufacturing SIC codes 2865 and 2869 and for the Plastics and Synthetic Materials manufacturing SIC code 282. SIC 282 includes the three codes covered by this regulation, 2821, 2823, and 2824, as well as SIC 2822, Synthetic Rubber (Vulcanizable Elastomers), which is covered specifically in the Settlement Agreement by another industrial category, Rubber Manufacturing (40 CFR Part 428). The Agency therefore directed its data collection efforts to those facilities that report manufacturing activities under SIC codes 2821, 2823, 2824, 2865 and 2869. Based on an assessment of this information and the integrated nature of the synthetic organic chemicals, plastics and synthetic fibers industry, the Agency also defined the applicability of the OCPSF regulation by listing the specific products and product groups that provide the technical basis for the regulation.

Since many of these products may be reported under more than one SIC code even though they are often manufactured with the same reaction chemistry or unit operations, the Agency considered extending the applicability of the OCPSF regulation (50 FR 29068; July 17, 1985, or 51 FR 44082; December 8, 1986) to include OCPSF production reported under the following SIC subgroups:

1. SIC 2911058—aromatic hydrocarbons manufactured *from* purchased refinery products,

2. SIC 2911632—aliphatic hydrocarbons manufactured *from* purchased refinery products,

3. SIC 28914—synthetic resin and rubber adhesives (including only those synthetic resins listed under both SIC 28914 and SIC 2821 that are polymerized for use or sale by adhesive manufacturers),

4. Chemicals and Chemical Preparations, not Elsewhere Classified:
a. SIC 2899568—sizes, all types
b. SIC 2899597—other industrial chemical specialties, including fluxes, plastic wood preparations, and embalming fluids,
5. SIC 2843085—bulk surface active agents, and
6. SIC 3079—miscellaneous plastics products (including only cellophane manufacture from the viscose process).

However, for the reasons discussed below, the Agency has decided not to extend the applicability of the OCPSF regulation to discharges from establishments that manufacture OCPSF products and have, in the past, reported such production under these non-OCPSF SIC subgroups.

The SIC codes are classifications of commercial and industrial establishments by type of activity in which they are engaged. The predominant purpose of the SIC code is to classify the manufacturing industries for the collection of economic data. The product descriptions in SIC codes are often technically ambiguous and also list products that are no longer produced in commercial quantities. For this reason, the Agency proposed to define the applicability of the OCPSF regulation in terms of both SIC codes and specific products and product groups (50 FR 29073, July 17, 1985). Many chemical products may appear under more than one SIC code depending on the manufacturing raw material sources, use in the next stage of the manufacturing process, or type of sale or end use. For example, phenolic, urea, and acrylic resin manufacture may be reported under SIC 28914, Synthetic Resin Adhesives, as well as under SIC 2821, Plastics Materials and Resins. Benzene, toluene, and xylene manufacture may be reported under SIC 2911, Petroleum Refining, or under SIC 2911058, Aromatics, Made from Purchased Refinery Products, as well as SIC 2865, Cyclic Crudes and Intermediates. Likewise, alkylbenzene sulfonic acids and salts manufacture may be reported under SIC 2843085, Bulk Surface Active Agents, which include all amphoteric, anionic, cationic and nonionic bulk surface active agents excluding surface active agents produced or purchased and sold as active ingredients in formulated products, as well as SIC 286, Industrial Organic Chemicals.

Many commenters stated that the Agency's OCPSF technical and economic studies do not contain sufficient information to extend coverage to all facilities reporting OCPSF manufacturing under all of the above SIC subgroups. The Agency agrees in part with these commenters. The OCPSF technical, cost, and economic impact data gathering efforts focused only on those primary and secondary manufacturers that report OCPSF manufacturing activities under the above SIC codes 2821, 2823, 2824, 2865 and 2869. Specific efforts were not directed toward gathering technical and financial data from facilities that report OCPSF manufacturing under SIC subgroups 2911058, 2911632, 28914, 2843085, 2899568, 2899597 and 3079. As a result, EPA lacks cost and economic information from a significant number of plants that report OCPSF manufacturing activities to the Bureau of Census under these latter SIC subgroups. Consequently, the applicability section of the final regulation (§ 414.11) clarifies that the OCPSF regulation does not apply to a plant's OCPSF production that has been reported by the plant in the past under SIC groups 2911058, 2911632, 28914, 2843085, 2899568, 2899597, and 3079.

Approximately 140 of the 940 OCPSF plants that provide the basis for today's regulation reported parts of their OCPSF production under SIC codes 2911058, 2911632, 28914, 2843085, 2899568, and 2899597 as well as SIC codes 2821, 2823, 2824, 2865, and 2869. As a result of the definition of applicability, a smaller portion of plant production than was reported as OCPSF production for these plants will be covered by today's regulation.

The Agency does note, however, that the OCPSF manufacturing processes are essentially identical regardless of how manufacturing facilities may report OCPSF production to the Bureau of Census. Therefore, the OCPSF data base and effluent limitations and standards provide permit issuing authorities with guidance for establishing "Best Professional Judgement" (BPJ) permits for OCPSF production activities to which this regulation does not apply.

Some of the non-OCPSF SIC subgroups were the subject of prior EPA decisions not to establish national regulations for priority pollutants under the terms of Paragraph 8 of the Settlement Agreement. Such action was taken for adhesive and sealant manufacturing (SIC 2891), as well as plastics molding and forming (SIC 3079), paint and ink formulation and printing (which industries were within SIC 2851, 2893, 2711, 2721, 2731 and ten other SIC 27 groups) and soap and detergent manufacturing (SIC 2841). However, it should be noted that in specific instances where a plant in these categories has OCPSF production activities, toxic pollutants may be present in the discharge in amounts that warrant best professional judgement (BPJ) regulatory control. The adhesives and sealants, plastics molding and forming, and paint and ink formulation and printing Paragraph 8 exclusions do not include process wastewater from the secondary manufacture of synthetic resins. Similarly, the soaps and detergents Paragraph 8 exclusion does not include process wastewater from the manufacture of surface active agents (SIC 2843). In these cases, and even in cases where priority pollutants from OCPSF production covered by other categorical standards (e.g., petroleum refining and pharmaceuticals) have been excluded from those regulations under the terms of Paragraph 8 of the Settlement Agreement, BPJ priority pollutant regulation for individual plants having OCPSF production may be appropriate.

III. 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)) To implement the Act, EPA was required to issue effluent limitations guidelines, pretreatment standards, and new source performance standards for industrial dischargers.

In addition to these regulations for industrial categories, EPA was required to promulgate effluent limitations guidelines and standards applicable to discharges of toxic pollutants. The Act included a timetable for issuing these standards. However, EPA was unable to meet many of the deadlines and, as a result, in 1976, it was sued by several environmental groups. In settling this lawsuit, EPA and the plaintiffs executed a "Settlement Agreement" that was approved by the Court. This agreement required EPA to develop a program and adhere to a schedule for controlling 65 "priority" toxic pollutants and classes of pollutants. In carrying out this program, EPA was required to promulgate BAT effluent limitations guidelines, pretreatment standards, and new source performance standards for a variety of major industries, including the OCPSF industry. See *Natural Resources Defense Council, Inc* v. *Train, supra.*

Many of the basic elements of the Settlement Agreement were incorporated into the Clean Water Act of 1977. Like the Agreement, the Act stressed control of toxic pollutants,

including the 65 "priority" toxic pollutants and classes of pollutants.

Under the Act, the EPA is required to establish several different kinds of effluent limitations guidelines and standards. They are summarized briefly below:

1. Best Practicable Control Technology Currently Available (BPT)

BPT effluent limitations guidelines are generally based on the average of the best existing performance by plants of various sizes, ages, and unit processes within the category or subcategory for control of familiar (i.e., conventional) pollutants.

In establishing BPT effluent limitations guidelines, EPA considers the total cost in relation to the effluent reduction benefits, the age of equipment and facilities involved, the processes employed, process changes required, engineering aspects of the control technologies, and non-water quality environmental impacts (including energy requirements). The Agency considers the category-wide or subcategory-wide cost of applying the technology in relation to the effluent reduction benefits.

2. Best Available Technology Economically Achievable (BAT)

BAT effluent limitations guidelines, in general, represent the best existing performance in the category or subcategory. The Act establishes BAT as the principal national means of controlling the direct discharge of toxic and nonconventional pollutants to navigable waters.

In establishing BAT, the Agency considers the age of equipment and facilities involved, the processes employed, the engineering aspects of the control technologies, process changes, the cost of achieving such effluent reduction, and non-water quality environmental impacts.

3. Best Conventional Pollutant Control Technology (BCT)

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

BCT is not an additional limitation but replaces BAT for the control of conventional pollutants. BAT remains in effect for the toxic and nonconventional pollutants. In addition to other factors specified in section 304(b)(4)(B), the Act requires that the BCT effluent limitations guidelines be assessed in light of a two part "cost-reasonableness" test. *American Paper Institute* v. *EPA*, 660 F.2d 954 (4th Cir. 1981). The first test compares the cost for private industry to reduce its discharge of conventional pollutants with the cost 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.

EPA has promulgated a methodology for establishing BCT effluent limitations guidelines (51 FR 24974, July 8, 1986).

4. New Source Performance Standards (NSPS)

NSPS are based on the performance of the best available demonstrated technology. New plants have the opportunity to install the best and most efficient production processes and wastewater treatment technologies. As a result, NSPS should represent the most stringent numerical values attainable through the application of best available demonstrated control technology for all pollutants (toxic, conventional and nonconventional).

5. Pretreatment Standards for Existing Sources (PSES)

PSES are designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of publicly owned treatment works (POTWs). The Clean Water Act requires pretreatment standards for pollutants that pass through POTWs or interfere with POTWs' treatment processes or sludge disposal methods. The legislative history of the 1977 Act indicates that pretreatment standards are to be technology-based and analogous to the BAT effluent limitations guidelines for removal of toxic pollutants. For the purpose of determining whether to promulgate national category-wide pretreatment standards, EPA generally determines that there is pass through of a pollutant and thus a need for categorical standards if the nation-wide average percentage of a pollutant removed by well-operated POTWs achieving secondary treatment is less than the percent removed by the BAT model treatment system. The General Pretreatment Regulations, which set forth the framework for categorical pretreatment standards, are found at 40 CFR Part 403. (Those regulations contain a definition of pass through that addresses localized rather than national instances of pass through and does not use the percent removal comparison test described above. See 52 FR 1586, January 14, 1987.)

6. Pretreatment Standards for New Sources (PSNS)

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

B. Overview of the Industry

The OCPSF industry is large and diverse, and many plants in the industry are highly complex. This industry manufactures over 25,000 different organic chemicals, plastics, and synthetic fibers. However, less than half of these products are produced in excess of 1,000 pounds per year. The industry includes approximately 750 facilities whose principal or primary production activities are covered under the OCPSF SIC groups. There are approximately 200 other plants which are secondary producers of OCPSF products, i.e., OCPSF production is ancillary to their primary production activities. (As discussed above in this preamble, this regulation covers OCPSF discharges from secondary producers, with certain exceptions.) Thus the total number of plants to be regulated totally or in part by the OCPSF industry regulation is approximately 1,000. Secondary OCPSF plants may be part of other chemical producing industries such as the petroleum refining, inorganic chemicals, pharmaceuticals, and pesticides industries as well as chemical formulation industries such as the adhesives and sealants, the paint and ink, and the plastics molding and forming industries.

Some plants produce chemicals in large volumes while others produce only small volumes of "specialty" chemicals. Large volume production tends to use continuous processes. Continuous processes are generally more efficient than batch processes in minimizing

water use and optimizing the consumption of raw materials.

Different products are made by varying the raw materials, the 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 produce simultaneously many different products using a variety of continuous and batch operations and the product mix may change on a weekly or daily basis.

A total of 940 facilities (based on 1982 production) are included in the technical and economic studies used as a basis for this regulation. Approximately 76 percent of these facilities are primary OCPSF manufacturers (over 50 percent of their total plant production involves OCPSF products) and approximately 24 percent of the facilities are secondary OCPSF manufacturers that produce mainly other types of products. An estimated 32 percent of the plants are direct dischargers, about 42 percent discharge indirectly (i.e., to publicly owned treatment works), and the remaining facilities (26 percent) either do not discharge to surface waters or have unknown discharge status. The estimated average daily process wastewater discharge per plant is 1.31 MGD (millions of gallons per day) for direct dischargers and 0.25 MGD for indirect dischargers. The non-discharging plants use dry processes, reuse their wastewater, or dispose of their wastewater by deep well injection, incineration, contract hauling, or by means of evaporation and 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. They include conventional pollutants (pH, BOD, TSS and oil and grease); an unusually wide variety of toxic priority pollutants (both metals and organic compounds); and a large number of nonconventional pollutants. Many of the toxic and nonconventional pollutants are organic compounds produced by the industry for sale. Others are created by the industry as byproducts of their production operations. EPA focused its attention in today's rulemaking on the conventional pollutants and on the 126 toxic priority pollutants.

Economic data provided in response to "308 survey" questionnaires completed pursuant to Section 308 of the CWA indicate that OCPSF production in 1982 totaled 185 billion pounds and that the quantity shipped was 151 billion pounds. The corresponding value of shipments equaled $59 billion, and employment in the industry totaled 183,000 in 1982. In that same year a total of 455 firms operated the 940 facilities referred to above.

Plant and firm sizes and types vary considerably. Single plant firms are much smaller in terms of total (OCPSF and non-OCPSF) sales, an average of $33 million annually. By contrast, multi-plant firms are much larger with average annual sales totaling $1.39 billion. This relationship holds whether a plant is a primary producer or a secondary producer of OCPSF products.

Certain sectors of the OCPSF industry tend to be more concentrated than others. Cellulosic fiber manufacturers exhibit the most concentration, with all domestic production coming from only six plants. Synthetic fibers manufacturers are the next most concentrated with 40 plants. The organic chemicals and plastics sectors are the least concentrated and the most competitive; both sectors have large numbers of plants and firms with both primary and secondary producers. In addition, most sectors of the OCPSF industry face extensive foreign competition.

International OCPSF trade is an important factor for this industry and the U.S. economy. In 1984, exports of OCPSF products were five percent of all U.S. exports, while OCPSF imports accounted for one percent of all U.S. imports. Both imports and exports of OCPSF products have increased over the last 15 years, particularly for plastic resins and organic chemicals.

While U.S. exports were three times greater than imports in 1984, the trend over the most recent years has been for exports to remain constant or decline; while imports have steadily increased. As expansion in foreign petrochemical production continues, the worldwide market for OCPSF products will continue to become increasingly competitive in all product sectors. Domestic producers of basic commodity chemicals face the greatest problems in terms of foreign competition.

IV. Development of the Final OCPSF Regulation

A. Efforts Leading to the Proposed Rulemaking

1. Earlier Regulatory Efforts

EPA originally promulgated effluent limitations guidelines and standards for the Organic Chemicals Manufacturing Industry in two phases. Phase I, covering 40 product/processes, was promulgated on April 25, 1974 (39 FR 14676). Phase II, covering 27 additional product/processes, was promulgated on January 5, 1976 (41 FR 902). The Agency also promulgated effluent limitations guidelines and standards for the Plastics and Synthetic Fibers Industry in two phases. Phase I, covering 31 product/processes, was promulgated on April 5, 1974 (39 FR 12502). Phase II, covering eight additional product/processes, was promulgated on January 23, 1975 (40 FR 3716).

These regulations were challenged. On February 10, 1976, the Court in *Union Carbide* v. *Train*, 541 F.2d 1171 (4th Cir. 1976), remanded the Phase I Organic Chemicals regulation. EPA withdrew the Phase II Organic Chemicals regulation on April 1, 1976 (41 FR 13936). However, pursuant to an agreement with the industry petitioners, the regulations for butadiene manufacture were left in place. The Court also remanded the Phase I Plastics and Synthetic Fibers regulations in *FMC Corp.* v. *Train*, 539 F.2d 973 (4th Cir. 1976), and in response EPA withdrew both the Phase I and II Plastics and Synthetic Fibers regulations on August 4, 1976 (41 FR 32587) except for the pH limitations, which had not been addressed in the lawsuit. Consequently, only the regulations covering butadiene manufacture for the Organic Chemicals industry and the pH regulations for the Plastics and Synthetic Fibers industry have been in effect to date. These regulations are superseded by the regulations promulgated today.

In the absence of promulgated, effective effluent limitations guidelines and standards, OCPSF direct dischargers have been issued NPDES permits on a case-by-case basis using best professional judgment (BPJ), as provided in section 402(a)(1) of the CWA.

2. Initiation of Current Rulemaking Efforts

Subsequent to the remand and withdrawal of the above regulations, studies and data gathering were initiated in order to provide a basis for issuing effluent limitations guidelines and standards for this industry. These efforts provided a basis for a March 1983 proposal and July 1985, October 1985, and December 1986 (post-proposal) notices of availability of information. These efforts are described below.

On March 21, 1983, the Agency proposed regulations for the OCPSF categories at 48 FR 11828. The proposed regulations included effluent limitations guidelines based on the application of BPT, BCT, and BAT, along with NSPS and PSES and PSNS. EPA proposed BPT

regulations for four subcategories to control the discharge of conventional pollutants, 5-day biochemical oxygen demand (designated as BOD throughout this notice), total suspended solids (TSS), and pH. EPA also proposed BAT regulations for two subcategories (based on general types of products made), controlling 36 toxic organic and eight toxic metal pollutants in the Not Plastics-Only Subcategory and five toxic organic and five toxic metal pollutants in the Plastics Only Subcategory. The Agency also proposed BCT limitations setting all BCT limitations equal to BPT regulations based on the application of a proposed BCT cost test methodology (see 47 FR 49176). With regard to PSES and PSNS, EPA proposed standards controlling 15 toxic organic pollutants in the Not Plastics-Only Subcategory and two toxic metal pollutants in the Plastics Only Subcategory. For NSPS, EPA proposed to establish limitations based on the proposed BPT limitations for conventional pollutants and on the proposed BAT limitations for toxic pollutants. PSNS was proposed to be equal to PSES.

As part of the proposal, the Agency solicited additional comments and information on 30 specific issues related to the proposed rulemaking (refer to section XIX of the proposal at 48 FR 11850 of March 21, 1983). These issues related to several topics including: (1) The industry generic process basis for the subcategorization scheme, (2) the potential use of post-biological polishing ponds and filters as the technology basis for the BPT total suspended solids limitations, (3) the potential difficulty of meeting BPT limitations due to high or low ambient temperatures, (4) the methodology devised to determine which priority pollutants are likely to be discharged from particular product/processes, (5) the technical and economic achievability of the proposed BAT limitations at individual plants, (6) a workable scheme for not regulating all priority pollutants at all plants, (7) the methodology for excluding certain priority pollutants from PSES, (8) the unit costs and costing models used for developing BPT and BAT costs, (9) the analytical methods utilized to develop the priority pollutant data base, and (10) the economic impact analysis methodology. The Agency also acknowledged the need for more data. In addition to soliciting information, EPA stated its intent to collect additional data.

B. Post Proposal Notices

On July 17, 1985 (50 FR 29068), the Agency published a notice of availability in which numerous changes to the March 1983 proposal were discussed. Most of the changes noticed were a direct result of the comments received on the proposed regulation or due to the new information and data collected after the proposal was published. The changes discussed in this notice included a new approach to BPT subcategorization, changes to the technology bases for BAT, PSES, NSPS and PSNS, with a description of what the revisions in the proposed limitations and standards would be, based on the changes in technology and the new data. EPA presented new estimates of pollutant loadings and discussed revisions to the engineering costing methodology. Options were presented for toxic pollutant monitoring requirements, and a revised methodology for determining economic impacts was discussed.

On October 11, 1985 (50 FR 41528), the Agency extended the comment period for the July 17, 1985 notice (50 FR 29068). The notice also provided corrected estimates of the wastewater pollutant loadings set forth in the July notice and announced the addition of both data analyses and regulatory options to the record. In this notice, the Agency discussed possible controls of air emissions of volatile pollutants, the possibility of editing the BPT data base for TSS performance, and the possibility of accommodating for adverse economic impacts at small facilities. The notice also discussed establishing alternative zinc BAT limits for manufacturers of rayon fibers that use the viscose process and manufacturers of acrylic fibers that use the zinc chloride/solvent process.

On December 8, 1986 (51 FR 44082), the Agency published another notice of availability in which several additional issues for the OCPSF regulation were discussed, including options for alternative BAT limits and PSES for small plants, and a revised BPT subcategorization approach. In conjunction with this new approach to subcategorization, the Agency presented a mathematical equation to model long-term average effluent concentrations of BOD and TSS as a function of the proportion of activity in each subcategory at an individual facility. The coefficients used in this equation were estimated from reported plant data using standard statistical regression methods. The Notice also discussed the possible use in the POTW pass-through analysis of qualitative information which would expand the data base for evaluating the effectiveness of POTW removal. The Notice discussed the possibility of transferring metals treatment effectiveness data based on hydroxide precipitation and sulfide precipitation from metals industries. The Notice also discussed treatment of cyanide in OCPSF wastewater by alkaline chlorination, and the application of package biological or in-plant biological treatment in setting limits for some pollutants. Finally, EPA announced the availability of additional data to characterize the effectiveness of steam stripping technology.

C. Summary of the Data Base Used in the Final Regulations

The data used for the proposal were collected through industry surveys via 1976 and 1977 questionnaires, telephone calls, and sampling visits and are described in the following paragraphs. The data used for the engineering analysis were extracted from the industry responses to the 1976 BPT questionnaire and a subsequent 1977 BAT questionnaire. The data from these questionnaires were computerized and sent to the plants for their review and comments during December 1979 and January 1980. Also, (long-term daily) pollutant raw waste and final effluent data were collected by EPA through on-site sampling visits.

The above questionnaires requested information related to products manufactured, processes used, production rates, age and size of facilities, water consumption, wastewater generation, treatment technologies employed, and influent wastewater and effluent characteristics.

Additionally, some qualitative information was gathered through telephone calls on the generation of wastewater and mode of discharge at 301 plastics manufacturing facilities.

From all these sources of data, the Agency identified 428 plants which make up the 1983 Proposal Summary Data Base. The Proposal Summary Data Base is a corrected and updated version of the original data found in the 1976 and 1977 generated 308 Data Base.

Data on product/processes, plant location and age, production, percent operating capacity, mode of discharge, treatment unit operations, influent and effluent wastewater flow and concentrations, and period of data collection were obtained from the original 1976 and 1977 questionnaires data printouts for each of the plants in the data base. The information on each plant was examined, and the data were modified to reflect any corrections to the original data and to incorporate the plant's responses to the 1979–1980 mailing.

As part of the data collection efforts, the Agency conducted four major

sampling studies in order to characterize the raw wastewaters and treated wastewaters in the OCPSF industry. These studies are the Screening Study (performed in two phases), Verification Study, Five-Plant Study and Twelve-Plant Study, and are discussed in the following paragraphs.

In 1977 and 1978, EPA performed sampling at 131 plants to determine the presence of priority pollutants (Phase I of the Screening Study). These plants were chosen because they operated product/processes that produce the highest volume organic chemicals, plastics and synthetic fibers. Twenty-four hour composite samples were taken of the raw plant water, effluent from certain product/processes, and wastewater influents and effluents at the plant wastewater treatment facilities. These samples were analyzed for toxic pollutants and conventional pollutants.

In December 1979, samples were collected from an additional 40 plants (Phase II of the Screening Study). These plants manufactured products such as dyes, flame retardants, coal tar distillates, photographic chemicals, flavors, surface active agents, aerosols, petroleum additives, and other low volume specialty chemicals.

Subsequent to this screening effort, EPA conducted more intense sampling at 37 plants with samples collected from the effluents of 147 product/processes manufacturing organic chemicals and 29 product/processes manufacturing plastics or synthetic fibers, as well as from treatment system influents and effluents at selected facilities (Verification Study). This sampling was conducted over a period of three days at each plant (with the exception of one plant which had six days of data), and was performed in order to verify the presence and estimate the concentrations of priority pollutants in discharges from the predominant product/processes in the industry.

The raw wastewater sampling data for the priority pollutants gathered from the 176 product/process wastewater streams in the Verification Study were computerized to become the Master Process File (MPF). These data were used in estimating the pollutants and loadings for the product/processes in the industry for the proposal.

From June 1980 to May 1981, EPA, with cooperation from the Chemical Manufacturers Association (CMA) and five participating chemical plants, performed the EPA/CMA Five-Plant Study to gather longer-term data on biological treatment of certain specific toxic pollutants at organic chemical plants. In addition to effluent data, biological wastewater treatment system influent samples were taken subsequent to in-plant treatment and prior to biological treatment and to any preliminary neutralization and settling, although in some instances following equalization, of each plant's combined waste stream. The five plants were selected because of the specific toxic organic pollutants expected to be generated by plant processes and because they were characterized as having well-designed and well-operated activated sludge treatment systems. Seven to thirty sets of influent and effluent samples (generally 24-hour composites) were collected at each plant over a four- to six-week sampling period. Thus, the toxic pollutant data base which formed the basis of the March 21, 1983 proposal was generated from the OCPSF industry over a period of time from 1977 through part of 1981.

The Agency received numerous comments on the proposed regulation from individuals representing industry, environmental groups, and state and local governments. These comments criticized the data and analyses that were fundamental to the proposed regulation and urged the Agency to reassess its data base and reconsider many aspects of the proposal. Significant comments on the proposal concerned, among other issues: (1) The adequacy of the Agency's data base to cover a diverse industry such as this, (2) the BPT subcategorization scheme (3) the treatment effectiveness data base and editing rules, (4) the compliance cost estimates, and (5) the economic impact methodology. Following a review and analysis of these and other comments, the Agency began a new data gathering effort in order to assure that the OCPSF regulation is based upon information that represents the entire industry and to assess wastewater treatment installed since 1977. The Agency conducted an extensive data gathering program to improve the coverage of all types of OCPSF manufacturers.

This effort involved mailing new "Section 308" survey questionnaires (i.e., under the authority of Section 308 of the Act) to all manufacturers of OCPSF products. In addition to this survey, which covered all known OCPSF manufacturers, EPA also sent a supplemental questionnaire to 84 OCPSF facilities known to have installed selected wastewater treatment unit operations for which EPA sought additional information.

Also included in the 1983 308 survey questionnaire were questions designed to obtain additional cost, economic and financial data. (EPA also obtained economic and financial data from a number of public and private sources.)

The technical data collected through the new 308 survey included data on processes, production levels, raw wastewater characteristics and treatment performance from calendar year 1980, which was selected to reflect normal plant operations at near capacity levels. Economic and financial data were collected for calendar year 1982 to reflect then-current market conditions.

In addition to this new survey, EPA also conducted toxic pollutant sampling at 12 additional OCPSF facilities between March of 1983 and May of 1984. Eight plants were sampled between 14 and 20 days each; three plants between 10 and 12 days; and one plant for one day. The analytical protocol used to measure the volatile organic priority pollutants was Method 1624 (purge and trap followed by isotope dilution GC–MS) while Method 1625 (isotope dilution GC–MS) was used to measure semi-volatile organic priority pollutants. (See 40 CFR Part 136 for a description of these methods.) This new sampling program improved the data base for pollutants already covered by the proposal, expanded the coverage of priority pollutants, and provided an additional basis for estimating wastewater treatment system variability. During the program, EPA sampled influents to and effluents from in-plant controls including steam strippers, chemical precipitation units, and an in-plant activated carbon adsorption unit. The end-of-pipe systems influents and effluents sampled included extended aeration and pure oxygen activated sludge systems, a powdered activated carbon (PAC) biological system, polishing ponds, filtration units, and an activated carbon adsorption unit.

D. Engineering Costing Methodology

The development of effluent limitations guidelines includes identifying technologies available for reducing pollutant loadings, quantifying the reduction of pollutants by a technology or group of technologies, and identifying the costs and economic impacts associated with the application of the technologies or groups of technologies. The results of these analyses form the basis for regulatory options.

To derive costs since proposal, EPA has changed its engineering costing methodology in response to comments and as a result of further analyses and evaluations performed by the Agency.

The costs of the proposed regulation were based on estimates of compliance

costs for model plants, referred to as generalized plant configurations ("GPC's"). The GPC's represent typical combinations of product/processes as reported by plants in the OCPSF industry data base. The product/processes used in GPCs were the 147 organic chemicals product/processes and 29 plastic/synthetic fibers product/processes for which the Master Process File contains data.

The Agency received a number of comments as a result of the proposal pointing out inadequate coverage of the industry using the Agency's methodology, and claiming that EPA had underestimated the cost of compliance because of it. In order to respond to these comments, data on industry's experience in the acquisition and operation of certain technologies were required to revise and/or calibrate predictive cost models. This additional information was obtained from the OCPSF industry using the 1983 308 survey data collection effort, discussed earlier. This specific data collection effort was part of the Supplemental Questionnaire which was sent to 84 selected OCPSF manufacturers, and requested detailed cost information regarding capital and operating costs for specific treatment technologies. A total of 67 questionnaires were completed and returned with useful data and information. The remaining 17 plants did not respond or did not provide useful data and information.

The cost data collected was adjusted to 1982 dollars (if reported as other year dollars) using the Engineering News Record (ENR) index. The reported plant cost data were used, where possible, to derive curves for estimating the cost of acquiring and operating the technologies. Where the data were not sufficient to derive the cost curves, the data were used to check the accuracy of cost curves derived from other sources of information such as equipment vendors.

For the final regulation, the Agency has estimated the total costs of the regulation on a plant-by-plant basis using all available data, i.e., by adding together the estimated individual costs for all the plants. Plants which provided partial responses to questionnaires (primarily secondary producers) were costed on a plant-by-plant basis as well as those which provided full responses. However, the Agency estimated loadings for the partial response plants using data submitted by full response plants and data included in the Master Process File in order to generate plant-by-plant estimates of raw waste characteristics for the partial response plants. A summary of the major aspects of the costing methodology follows. A more detailed description of this methodology is contained in Section VIII of the Development Document.

The final engineering costing methodology was used to develop costs on a plant-specific basis for selected BPT options for BOD and TSS, and for in-plant wastewater stream control of priority toxic pollutants for selected BAT and PSES options.

BPT Costing

Plant-specific BPT costs were developed based on a comparison of the individual plant's current (i.e., 1980) BOD and TSS effluent concentrations (as reported by the plants) and the calculated effluent long-term average concentration targets upon which the BOD and TSS limits in the BPT regulation are based. The treatment system technologies that were costed for each plant depended on that comparison (after adjustment for dilution by non-process wastewater flows). If the current discharge concentrations exceeded the calculated target levels, the Agency determined the additional treatment units or operational upgrades that would be needed to achieve the long-term average target concentration levels and calculated the cost of the treatment. For example, some plants were costed for the addition of clarifiers for improved control of solids in existing systems. Where the required upgrades were substantial, EPA costed full scale activated sludge treatment and/or second stage activated sludge.

BAT Costing

BAT technology in the regulation promulgated today is based upon BPT technology plus appropriate in-plant or end-of-pipe physical/chemical treatment for the removal of individual toxic pollutants. The costing approach thus incorporates in-plant treatment costs.

First, EPA estimated each plant's current level of discharge for each toxic pollutant. These estimates were obtained by using data in the Master Process File and 1983 308 Survey (see Section IV–C above) for the product/processes used by the plant.

Based on the toxic pollutants estimated to be present, the appropriate in-plant treatment technology was selected. For plants using end-of-pipe biological treatment, each pollutant discharged to the end-of-pipe biological system had to be above a certain concentration value before in-plant treatment would be costed. Steam stripping was costed for the removal of volatile organic pollutants; activated carbon was costed for other specific organic pollutants; and multi-stage or package biological treatment was costed for the remaining regulated organic pollutants. Chemical precipitation was costed for metals removal, and cyanide destruction via alkaline chlorination was costed to control total cyanide.

For plants with product/process flows less than 500 gallons per day, only contract hauling was costed. Current zero discharge wastestreams such as wastestreams which were reported to be discharged or disposed of currently via contract hauling, deep well disposal, incineration, or land disposal including surface impoundment use were not included in the BAT cost analysis. Costs associated with RCRA requirements for surface impoundments were included in the baseline costs for certain facilities and are discussed below.

NSPS Costing

EPA used its BPT costing methods to cost entirely new treatment systems for new sources based on model flow sizes for each subcategory. BAT technology costs were used to estimate costs for new sources to control priority pollutant discharges.

PSES Costing

PSES toxic pollutant removal cost estimates were obtained using the same procedures as used in the BAT costing.

RCRA Baseline Costs for Relining of Surface Impoundments

The Hazardous and Solid Waste Amendments enacted in November 1984 (Pub. L. 98–616, November 8, 1984) require that each existing surface impoundment be retrofitted by November 8, 1988 so as to be in compliance with the minimum technology requirements established by the Amendments for land-based treatment, storage and disposal of hazardous wastes. Facilities in the OCPSF Industry were reviewed to determine what costs would be incurred as a result of the 1984 amendments.

Utilizing the RCRA *1986 National Screening Survey of Hazardous Waste Treatment, Storage, Disposal, and Recycling Facilities* ("Screening Survey Data Base"), a total of 48 OCPSF facilities were identified as likely to incur costs as a result of the amendments, and were therefore included in the RCRA costing analysis. After evaluation, these costs were included for 41 of these plants in the baseline economic analysis. The plants selected included plants with surface impoundments that are used for treatment or storage. Costs were estimated to retrofit these

impoundments with double liners and to install groundwater monitoring wells. This is discussed in more detail in Section VIII of the document entitled "Development Document for Effluent Guidelines, New Source Performance Standards and Pretreatment Standards for the Organic Chemicals, Plastics and Synthetic Fibers Point Source Category."

E. Pollutant Loading Estimate Methodology

This section describes the methodology used to calculate pollutant loading estimates and presents a summary of the results of these calculations for the OCPSF regulated process waste streams. A more detailed description of these efforts is contained in Section VIII of the Development Document.

1. Conventional Pollutant Loadings

BOD and TSS loadings (i.e., pounds of pollutants discharged by direct dischargers) were calculated from the data base on a plant-by-plant basis.

Current (1980) BOD and TSS loadings were calculated by multiplying current BOD and TSS concentration values, as reported by the plants, times the plant's process wastewater flow. For plants for which EPA lacked either BOD or TSS current effluent data, effluent concentrations were estimated using the available reported plant effluent data as a basis.

BPT loadings (i.e., the pounds that would be discharged after compliance with BPT) were calculated by multiplying the BOD and TSS long-term average effluent concentration targets times the plant's process wastewater flow. (The methodology for determining long-term average effluent target values is described in Section VI of this notice.) For plants already achieving the long-term average effluent target for BPT, its current concentration values are used to calculate BPT loadings.

The current (1980) in-place treatment BOD and TSS estimated annual discharge loadings are 61.49 and 99.59 million pounds per year, respectively. The BOD and TSS BPT estimated discharge loadings, based on compliance with today's regulation, are 19.76 and 33.32 million pounds per year, respectively.

2. Toxic Pollutant Loadings

The methodology used to estimate OCPSF industry toxic pollutant loadings uses the data from the Master Process File and the 1983 survey data which incorporates NPDES permit application form data where appropriate and other available toxic pollutant analytical data. The methodology has been used to estimate raw (untreated) and current (1980) toxic pollutant loadings, as well as projected BPT and BAT loadings for direct dischargers and PSES loadings for indirect dischargers, on a plant-by-plant basis.

The current (1980) in-place treatment toxic pollutant annual loadings are estimated to be 1.6 million and 22.6 million pounds for direct and indirect dischargers respectively. The toxic pollutant estimated loadings for direct dischargers after compliance with BAT are 0.49 million pounds, and for indirect dischargers after compliance with PSES are 0.08 million pounds.

At the time of proposal, the Agency overestimated the annual discharges of toxic pollutants. Industry comments objected to these overestimates, argued that toxic pollutant discharges by the OCPSF industry are low, and questioned the need to establish BAT limitations on a wide range of toxic pollutants. These commenters suggested that the Agency rely on the NPDES permit application Form 2C toxic pollutant data for determining toxic pollutant loadings. They maintained that available NPDES permit application Form 2C data constitute the most appropriate and extensive data base for predicting the extent (frequency) of occurrence of priority pollutants in the OCPSF industry. They argued that the Form 2C data submitted by trade association member companies indicate that only a few priority pollutants are detected in treated discharges and concluded that existing treatment systems, installed principally for the control of conventional pollutants, do an excellent job of controlling priority pollutant discharges.

The Agency disagrees with these comments and, for the reasons discussed below, has concluded that although the industry's loadings are lower than estimated at proposal, many OCPSF plants currently discharge significant amounts of toxic pollutants. Thus regulation beyond BPT is warranted.

Since the OCPSF regulations apply to process wastewater only (nonprocess wastewater is regulated by permit writers on a case-by-case basis), the Agency determined the relative contributions of process and nonprocess wastewater at the effluent sample sites using data from the 1983 308 Survey. These data were used to calculate plant-by-plant "dilution factors" for use in adjusting or assessing analytical data at effluent sampling locations. This information was used to determine if reported Section 308 and Form 2C final effluent concentration data could be used to adequately characterize actual process wastewater pollutant concentrations. For example, if a pollutant was reported as 30 ppb at the final effluent sampling location with 1 MGD of process wastewater flow and 9 MGD of noncontaminated nonprocess cooling water flow, then the concentration of the pollutant in the process wastewater was actually 300 ppb. Similarly, if the same plant reported that another pollutant was not detected at the same sampling location and the analytical method threshold level or minimum "detection" level was 10 ppb, then the other pollutant concentration in the process wastewater could be as high as 90 ppb without being detected in the diluted final effluent.

One hundred six plants reported Form 2C toxic pollutant data in the 1983 Section 308 Questionnaire. Of these, 70 plants diluted the process wastewater before the Form 2C effluent sampling point. The following table relates the number of plants with Form 2C data to the range of dilution at the effluent sampling point.

TABLE 1—RANGE OF DILUTION FOR PLANTS WITH FORM 2C DATA

Range of dilution in percent	Number of plants with Form 2C data (percent)
0	36(34)
>0 to 25	20(19)
>25 to 100	20(19)
>100 to 500	17(16)
>500 to 6054	13(12)
Total	106(100)

The Agency was able to identify 13 facilities that reported measured toxic pollutant concentrations of treated process wastewater both before and after dilution with nonprocess wastewater. In general, analyzing the diluted effluents yields underestimated or undetected values for organic toxic pollutants that were measured in the undiluted process wastewater. However, this was not generally the case for cyanide and toxic pollutant metals such as cadmium, chromium, and lead. These compounds are commonly found in cooling water additives that may be utilized to inhibit biological growth or the formation of rust and scale in cooling equipment. The presence of a portion of these metals and cyanide in the diluted effluent seems in many cases to be caused by their presence in nonprocess cooling water. Therefore, the assumption that the nonprocess dilution wastewater is relatively free of toxic pollutants appears true for the organic toxic pollutants but is not necessarily true for

cyanide and the toxic metal parameters. Thus, the use of unqualified Form 2C data does not provide an adequate assessment of process wastewater toxic pollutant constituents and concentrations. Using Form 2C data tends to underestimate organic toxic pollutant loadings in process wastewater and may actually overestimate metal toxic pollutant loadings in process wastewater.

V. Summary of the Most Significant Changes From Proposal and Notices

This section describes several of the most significant changes from proposal and subsequent notices to the final rule. Other areas of change and issues are discussed in Sections VI, VIII and X of this preamble, the Development Document, the Economic Impact Analysis, and the record for this rule.

A. BPT

On March 21, 1983, EPA proposed BPT limitations for BOD, TSS and pH for four subcategories of the OCPSF industry (48 FR 11828). These were subcategory 1—Plastics only, subcategory 2—oxidation, subcategory 3—type 1 (which included specified processes other than oxidation), and subcategory 4—other discharges. These subcategories were developed following an analysis of manufacturing processes in use by the OCPSF industry and the BOD loadings associated with them.

Subcategory 1 included discharges resulting from the manufacture of plastics and synthetic fibers only. Subcategory 2 included discharges from the manufacture of organic chemicals only or both organic chemicals and plastics and synthetic fibers that included wastewater from the oxidation process only. This subcategory was further divided into two groups based on 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 (less than 0.2 gallon per pound of total daily production). Subcategory 3 included discharges resulting from the manufacture of either organic chemicals only or both organic chemicals and plastics and synthetic fibers that included wastewater from Type I chemical processes but not from the oxidation process. Type I processes were listed as peroxidation, acid cleavage, condensation, isomerization, esterification, hydro-acetylation, hydration, alkoxylation, hydrolysis, carbonylation, hydrogenation, and neutralization. Subcategory 4 included all OCPSF discharges not included in subcategories 1–3. Different BOD and TSS daily maximum and maximum monthly average BPT limitations were proposed for each of the subcategories.

Commenters claimed that the proposed subcategorization scheme was unworkable and that it arbitrarily grouped chemical processes into non-homogeneous groups with respect to effluent treatability. They also complained that, under the proposed scheme, minor changes in production or product mix could cause the applicable discharge subcategory to change. Numerous specific comments questioned whether specific product/processes were properly placed within the subcategorization scheme.

Following a review of the comments and analysis of additional BOD and TSS loading and production data, the Agency developed and solicited comment on a new BPT subcategorization scheme consisting of eight product-based subcategories (50 FR 29068; July 17, 1985). In this scheme, plants were classified according to the proportion of their total production volume associated with particular classes of OCPSF products. The eight production-class subcategories and the plant production characteristics associated with them are as follows: (1) Rayon fibers—plants in which rayon fibers production by the viscose-rayon process constitute at least 95 percent of total OCPSF production. (2) Other man-made fibers—plants in which other man-made fiber and organic chemical production constitute at least 95 percent of total OCPSF production. (3) Thermosets—plants in which thermosetting resins constitute at least 95 percent of total OCPSF production and plants in which thermosetting resins plus organic chemicals constitute at least 95 percent of total OCPSF production. (4) Thermoplastics—plants in which thermoplastic materials constitute at least 95 percent of total OCPSF production. (5) Thermoplastics and Organics—plants in which thermoplastic materials and organic chemicals constitute at least 95 percent of total OCPSF production. (6) Commodity Organics—plants in which organic commodity chemicals (those produced nationally at a level exceeding one billion pounds per year) constitute at least 75 percent of organic chemical production and in which plastics production is less than 5 percent of total OCPSF production. (7) Bulk Organics—plants whose production was not classified as either commodity or specialty organics (those produced at a level below 40 million pounds per year) but is at least 95 percent organics, and (8) Specialty Organics—plants in which specialty organic chemical products constitute at least 75 percent of total organic chemical production and in which plastics production is less than 5 percent of total OCPSF production.

This scheme was intended to address the issues raised by commenters on the first proposed subcategorization scheme, and was also based primarily on production characteristics.

Industry commenters argued, however, that even given the revisions in the July 17, 1985 subcategorization scheme, a one or two percent difference in relative production could still place similar plants in different subcategories with significantly different limitations. In addition, it was asserted that some plants could not be placed in any of the subcategories and that there was no mechanism presented to develop limitations for these plants. Industry commenters also commented that the analysis of BOD concentration values ignored the effects of different water use practices and various water conservation efforts by OCPSF plants.

In order to respond to the issues raised concerning the BPT subcategorization, the Agency has modified its July 17, 1985 scheme as follows: The fundamental product-based subcategory classification framework is generally retained with the exception that one subcategory, thermoplastics and organics, is dropped as it is simply a combination of two distinct subcategories under the new scheme. This approach was noticed in the December 8, 1986 notice of availability (51 FR 44082) and is discussed in more detail in section VI of this notice. In the final regulation, BPT limitations for facilities are not based on their assignment to a single subcategory defined in terms of the predominant production at the facility. Instead, limitations for a particular facility are determined explicitly by the proportion of subcategory production at the plant.

This approach parallels the way EPA generally implements its effluent limitations and standards in the sense that it uses proportions of types of activities (categories, subcategories, or process operations) generating wastewaters in what is essentially a building block approach to establish limits for plants with multiple activities, or in this case subcategory processes. The seven product-based subcategories provided for in today's regulation generally cover the following types of products and SIC codes:

(1) Rayon Fiber (Viscose process only).

(2) Other Fibers (SIC 2823, except rayon, and 2824).

(3) Thermoplastics (SIC 28213).

(4) Thermosets (SIC 28214).

(5) Commodity Organics—organic chemical products produced nationally in amounts greater than or equal to one billion pounds per year (generally SIC 2865 and 2869).

(6) Bulk Organics—organic chemical products produced nationally in amounts less than 1 billion but more than 40 million pounds per year (generally SIC 2865 and 2869).

(7) Specialty Organics—organic chemical products produced nationally in amounts less than or equal to 40 million pounds per year (generally SIC 2865 and 2869).

B. BAT

The Agency proposed in 1983 to establish BAT limits for two subcategories. The "Plastics Only" subcategory consisted of plants that manufacture plastics and synthetic fibers only. Plants in this subcategory tend to discharge significant levels of fewer priority pollutants than plants included in the "Not Plastics-Only" subcategory, all of which result from the manufacture of at least some organic chemicals. The proposed limits thus controlled relatively few priority pollutants in the "Plastics Only" subcategory, and many were proposed to be controlled in the "Not Plastics-Only" subcategory.

The Agency modified its proposed approach in its July 17, 1985 notice of availability (50 FR 29068). The revised approach was to not subcategorize the OCPSF category by product mix for BAT. Since OCPSF plants can economically achieve compliance with the BAT limitations for toxic priority pollutants through some combination of in-plant or end-of-pipe demonstrated technology irrespective of products produced, the BPT product mix subcategorization is not a necessary basis for establishing BAT limitations. In addition, EPA analyzed the costs for compliance and their associated impacts and believes that product mix subcategories do not appear to be necessary for an effective, equitable BAT regulation. EPA recognizes that this requires all direct discharger NPDES permits to limit and to monitor all regulated pollutants, which, if done on a routine and frequent basis, could require large expenditures. Therefore, the Agency intends to provide guidance to permit writers which will instruct them on how to determine which pollutants may only need to be monitored for on a minimum basis, which must be no less frequently than once per year. (Monitoring is discussed further in response to Comment Number 4 in Section X of this preamble.)

The proposed basis in 1983 for BAT limits was in-plant physical/chemical technology and biological treatment for plants that have or need biological treatment and in-plant physical/chemical technology for non-biological treatment plants. After the publication of the proposed regulation on March 21, 1983 (48 FR 11828) the Agency conducted sampling at 12 additional OCPSF plants in order to collect additional data that would characterize the effectiveness of in-plant treatment technologies. This led to the proposal of revised technology bases for BAT published in the notice of availability of July 17, 1985 (50 FR 29068).

At that time, EPA discussed three technology options being considered for controlling toxic priority pollutants at BAT. Option I consisted of biological treatment only. Option II added in-plant control technologies to Option I treatment. These in-plant technologies included steam stripping to remove volatile and semi-volatile (based on analytical methods GC/MS fractions) priority pollutants, activated carbon for various base/neutral priority pollutants, chemical precipitation for metals and alkaline chlorination for cyanide, and possibly in-plant biological treatment for removal of polynuclear aromatic (PNA) priority pollutants. Option III added activated carbon to Option II technology as a final polish to the end-of-pipe biological treatment system.

The technology option selected as a basis for this rule (and discussed in Section VI of this preamble) is in-plant physical/chemical and biological treatment with BPT end-of-pipe treatment. For plants without end-of-pipe biological treatment, a separate set of limitations are provided. In addition, separate zinc limitations are provided for rayon fiber production by the viscose process and acrylic fiber production by the zinc chloride solvent process.

C. PSES

The determination of pollutants for regulation at PSES relies on an analysis of whether pollutants pass through, interfere with, or are otherwise incompatible with POTWs. The Agency has traditionally determined passthrough by comparing the percentage of a pollutant removed by the selected BAT treatment system to the percentage removed by POTW's with good secondary treatment. However, the Agency proposed in 1983 to modify this approach slightly and determine pass through only if the BAT percent removal exceeded the POTW percent removal by at least five percent. The rationale given at the time was that a difference of less than five percent may not reflect real differences in treatment efficiency. Rather, EPA said, they may reflect analytical variability at the concentrations typically found in end-of-pipe biological systems at POTWs and OCPSF plants. In its notice of availabilty published on July 17, 1985 (50 FR 29068), the Agency announced that it would consider using a percent differential as great as ten percent.

At the same time EPA announced that it was considering regulating some volatile and semivolatile organic toxic pollutants on two additional bases. One was interference based upon potential safety hazards to workers due to volatilization of pollutants in POTWs' headworks. The other was pass through based on the belief that pollutants pass through POTWs by volatilizing in substantial part to the atmosphere from the primary and secondary stages of the biological treatment systems employed by POTWs.

After considering comments and evaluating the different approaches, the Agency announced that it no longer intended to use percent removal differentials but instead intended to compare actual POTW percent removals to actual BAT treatment system percent removal to determine pass-through (December 8, 1986, 51 FR 44082). However, the Agency stated that it would consider conducting the comparison by comparing only POTW and BAT removal efficiencies for comparable influent concentration ranges.

The approach used in selecting pollutants for regulation in the PSES issued today determines pass through by comparing BAT and POTW removals directly (i.e., no percent removal differential is used). However, as will be discussed in greater detail in Section VI, the final data base used to develop these respective removals was modified to assure consistency with the industrial data base used to establish limitations. This was done by using average plant influent and effluent values and, to the extent possible, by using plant removal data only where influent concentrations were equal to or greater than ten times the analytical threshold level (generally ten times 10 ppb, or 100 ppb). In addition, EPA is establishing PSES for three pollutants whose removal by POTWs is accomplished in part by volatilization.

VI. Basis for the Final Regulation

A. BPT

1. BPT Subcategorization and Method for Deriving Limitations

The Agency is designating seven subcategory classifications for the OCPSF category to be used for the purpose of establishing BPT limitations.

In this final subcategorization scheme, facilities are not assigned to a single subcategory based on the predominant production at the facility. While some plants may have production which falls entirely within one of the seven subcategory classifications, most plants have production which is divided among two or more subcategories. To analyze treatment effectiveness for each of the individual subcategories, EPA needed to develop a method for assessing and using the treatability data from the many OCPSF plants whose influents and effluents are comprised of wastewater from two or more subcategory operations. The method EPA used is based on a regression equation that accounts for the pollutant discharges from such multiple subcategory plants in an explicit and straight-forward manner. For setting the limits in the final regulation, the regression equation is used to model long-term average effluent BOD as a function of the proportion of the production of each subcategory at each facility. The coefficients of this equation are estimated from actual plant data using standard statistical regression methods. The equation has a coefficient that corresponds to each of the subcategory classifications listed above. The BPT subcategory long-term average effluent values are determined for each subcategory using the appropriate coefficient.

BPT limitations for each subcategory are based on a combination of long-term average effluent values and variability factors that account for variation in treatment performance about the long term averages. The long term averages are values that a plant should target the design of its treatment system to achieve on an average basis. The variability factors are values that represent the ratio of a large value that would be expected to occur only rarely (on a daily or monthly basis) to the long term average. The purpose of the variability factor is to allow for variation in effluent concentrations about the long-term average. A facility that designs and operates its treatment facility to achieve the long-term average on a consistent basis should be able to comply with the daily and monthly limitations in the course of normal operations.

The BPT long-term average effluent values were developed from a data base comprised of selected plant average values reported to the Agency in the 1983 survey discussed previously. (The basis for selection is presented in A.2, below.) In this survey, plants were to report average annual influent and effluent BOD and TSS along with technical information concerning treatment operation, process flows and subcategory production classifications.

The variability factors were developed from a data base comprised of individual daily measurements on treated effluent BOD and TSS from 21 and 20 of these OCPSF plants, respectively. Daily measurement data are required to determine variability factors and were obtained from plants as part of the 1983 survey supplemental questionnaire and from prior data submittals. In the history of the development of effluent guidelines regulations, it has usually been the case that variability factors are determined from data bases comprised of different sets of plants and, usually, smaller numbers of plants, in comparison to data sets consisting of plant annual averages. This is due to the fact that many plants do not monitor frequently enough for use of their data in analyzing day to day variability or do not have monitoring records for the period being studied (1980, in the case of the OCPSF BPT study), since some plants do not maintain the records of daily values used to report monthly averages for greater than three years. Individual daily pollutant measurements are therefore more difficult to obtain. However, plants in the OCPSF annual average and daily data bases cover the full range of subcategory classifications covered by this regulation.

For the July 17, 1985 Notice, the 1983 survey annual average data were used to determine the effluent BOD and TSS long-term averages for the subcategories presented. Limitations were determined by multiplying the long-term averages for each subcategory by the variability factors determined from the daily measurement data base. In response to comments on the 1985 notice, the Agency proposed a revised approach based on a regression analysis of the 1983 survey annual average data. The basis of the revised approach, presented in the December 8, 1986 Notice, was a mathematical equation that models long-term average effluent BOD as a function of the subcategory characteristics and includes a term that attempted to account for plant OCPSF process wastewater flow. For purposes of the 1986 notice, variability factors were based on a daily measurement data base consisting of data from 23 plants which were unchanged from the 1985 notice. The Agency has retained the regression equation framework to calculate the long-term average subcategory bases for BPT limitations in the final regulation. Comments on the 1986 notice, however, prompted the Agency to reconsider the flow adjustment term. On reanalysis, EPA concluded that inclusion of the flow term was not appropriate and that there was no technical basis in the record to conclude that achievable long-term mean effluent concentrations were significantly affected by water use practices in the industry.

The final variability factors used in conjunction with the long-term means to calculate the limitations are based on the same daily measurement data base as in the previous notices, with the exception that two plants' data previously included have been excluded because measured performance included effects of polishing ponds at these plants and one plant was excluded because it had an average effluent TSS greater than 100 mg/1. Thus, the final variability factors are derived from data obtained from 21 plants for BOD and 20 plants for TSS.

In applying the limitations set forth in the regulation, the permit writer will use what is essentially a building-block approach that takes into consideration applicable subcategory characteristics and the proportion of production quantities within each subcategory at the plant. Production characteristics are reflected explicitly in the plant's limitations through the use of this approach.

2. Data Selection Criteria

The Agency has received two diametrically opposed sets of comments on the proposed data editing criteria used to develop BPT limitations. EPA proposed to select plants for analysis in developing limitations only if the plants achieve at least a 95 percent removal efficiency for BOD or a long term average effluent BOD concentration below 50 mg/1. On one hand, many industry commenters argued that these criteria were too stringent; were based upon data collected after 1977 from plants that had already achieved compliance with BPT permits and thus raised the standard of performance above what it would have been had the regulation been promulgated in a timely manner; and had the effect of excluding from the BPT data base some well-

designed, well-operated plants. An environmental interest group argued, in contrast, that the criteria were not stringent enough, in that they resulted in the inclusion of the majority of plants in the data base used to develop effluent limitations.

The data collected by EPA for the BPT regulation are indeed, as industry commenters have noted, based largely on post-1977 data. EPA had originally collected data in the early and mid-1970's which reflected OCPSF pollutant control practices at that time. As a result of industry challenges to EPA's ensuing promulgation of BPT (and other) limitations for the OCPSF industry, EPA began a new regulatory development program, which included a new series of data gathering efforts (see Section IV of this preamble). Industry commenters are correct in noting that the data are thus taken to a large extent from OCPSF plants that had already been issued BPT permits that required compliance by July 1977 with BPT limitations established by the permit writers on a case-by-case basis. It is thus fair to conclude that the performance of at least some of these plants was better when EPA collected the data for the new rulemaking effort than it had been in the mid-1970s when the original BPT regulations were promulgated.

EPA does not believe that the use of post-1977 data is improper. First, the Clean Water Act provides for the periodic revision of BPT regulations when appropriate. Thus it is within EPA's authority to write BPT regulations after 1977 and to base them on the best information available at the time. Moreover, it is not unfair to the industry. The final BPT regulations are based on the same technology that was used to effectively control BOD and TSS in the 1970s—biological treatment preceded by appropriate process controls and in-plant treatment to assure effective, consistent control in the biological system, and followed by secondary clarification as necessary to assure adequate control of solids. The resulting effluent limitations are not necessarily more (or less) stringent than they would have been if based on pre-1977 data. Many of the plants that satisfy the final data editing criteria discussed below, and thus are included in the BPT data base, would not have satisfied those criteria in the mid-1970s. The improved performance wrought by the issuance of and compliance with BPT permits in the 1970's has resulted in EPA's ability in 1987 to use data from a large number of plants to develop the BPT limitations. Approximately 72 percent of the plants for which data were obtained pass the final BOD editing criteria (95 percent/40 mg/l for biological only treatment); the editing criteria have excluded other plants that, despite having BPT-type technology in-place, were determined not to meet the performance criteria used to establish the data base for support of BPT limitations. EPA concludes that the use of post-1977 data has resulted in a good quality but not unrealistic BPT data base.

EPA has modified the BOD editing criteria to make them slightly more stringent. However, it must be noted that EPA does not consider the selection of editing criteria to be a strict numerical exercise based upon exclusion of data greater than a median or any other such measure. EPA specifically disagrees with the comment that data reflecting BPT performance must necessarily comprise performance levels better than a median. The criteria represent in numerical terms what is essentially an exercise of the Agency's judgment, informed in part by industry data, as to the general range of performance that should be attained by the range of diverse OCPSF plants operating well-designed biological systems properly. The numerical analyses discussed below should thus be regarded as an analytical tool that assisted EPA in exercising its judgment.

The data to which the criteria have been applied reflect the performance of plants that have been issued BPT permits requiring compliance with BPT permit limits. It is not unreasonable to expect, therefore, that the class of facilities identified as the "best" performers in the industry is considerably larger than it would have been had the data been collected in the mid-1970's. This result is consistent with the purpose and intent of the NPDES program: To require those plants performing below the level of the best performers to improve their performance to the point of being on a par with the best performers. Moreover, it should be noted that while the majority of OCPSF plants pass the initial screening criteria, a majority of OCPSF plants (approximately 70 percent) will nonetheless need to upgrade their treatment systems' performance to comply with the BPT effluent limitations guidelines, based upon the reported effluent data (for 1980), and the long-term average targets for BOD and TSS. The fact that a majority of plants will need to upgrade years after they received their initial BPT permits indicates that the result of the adoption of the data base used to develop the limitations is appropriately judged the best practicable treatment.

The editing criteria were applied to the 1983 "308 survey" data, comprised of annual average BOD and TSS data from plants in the OCPSF industry. The purpose of the editing criteria was to establish a minimum level of treatment performance acceptable for admission of a plant's data into the data base that would be used to determine BPT limitations. First, only data from plants with suitable treatment (i.e., biological treatment) were considered for inclusion in the data base. For these plants, the use of both a percent removal criterion and an average effluent concentration criterion for BOD is appropriate since well operated treatment can achieve either substantial removals or low effluent levels or both. In addition, use of only a percent removal criterion would exclude data from plants that submitted useable data but did not report influent data. The use of an effluent level criterion allowed the use of data from such plants in developing limitations.

Following review of the data base, EPA continues to believe that 95 percent BOD removal is an appropriate editing criterion. Well over half the plants in the 308 survey that reported both influent and effluent BOD achieve better than 95 percent removal. The median removal for these plants is 95.8 percent, which reflects good removal from an engineering point of view.

The Agency also continues to believe that achievement of a specified long-term average effluent BOD concentration is also an acceptable standard of performance to qualify a plant's data for inclusion in the data base for BPT limits. In order to establish a concentration value, i.e., a data selection criterion for the final regulation and respond to various comments, the Agency re-examined the 1983 308 survey data. There are data from a total of 99 direct discharging plants with end-of-pipe biological treatment only (the selected BPT technology, as discussed below) that reported average effluent BOD and a full range of information regarding production at the plant. All of these data were used in the evaluation of the BOD data selection criterion, even in cases of plants that did not report influent values and for which removal efficiencies could therefore not be estimated. The median BOD average effluent for these 99 plants is 29 mg/l. There is no engineering or statistical theory that would support the use of the median effluent concentration as a data selection criterion for developing a regulatory data base. In fact, there are many plants that, in the Agency's best judgment, achieve

excellent treatment and have average effluent values greater than the overall median of 29 mg/l. There are many reasonable explanations for differences in average effluent levels at well operated plants. Differences in plants' BPT permit limitations, coupled with individual plant waste management practices and wastewater treatment system design and operation practices, and the types of products and processes at each plant, contribute to differences in average effluent levels achieved.

To obtain insight into differences in BOD values among different subcategories, the data were divided into subsets two different ways based on subcategory production at each plant. The results of this analysis are summarized in Tables 2A and 2B. The data were assigned by plant in one case into three groupings and in the other into five groupings, and in each case the medians of the average BOD effluent values in each grouping were determined. In the first case plants were assigned as plastics, organics, or mixed and in the second, as fibers/rayon, thermoplastics, thermosets, organics or mixed. All plants considered in the analysis had biological treatment only in place. The assignment of a plant to a group was determined by the predominant production at the plant, that is, whether a plant had 95 percent or more of its production in the group. For instance, if a plant has 95 percent or more plastics production, it was placed in the plastics group. Those plants not containing 95 percent or more of a group production were classified as mixed.

TABLE 2A—MEDIANS FOR THREE GROUPINGS

Groupings	Number of plant averages	Median of plant average effluent BOD (mg/l)
Plastics	30	20.5
Organics	42	42.5
Mixed (all remaining plants)	27	35
All plants	99	29

TABLE 2B—MEDIANS FOR FIVE GROUPINGS

Groupings	Number of plant averages	Median of plant average effluent BOD (mg/l)
Rayon/Fibers	7	14
Thermoplastics	17	18
Thermosets	3	32
Organics	42	42.5
Mixed (all remaining plants)	30	35.5
All plants	99	29

The largest median average effluent BOD for a grouping in both cases is 42.5 mg/l, which suggests that the proposed 50 mg/l data selection criterion is high.

In the absence of a theoretical engineering or statistical solution which would determine what value should be used in a regulatory context, the Agency examined some reasonable alternatives suggested by the results displayed in Tables 2A and 2B. The Agency considered using different editing criteria for different product groups, such as those listed in Table 2B, but decided to use a single criterion to define the final data base.

An important reason for using a single editing criterion for all subcategories is that this facilitates setting an editing criterion for the group of plants that do not fall primarily into a single subcategory. These mixed plants comprise a significant segment of the industry, and it is important that the data base for the regulations include data from this segment. Editing criteria that are subcategory specific cannot be applied to mixed plants. We did, however, examine BOD levels by the groupings used in Tables 2A and 2B to gain insight into what uniform editing criterion would be appropriate.

For the groupings exhibiting relatively high BOD levels, organics and mixed plants, EPA determined that a 40 mg/l BOD edit would be appropriate. This value is between the median for these two groupings. Given the fact that plants with substantial organics production tend to have fairly high influent BOD levels or complex, relatively difficult-to-biodegrade wastewaters, EPA believes that a more stringent edit would not be appropriate for these two groupings. However, EPA believes that a less stringent edit would be inappropriate, since many plants in these groupings meet the 40 mg/l criterion.

The other groupings have median values below 40 mg/l, and EPA examined them closely to determine whether they should be subject to more stringent editing criteria than the organics and mixed groupings. EPA concluded that they should not for the reasons discussed below.

The thermosets groupings contains three plants, whose average effluent BOD levels are approximately 15, 32, and 34 mg/l, respectively. EPA believes all three should be retained in the data base. This is particularly important because a major source of wastewater at the plant with the lowest value is melamine resin production; several other types of resins fall under the thermoset classification. Thus, including all three plants' data provides improved coverage of thermoset operations in the data base. An editing criterion of 30 mg/l arbitrarily excludes data from the two plants whose performance slightly exceeds 30 mg/l and would result in melamine resin production being the predominant thermoset production represented in the data base.

The average BOD effluent values for rayon/fibers and thermoplastics are lower than the average values for thermosets, organics and mixes. The Agency evaluated the effects on long-term average effluent values for these groups by uniformly editing the data base at 30, 35, 40 and 50 mg/l, using the BPT regression approach to calculate each of the subcategory long-term average values. The long-term averages for rayon/fibers and thermoplastics are relatively insensitive to the use of the 30, 35, 40 and 50 mg/l edited data bases. That is, the long-term averages are roughly the same regardless of which of these editing criteria is used.

After considering the effect of the various editing criteria on the different groupings discussed above, EPA has concluded that a 40 mg/l editing criterion for BOD is most appropriate. Moreover, in defining BPT level performance, this criterion results in a data base that provides adequate coverage of the industry.

Thus, data from plants with suitable treatment will be included in the data base for BOD if the plant achieves 95 percent BOD removal or a 40 mg/l long-term average. As a result of these criteria, BOD data from 71 plants are retained in the analysis.

As discussed previously, the Agency also saw a need to edit the data base for TSS performance. The Agency is using two editing criteria for selecting TSS data, both of which must be met. The first criterion is that data must be from a plant that meets one of the BOD editing criteria, i.e., achieves either 95 percent removal of BOD or 40 mg/l. The second is that the average effluent TSS must be 100 mg/l or less. As a result of this edit, TSS data from 61 plants are retained for analysis.

In a well-designed, well-operated biological treatment system, achievable effluent TSS concentration levels are related to achievable effluent BOD levels and, in fact, often are approximately proportional to BOD. This is reflected in the OCPSF data base for those plants that meet the BOD performance editing criteria (provided that they also exhibit proper clarifier performance, as discussed below). By using TSS data only from plants that have good BOD treatment, the Agency is thus establishing an effective initial editing for TSS removal by the biological system. However, as BOD is

treated through biological treatment, additional TSS may be generated in the form of biological solids. Thus, some plants may need to add post-biological, secondary clarifiers to assure that such biological solids are appropriately treated.

Thus, while the 95/40 BOD editing insures good BOD treatment and a basic level of TSS removal, plants meeting this BOD editing level will not necessarily meet a TSS level suitable for inclusion in the data base used to set TSS limitations. To insure that the TSS data base for setting limitations reflects proper control, EPA proposed in the December 8, 1986 Notice to include only data reflecting a long-term average TSS concentration of less than or equal to 100 mg/l.

The December 1986 Notice requested comment on the use of the 100 mg/l TSS editing criterion and, as an alternative, use of 55 mg/l as the editing criterion for TSS along with setting the TSS limitations based upon the relationship between BOD and TSS. Some commenters criticized both 100 mg/l and 55 mg/l as overly stringent and asserted that such additional TSS editing was unnecessary since the BOD editing was sufficient to assure that TSS was adequately controlled. These comments, while agreeing that there was a relationship between BOD and TSS, also recommended a slightly different methodological approach for analyzing the BOD/TSS relationship.

The Agency disagrees with the commenters who argued in effect that all TSS data from plants that meet the BOD criteria be included in the data base for setting TSS limitations. The Agency has examined the data and has concluded that an additional TSS edit is required at a level of 100 mg/l. Support for this is evident in the reasonably consistent BOD and TSS relationship for plants in the data set that results from the 95/40 BOD edit that have TSS values of 100 mg/l or less. For plants that have TSS values above 100 mg/l, there is a marked change in the pattern of the BOD/TSS relationship. Below 100 mg/l TSS, the pattern in the BOD/TSS data is characterized by a homoscedastic or reasonably constant dispersion pattern along the range of the data. Above the 100 mg/l TSS value, there is a marked spread in the dispersion pattern of the BOD/TSS data. The Agency believes that this change in dispersion (referred to as heteroscedastic) reflects insufficient control of TSS in some of the treatment systems. The Agency has concluded that the 100 mg/l TSS editing criterion provides a reasonable measure of the additional control on TSS required in good biological treatment systems that have met one of the BOD editing criteria.

The Agency considered the more stringent TSS editing criterion of 60 mg/l, rather than 100 mg/l. The Agency's analysis demonstrated that this is not appropriate. Most fundamentally, this criterion would result in the exclusion of plants that EPA believes are well-designed and well-operated plants. Moreover, the relationship between BOD and TSS is well defined for plants with TSS less than 100 mg/l and BOD meeting the 95/40 criteria.

The Agency gave serious consideration to the statistical method recommended by a commenter for the analysis of the BOD/TSS relationship. The commenter recommended a linear regression relationship between the untransformed (not converted to logarithms) BOD and TSS data. The Agency has retained the use of a linear regression relationship between the natural logarithms of the BOD and TSS data. The logarithmic approach is similar to that recommended by the commenter but resulted in a somewhat better fit to the data.

The Agency also considered in response to comments an editing criterion based on secondary clarifier design criteria, i.e., clarifier overflow rates and solids loadings rates. While the Agency agrees that using these design criteria, if available, may have provided an appropriate editing criterion, very little data were supplied by industry in response to the Agency's request for data regarding these design criteria or are otherwise contained in the record.

3. Technology Selection

The Agency developed three technology options for consideration in developing BPT limitations. Option I consists of biological treatment, which usually involves either activated sludge or aerated lagoons, followed by clarification (and preceded by appropriate process controls and in-plant treatment to assure that the biological system may be operated optimally). Many direct discharge facilities in the OCPSF industry have installed this kind of treatment.

Option II consists of Option I technology with the addition of a polishing pond to follow biological treatment.

Option III includes multimedia filtration as an alternative technology (in lieu of Option II ponds) to achieve TSS control beyond Option I biological treatment.

EPA has selected Option I, biological treatment with clarification, as the technology basis for BPT limitations controlling BOD and TSS for the OCPSF industry. (This option has previously been referred to simply as "biological treatment." However, a properly designed biological treatment system includes "secondary clarification", which usually consists of a clarifier following the biological treatment step. EPA's costing methodology for BPT Option I includes the installation of secondary clarifiers for plants needing significantly improved TSS control.)

There were 70 plants identified in the OCPSF 1983 Section 308 survey that rely exclusively upon end-of-pipe physical/chemical treatment. Forty-one of these plants reported effluent BOD and 45 plants reported effluent TSS values. Some of these plants have such low levels of BOD that they will only have to upgrade their treatment to meet the TSS limits. Some of the other plants which reported BOD values were achieving low concentrations by dilution with nonprocess waters; for these plants the BOD concentrations were adjusted to take into account this dilution. Based upon this evaluation, plants which did not meet the long-term average target for BOD (approximately 71 percent of these plants) were determined (for costing) either to have sufficient BOD in their OCPSF process wastewaters to support biological treatment or to have flows small enough (less than 500 gallons per day) to be contract hauled. In addition, costs were included for these plants to upgrade treatment of TSS where necessary as part of installing biological treatment and clarification, to provide chemically assisted clarification, for algae control at existing ponds, or for contract hauling. The cost of compliance with the TSS limitations for plants without biological treatment are based upon the performance of clarifiers, using the data from biological treatment plants' secondary clarifier performance.

Option I technology is in place at 156 of 304 direct discharging plants in the OCPSF industry data base. Seventy-one of those plants are included in the Option I data base used to develop the BPT limitations for BOD, since their treatment passes the 95/40 BOD editing criteria; and 61 of the 71 plants are included in the data base to develop TSS limitations since their effluent TSS long-term average is less than 100 mg/l. Twenty-three of these facilities have reported actual long-term averages less than or equal to their respective Option I, subcategory-proportioned (based on

1980 production) long-term average concentration levels.

The Agency estimates that BPT Option I would cost the OCPSF direct discharge plants $215.8 million in capital investment and $76.6 million annually and remove 41.7 million lb/yr of BOD and 66.3 million lb/yr of TSS in addition to current removals. EPA has concluded that the costs of compliance with BPT are justified by the pounds of pollutants that will be removed by such compliance.

EPA has rejected Options II and III because they are not clearly demonstrated to enhance the treatment of OCPSF discharges beyond the levels achieved by the Option I requirements and because they do not currently appear to be used by a representative portion of the industry.

Theoretically, a polishing pond should accomplish additional removal of TSS and perhaps some removal of insoluble BOD. However, as discussed below, the data available to the Agency do not clearly demonstrate the effectiveness of polishing ponds following effective biological treatment with clarification. The Agency identified 18 plants that reported using polishing ponds and also met the earlier editing criteria for BOD of 95 percent removal or 50 mg/l or less and TSS of 100 mg/l or less. (All but one of the 18 also meet the final editing criteria of 95 percent removal or 40 mg/l for BOD and meeting BOD criteria plus 100 mg/l for TSS.) For reasons discussed below, EPA does not believe that the data support any firm estimate of incremental pollutant removals and incremental costs for Option II.

EPA notes first that only 17 plants in the industry have polishing ponds and meet the 95/40 BOD editing criteria. Even if ponds were demonstrated to be an effective treatment option for this industry, which they are not, the data base for BPT Option II limitations would necessarily be very small relative to the large number of BPT subcategories, and therefore, would provide far less coverage of subcategories in the industry than the Option I data base.

In examining the data from the 18 plants originally placed in the Option II data base (using the 95/50 criteria), EPA noted that they yielded concentrations that were not much lower than Option I concentrations. Option II plants averaged only 2 mg/l BOD and 8 mg/l TSS lower than Option I plants. Because these increments seemed rather small, EPA performed a statistical analysis to compare the averages for the two data bases. The results of the analysis did not provide evidence of a significant difference between the two data sets. These results led EPA to question the validity of the Option II data as an expression of a true incremental control option and to reexamine the sources of the data.

In the July 17, 1985 notice, EPA discussed its belief that plants using polishing ponds in the OCPSF industry have done so not to add another treatment step after effective Option I-level biological treatment but rather to improve upon substandard biological treatment. As noted above, the Option II data base showed little incremental removal over Option I. Subsequent to the December 8, 1986 Notice, EPA reexamined all available engineering information on plants with polishing ponds, including treatment plant schematics provided by these facilities in response to 308 questionnaires. This examination revealed that seven of the 18 original Option II facilities are using their polishing ponds as secondary clarifiers (i.e., in lieu of effective secondary clarification typically included in an Option I biological system), another six facilities use their ponds to control or equalize unusual releases or combine treated wastewater from their biological systems with other wastewaters at the final pond stage, and one facility uses its pond as a reaeration basin prior to discharge.

This reanalysis confirms the hypothesis that, in most cases, plants that have installed polishing ponds have done so to improve the substandard treatment afforded by their biological systems. In general, if the plant's biological treatment system were well-designed and well-operated, polishing ponds would not have been installed. For example, some plants, where land is readily available, use polishing ponds to achieve some of the BOD removal that would otherwise be achieved by activated sludge treatment because this BOD removal is accomplished more economically at these plants by polishing ponds. In summary, almost no plants have installed ponds to achieve additional removal of BOD and TSS beyond that achieved by well-operated, well-designed biological treatment with clarification.

Further, EPA believes that there would be significant problems connected with the installation and operation of polishing ponds added to biological treatment (Option II) at some OCPSF facilities. Due to the size of polishing ponds (they are often significantly larger than activated sludge systems), land availability is a barrier to installation at a number of plants. In addition, algae growth in warm climates interferes with the operation of the polishing ponds by creating high suspended solids levels. (Algae growth can be controlled by the addition of copper sulfate.) Consequently, the Agency has concluded that Option II (polishing ponds added to good biological treatment) is not sufficiently demonstrated or practicable as a basis for BPT limitations for the OCPSF industry.

EPA has evaluated Option III (good biological treatment plus multimedia filtration) technology to determine if this option can achieve, in a practicable manner, additional conventional pollutant removal beyond that achievable by well-designed, well-operated biological treatment with secondary clarification.

Forty-five plants identified filtration as an in place technology in the 1983 308 survey. Of these, 30 submitted data (BOD or TSS); however, only 28 could be evaluated for both BOD and TSS performance. Eleven plants had biological treatment (usually with secondary clarification) followed by filtration and passed the 95/40 BOD and 100 TSS editing criteria. Because only 11 plants in the OCPSF data base use this Option III technology and comply with the editing criteria, this option would require EPA to regulate all seven subcategories based upon a very small data set.

The median effluent TSS concentration value for these 11 plants is 32 mg/l. If three additional plants were included in this data base because they use Option I treatment plus either ponds or activated carbon followed by filters, the resulting median TSS value would be 34 mg/l. These results, when compared to the performance of clarification only following biological treatment (median value of 30 mg/l) clearly show that the efficiency of filtration following good biological treatment and clarification is not demonstrated for this industry. Moreover, on the average, OCPSF plants with more than Option I treatment in EPA's data base (biological treatment plus filtration) have not demonstrated substantial BOD removal beyond that achievable by Option I treatment alone. The median BOD concentration value for these plants in 19 mg/l compared to a median value of 23 mg/l BOD for those plants with Option I technology in place and meeting the 95/40 BOD editing criteria.

Like Option II, then, the results of this analysis of Option III data do not provide evidence of a significant difference in performance between plants with good biological treatment alone compared to those with biological treatment plus filtration. The data do not support any firm estimate either of

incremental pollutant removal benefits or of incremental costs for Option III technology.

One commenter suggested that, in light of the apparent poor incremental performance of filters in the OCPSF industry, EPA should transfer data from non-OCPSF filtration operations, specifically from domestic sewage treatment. EPA also possesses some filtration data from certain industries other than the OCPSF industry. However, EPA believes that it would be inappropriate to use non-OCPSF wastewater data to set the OCPSF BPT limitations.

The OCPSF industry filtration data do not indicate any substantial TSS or BOD removal beyond that achieved by Option I technology. This fact indicates that differences in the biological solids in the OCPSF industry may be responsible for the lack of filtration effectiveness. For example, if the OCPSF biological floc (solids) were to break into smaller-sized or colloidal particles, they could pass through the filter substantially untreated. While EPA cannot be certain whether this occurs, the data indicate that filters are not as effective in removing OCPSF wastewater solids as they may be for domestic sewage or certain other industry wastewater solids. EPA does not believe that the appropriateness of transferring data from these other wastewaters to the OCPSF industry is demonstrated.

Finally, it should be noted that polishing ponds and filters have rarely been selected by EPA as a BPT technology for any industry. Moreover, filtration has in the vast majority of cases been expressly rejected even at BAT as yielding minimal incremental removals at relatively high cost. Thus to the extent that the commenter wishes EPA to transfer filtration data from other industries, it must be recognized that filtration data has, with very few exceptions (i.e., to remove certain toxic pollutants at BAT), not been considered sufficient to justify the use of filters for BPT and even for BAT. Of course, where solids that contain toxic pollutants may remain after BPT Option I treatment, those pollutants are specifically required to be reduced to the level required by the more stringent BAT regulations promulgated today.

Thus, in summary, EPA has rejected Options II and III because they are not currently demonstrated to be effective technologies for additional control of OCPSF discharges that have already been treated by Option I technology, good biological treatment. Moreover, it should be noted that the Agency generally has refrained from basing BPT limitations on series of end-of-pipe technologies (as distinct from in-plant treatment and preliminary end-of-pipe treatment such as equalization and neutralization necessary for good end-of-pipe treatment). EPA believes that effective biological treatment including clarification, rather than alternatives whose effectiveness and practicability have not been sufficiently documented, is the appropriate basis for BPT limitations in the OCPSF industry.

B. BCT

EPA is not promulgating BCT regulations as part of this regulation.

C. BAT

1. BAT Subcategorization

The Agency is promulgating BAT limitations for two subcategories. These subcategories are largely determined by raw waste characteristics. The end-of-pipe biological treatment subcategory includes plants which have or will install biological treatment to comply with BPT limits. The non-end-of-pipe biological treatment subcategory includes plants which either generate such low levels of BOD that they do not need biological treatment or choose to use physical/chemical treatment alone to comply with the BPT limitations for BOD. The Agency has concluded that, within each subcategory, all plants can treat priority pollutants to the levels established for that subcategory.

Different limits are being established for these two subcategories. Biological treatment is an integral part of the model BAT treatment technology for the end-of-pipe biological treatment subcategory; it achieves incremental removals of some priority pollutants beyond the removals achieved by in-plant treatment without end-of-pipe biological treatment. In addition, the Agency is establishing two different limitations for the pollutant zinc. One is based on data collected from rayon manufacture using the viscose process and acrylic fibers manufacture using the zinc chloride/solvent process. This limitation applies only to those plants that use the viscose process to manufacture rayon and the zinc chloride/solvent process to manufacture acrylic fibers. The other zinc limitation is based on the performance of chemical precipitation technology used in the metal finishing point source category, and applies to all plants other than those described above.

The Agency is issuing BAT limits for 63 priority pollutants for facilities with end-of-pipe biological treatment, including 57 organic priority pollutants, five metal priority pollutants and cyanide. For facilities without end-of-pipe biological treatment, BAT limits are being issued for 59 priority pollutants, including 53 organic priority pollutants, five metal priority pollutants and cyanide. (See Section 5 below for discussion of the pollutant selection).

2. Technology Selection

As noted in Section V, the Agency developed three technology options for end-of-pipe BAT effluent limitations. (The Agency decided not to promulgate any supplemental in-plant BAT limitations to control volatile pollutants for reasons discussed in Section X of this preamble.)

Option I. This option would establish concentration-based BAT effluent limitations for priority pollutants based on using BPT-level biological treatment as described above for dischargers using end-of-pipe biological treatment. For plants not using end-of-pipe biological treatment, the Option I treatment is in-plant controls, consisting of physical/chemical treatment and in-plant biological treatment to achieve the same toxic pollutant limits as are achieved by end-of-pipe biological treatment at BPT.

Option II. This option would establish concentration-based BAT effluent limitations based on the performance of the end-of-pipe treatment component required to meet BPT limitations (biological treatment for the end-of-pipe biological treatment subcategory and physical/chemical treatment for the non-end-of-pipe biological treatment subcategory) plus in-plant control technologies which would remove priority pollutants from waste streams from particular processes prior to discharge to the end-of-pipe treatment system. Two variations of Option II were considered, based upon differing in-plant control technologies used to treat selected priority pollutants including several polynuclear aromatic hydrocarbons, several phthalate esters and phenol. The selected in-plant technologies which form the sole basis of the limitations for the non-end-of-pipe biological treatment plants and a partial basis for plants using end-of-pipe biological treatment, include steam stripping to remove volatile priority pollutants, activated carbon adsorption for various base/neutral priority pollutants, chemical precipitation for metals, alkaline chlorination for cyanide, and in-plant biological treatment (Option IIB) for removal of selected priority pollutants including polynuclear aromatic hydrocarbons, phthalate esters, and phenol. After considering the application of activated carbon adsorption systems (Option IIA)

to remove these latter pollutants, EPA selected in-plant biological treatment (Option IIB) for costing on the basis of available data demonstrating that the effluent levels achieved by dedicated biological systems treating waste streams from segregated processes result in levels equivalent to those achieved by activated carbon adsorption technology and that the in-plant biological treatment is less costly.

The estimated incremental cost of compliance with this option (Option IIB) over BPT is $360.8 in capital investment and $230.4 in annualized costs (1986 dollars). This option is estimated to remove a total of 1.1 million lb/yr of priority pollutants beyond removals by the BPT technology.

Option III. Option III adds activated carbon adsorption to the end-of-pipe treatment to follow biological treatment or physical/chemical treatment in addition to the Option II level of in-plant controls.

Option I technology is capable of treating some toxic priority pollutants to some extent; however, it does not represent the best available technology. In particular, the effectiveness of biological treatment for removing metal pollutants and volatile organic pollutants is limited. Its effectiveness for other pollutants as well is often less than what the Option II technologies can achieve. The Agency has identified many plants that combine various types of in-plant treatment with end-of-pipe biological treatment. Therefore, EPA has decided to reject Option I.

Option III (addition of end-of-pipe carbon adsorption) achieves further reduction in concentrations of some pollutants after Option II, particularly for organic pollutants that are less biodegradable. The capital investment cost associated with activated carbon adsorption systems that are large enough to treat the volume of water discharged from end-of-pipe treatment is very high, $1.2 billion, and the annualized cost is $831.9 million (1986 dollars). These incremental costs would be expected to cause very substantial incremental impacts, including 26 plant closures, and 16 product line closures resulting in a loss of 6475 jobs. In addition, 44 plants would incur other significant impacts. Given the exceptionally high costs and significant economic impacts associated with Option III, EPA has decided not to adopt Option III as the basis for BAT regulation.

The Agency has selected Option II as the basis for BAT limits for both subcategories. EPA has determined that Option II is the best available technology economically achievable for all plants except for a subset of small plants. As discussed immediately below, for plants whose annual OCPSF production is less than or equal to five million pounds, EPA has concluded that Option II is not economically achievable. For these plants, EPA has set BAT equal to BPT.

3. Economic Impacts; Alternative Requirements for Small Plants

EPA has determined that Option II is not economically achievable for a class of small plants, namely those whose annual OCPSF production is less than or equal to five million pounds. Therefore, EPA has set BAT equal to BPT for plants whose annual OCPSF production is less than or equal to five million pounds.

For this group of small producers, the costs of meeting BAT limitations applicable to all other direct dischargers would be an additional $6.2 million annually beyond the cost of complying with BPT. The 19 plants in this group would be heavily and disproportionately impacted by being required to meet the BAT requirements established for all other direct dischargers. One half (9) of these 19 plants are projected to experience a full plant or production line closure, and almost 80 percent (15) of them would incur significant adverse impacts as defined in Section VIII of this preamble. This contrasts with an overall closure rate of seven percent and total significant impact rate of 13 percent for direct dischargers as a whole. The projected closures for the group of small plants are estimated to result in the loss of 162 jobs. The incremental (over BPT) amount of toxic pollutants that would have been removed by these 19 plants is 818 pounds (0.07 percent of the toxic discharges being removed from all directs). EPA has thus determined, based upon the costs and resulting heavy and disproportionate economic impacts incurred by the 19 plants in this sector, and in light of the small increase in their discharges occasioned by this action and the fact that they will be required to meet BPT control levels, to set BAT equal to BPT for this group.

EPA also considered setting BAT equal to BPT for direct dischargers with production levels higher than five million pounds per year. However, EPA determined that the impacts for other production groups, such as plants producing ten million pounds or less and plants producing 15 million pounds or less per year are not nearly so disproportionate as for those in the five-million pound or less group, and that the BAT limitations were not economically unachievable for these groups. To exempt plants in these groups would relieve from full compliance with BAT an increasingly large number of non-impacted plants and would substantially increase the amount of uncontrolled toxic discharges.

EPA also considered restricting relief to small production plants owned by small businesses. EPA rejected this approach because it could not differentiate clearly between the economic impacts that would be experienced by small production plants owned by large businesses and small production plants owned by small businesses. (This issue is discussed in greater detail in Section VIII F of this preamble.)

4. Technology and Data Selection Criteria for Toxic Pollutant Groups

The BAT limits are based on priority pollutant data from both OCPSF and other industrial plants with BAT model treatment technologies in-place. (See Section IV for data gathering efforts in the OCPSF industry.) In selecting plants and product/processes for use in developing the data base for BAT limitations, EPA gave priority to product/processes involving the manufacture of either priority pollutants or high volume chemicals derived from priority pollutants. In each stage of its BAT data base development, the Agency has attempted to obtain data from OCPSF plants representing BAT performance to provide as complete coverage as possible for the priority pollutants discharged by the OCPSF industry. The Agency used information collected in all surveys as a basis for identifying representative plants to be sampled (in the 12 plant study), as is discussed in Section IV of this preamble.

The current BAT data base for organic priority pollutants and the toxic metal zinc (for certain rayon and acrylic fibers producers) contains data which adequately represent the performance of wastewater treatment technology employed by the OCPSF industry. As discussed below, data for toxic metals (including zinc from producers other than those mentioned above) and cyanide have been transferred from another industry data base.

The OCPSF Verification Study emphasized data collection which described raw process wastewater and effluents from the principal treatment configurations (i.e., preliminary in plant treatment and biological treatment for combined plant wastewaters). In cooperation with CMA and participating OCPSF plants, EPA next conducted the EPA/CMA Five-Plant Study to assess the effectiveness of biological treatment in removing certain organic priority pollutants. Finally, the Agency carried

out the Twelve-Plant Study designed to provide additional data on certain nonbiological treatment technologies, such as steam stripping and activated carbon adsorption. Site visits were conducted at these plants prior to sampling to assure that they had well operated biological treatment systems, and to assess what in-plant treatment technologies these plants employed and how they were being operated and maintained. This study was also designed to obtain supplemental long-term performance data for selected biological and physical/chemical treatment technologies.

The following criteria were used to assure that data used for setting limitations were analytically reliable, reflective of good treatment, and adequate to characterize variability:

- The analytical method must be EPA approved;
- There must be data for both the influent and effluent from the treatment system;
- The average influent concentration of a pollutant must be at least ten times the minimum (analytical threshold) level (in most cases 10 ppb); and
- Data for each pollutant must have been obtained from one or more plants with at least three days of both influent and effluent data.

Additional editing was performed to ensure that the quality of treatment represented by the data was BAT-level treatment. Detailed descriptions of how the editing was done are contained in the record for this rule and summarized in Section VII of the Development Document. As detailed previously and discussed further in Section X of this preamble, the data covers a broad spectrum of industry production and thus may be properly applied to all OCPSF plants.

a. *Volatiles Limits.* The Agency is basing its BAT limitations and costs for volatile pollutants on in-plant steam stripping technology alone for plants without end-of-pipe biological treatment. For all volatiles limited in the end-of-pipe biological treatment subcategory except 1,1-Dichloroethane, the combination of steam stripping and end-of-pipe biological treatment are used for limitations (and costing). The data used to derive these limits for the end-of-pipe biological treatment subcategory were taken from plants which exhibited good volatile pollutant reduction across the entire treatment system. For the end-of-pipe biological treatment subcategory the limitations (and costs) are based on the removals achieved by steam stripping alone for one pollutant (1,1-Dichloroethane), since the data for this pollutant demonstrated a treated effluent from the steam stripper at the lowest possible level (a long-term average steam stripping effluent level at the analytical threshold level of 10 ppb) and no data were available from the end-of-pipe biological treatment for this pollutant. To establish limits for the non-end-of-pipe biological treatment subcategory, the Agency used steam stripping data for volatile organic pollutants collected from plants that either did not have end-of-pipe biological treatment or provided data on the separate performance of the in-plant steam stripping treatment technology.

Steam stripping technology employs superheated steam to remove volatile pollutants of varying solubility in wastewater. The technology specifically involves passing superheated steam through a preheated wastewater stream column packed with heat resistant packing materials or metal trays in counter-current fashion. Stripping of the organic volatiles constituents of the wastewater stream occurs because the organic volatiles tend to vaporize into the steam until their concentrations in the vapor and liquid phases (within the stripper) are in equilibrium. The height of the column and the amount of packing material and/or the number of metal trays along with steam pressure in the column generally determine the amounts of volatiles that can be removed and the effluent pollutant levels that can be attained by the stripper. After the volatile pollutants are extracted from the wastewater into the super heated steam, the steam is condensed to form two layers of generally immiscible liquids, the aqueous and volatile layers. The aqueous layer is generally recycled back to the steam stripper influent feed stream because it may still contain low levels of the volatiles. The volatile layer may be recycled to the process from which it came, incinerated on-site, or contract hauled (for incineration, reclaiming, or further treatment off-site) depending on the specific plant's requirements.

Steam stripping is an energy intensive technology in which heat energy is required to both preheat the wastewater and to generate the super heated steam needed to extract the volatiles from wastewater. In addition, some waste streams may require pretreatment such as solids removal, e.g. filtration, prior to stripping because accumulation of solids within the column will prevent efficient contact between the steam and wastewater phases. Periodic cleaning of the column and its packing materials or trays is a necessary part of routine steam stripper maintenance to assure that low effluent levels are consistently achieved.

Steam strippers are designed to remove individual volatile pollutants based on a ratio (Henry's Law Constant) of their aqueous solubility (tendency to stay in solution) to vapor pressure (tendency to volatilize). The column height, amount of packing or number of trays, the operating steam pressure, and temperature of the heated feed (wastewater) are varied according to the strippability (using Henry's Law Constant) of the volatile pollutants to be stripped. Volatiles with lower Henry's Law Constants require greater column height, more trays or packing material, greater steam pressure and temperature, more frequent cleaning and generally more careful operation than do volatiles with higher strippability. Although the degree to which a compound is stripped can depend to some extent upon the wastewater matrix, the basis for the design and operation of steam strippers is such that matrix differences are taken into account for the volatile compounds the Agency has evaluated.

Data on the performance of steam stripper control technology for volatile organic compounds that formed the basis of the July 17, 1985 Notice proposed approach for controlling volatile organic pollutants were obtained for twelve (12) organic volatile priority pollutants from four plants that used steam stripping technology for waste streams from four processes. The July 17, 1985 notice considered regulating the volatile priority pollutants according to steam strippability using Henry's Law Constant. The pollutants were separated into three classes with high, medium and low stripping potential based on their Henry's Law Constants.

Additional steam stripper data were obtained from industry as a part of comments submitted or as a follow up to comments on this proposed approach. The Agency surveyed (by telephone) commenters' plants for any steam stripping data they had to support their comments. The Agency also requested (by telephone) other plants that, based on the type of product/processes employed, might have steam strippers in-place to provide any existing data demonstrating performance of steam stripping. The data were reviewed in detail and edited to assure that only data representing BAT-level design and operation were retained for purposes of developing limitations. The final data base used to develop BAT limitations consisted of performance results from 7 steam strippers at 5 plants for 15 volatile organic pollutants. EPA believes that the data for these plants provide an

adequate basis to set limitations for the industry.

These data were first sorted by process waste stream stripped for each of the compounds in the high and medium strippability groups. (The low strippability pollutants were determined to require types of treatment other than steam stripping, i.e., carbon adsorption or in-plant biological treatment. See Section 4.d. below.)

A further sort of the strippability data was made taking into account the process wastewater matrix. This review confirmed that process wastewater matrices in this industry generally do not preclude compliance with the concentration levels established in today's regulations.

However, EPA has determined that one product/process (production of methyl chloride from methanol by hydrochlorination) does produce an exceptionally corrosive wastewater whose matrix adversely affects the average performance of the packed tower type of steam stripper for which the data was submitted. Therefore, EPA is excluding the submitted steam stripping data from that product/process from the calculation of BAT and PSES limitations for the volatile pollutants.

The final regulations establish limitations for 28 volatile pollutants. For 15 of these pollutants, the limitations are based directly on data representing the actual control of these pollutants by treatment systems operating in the OCPSF industry. EPA calculated a separate limitation for each of these pollutants. For some of these pollutants the available effluent data consisted of measurements so low that very few exceeded the analytical threshold level (10 ppb, the minimum level for most pollutants); see Section X, comment 7. Since variability factors could not be calculated directly for these pollutants, EPA transferred variability factors from related pollutants.

For 13 other volatile pollutants, EPA lacked sufficient data to calculate limitations directly from data relating to these pollutants. Instead, EPA concluded that these pollutants may be treated to levels equivalent, based upon Henry's Law Constants, to those achieved for the 15 pollutants for which there were data. Dividing the 15 pollutants into "high" and "medium" strippability subgroups, EPA developed a long-term average and variability factors for each subgroup and applied these to the 13 pollutants for which data were lacking (six pollutants in the high subgroup and seven in the medium subgroup). The long-term average for each subgroup was determined by the highest of the long-term averages within the comparable "high" or "medium" subgroup of the 15 pollutants for which the Agency had data. This approach tends to be somewhat conservative but in the Agency's judgement not unreasonable in light of the uncertainty that would be associated with achieving a lower long-term average for the pollutants for which data are unavailable. The high strippability long-term average thus derived is 64.5 μg/l, while the medium strippability long-term average is slightly higher 64.7 μg/l.

While it may appear anomalous that the high strippable subgroup yields a just slightly lower long-term average effluent concentration, EPA believes that this is not the case. First, in the context of the maximum levels entering the steam strippers within the two subgroups (12,000 μg/l to over 23 million μg/l), the difference between these two long-term averages is negligible and essentially reflects the same level of long-term control from an engineering viewpoint. Second, the "high" and "medium" strippable compounds behave comparably in steam strippers, in the sense that roughly the same low effluent levels can be achieved with properly designed and operated steam strippers. In other words, it is possible to mitigate small differences in theoretical strippability among compounds in these groups with different design and operating techniques. The small differences in long-term average performance seen in the data reflect, in EPA's judgment, not real differences in strippability among pollutants but rather the difference in steam stripper operations among the plants from which the data was taken. Indeed, one could reasonably collapse the two subgroups into one group and develop a single long-term average for the 13 pollutants for which EPA lacks data. While such an approach might be technically defensible, EPA decided it would be most reasonable to retain the distinction between "high" and "medium" subgroups, which remains a valid and important distinction for the purpose of developing variability factors, as discussed below.

The "high" and "medium" subgroup variability factors were derived by using the average of the variability factors developed for each of the pollutants in the subgroups. The variability factor for the maximum daily limitation for the "high" strippability subgroup was 5.884, and for the "medium" subgroup was 12.266. The variability data in general confirmed the engineering hypothesis that medium strippability pollutants may have higher variabilities due to their greater sensitivity, on a short-term basis, to fluctuations in steam temperature and pressure and other factors.

EPA used an average variability factor for two reasons. First, EPA believes the average variability factor to be reasonable and achievable through vigilant control of those factors that produce variability, particularly in light of the fact that the variability factor values are fairly high. Second, since limitations are derived by multiplying the long-term average times the variability factor, and since the long-term averages were based upon the highest of the long-term averages in each pollutant subgroup, the use of the largest variability factor calculated from the available data would have resulted in limitations that would be too high to effect meaningful treatment. EPA believes that the final limitations set forth in the regulation, based upon conservatively high long-term averages and upon average variability factors yield achievable effluent limitations appropriate to represent best available design and operation of treatment technology for a wide range of product/process wastewater matrices. These average values are used to calculate limitations for the 13 volatile organic pollutants for plants that do not use end-of-pipe biological treatment and for PSES.

b. *Cyanide Limitations.* The final regulation contains concentration-based effluent limitations for total cyanide from process waste streams covered by the regulation. The selected technology basis for controlling the discharge of cyanide is chemical oxidation by the alkaline chlorination method. This technology is demonstrated in the OCPSF industry and is widely used in the metal finishing industry. This method involves the oxidation of free cyanide to carbon dioxide and nitrogen using chlorine gas in an alkaline solution at generally elevated temperatures. Ozone can also be used to oxidize free cyanide. The chemical oxidation equipment often consists of an equalization tank followed by two reaction tanks, although the reaction can be carried out in a single tank. Generally, a several-fold excess of chlorine and caustic plus elevated temperatures are necessary to drive the oxidation reaction to completion, that is, to the production of carbon dioxide and nitrogen.

Eleven direct and indirect discharge plants use cyanide destruction, including some plants that reported the use of alkaline chlorination. However, performance data on cyanide destruction are not available from the OCPSF industry. Nonetheless,

performance data on cyanide destruction by alkaline chlorination in the metal finishing industry are available, and EPA indicated in its December 8, 1986 Notice that it was considering using the performance data for cyanide destruction from the metal finishing industry to develop cyanide limitations and standards. Public comments on this notice suggested that EPA should transfer cyanide destruction performance data from the pharmaceutical manufacturing industry rather than from the metal finishing industry because of the similarity in wastewater characteristics shared by the OCPSF and pharmaceutical industrial categories. EPA has evaluated cyanide destruction in the pharmaceutical industry and has rejected transfer of performance data from that industry for use in the development of OCPSF cyanide limitations because the cyanide destruction performance data from the pharmaceutical industry are from a cyanide hydrolysis system which utilizes high temperatures and pressures to hydrolyze free cyanide, and this particular type of cyanide destruction technology has not yet been demonstrated to be effective on OCPSF cyanide-bearing wastewater. EPA is not aware of any OCPSF plants using hydrolysis treatment for cyanide. In contrast, cyanide destruction, of which alkaline chlorination is a common type, is used by some OCPSF plants. EPA believes that the cyanide destruction by alkaline chlorination data from the metal finishing industry is more appropriate for transfer to the OCPSF industry since this technology is used on cyanide waste streams in the OCPSF industry.

Another significant issue raised concerning the use of alkaline chlorination technology in the OCPSF industry was the contention that while this technology may effectively reduce concentrations of free cyanide in OCPSF wastewaters, it cannot reduce concentrations of metal-complexed cyanides. Commenters have stated that the limitations and standards should be for amenable cyanide only. EPA has evaluated the expected amount of cyanide complexing due to the presence of certain transition metals (nickel, copper, and cobalt) in OCPSF cyanide bearing waste streams, and has concluded that there are no combinations of cobalt and cyanide and only a few (6) product/process waste streams that would contain combinations of either copper and cyanide (four sources) or nickel and cyanide (two sources). For these product/process sources, a potential for cyanide complexing is present. However, no data has been submitted to demonstrate that the actual levels of complexing interfere with the ability of these or other plants to meet the total cyanide limitations. Thus, EPA believes that limitations controlling total cyanide are appropriate for all dischargers subject to this regulation. A detailed writeup identifying the sources of cyanide and the six product/processes with a potential for complex formation with nickel and copper is contained in Section V of the Development Document.

Limitations are based upon the transfer of data on alkaline chlorination (chemical oxidation) technology from the metal finishing industry data base. These limitations apply only to the cyanide-bearing waste streams; thus only cyanide-bearing process wastewater flow should be used by permit writers to convert the concentration-based cyanide limitations into mass-based permit limitations. Cyanide-bearing waste streams are listed in Appendix A to the regulation or may be identified by the permit writer.

c. *Metals Limitations.* The final rule contains concentration-based effluent limitations for chromium, copper, lead, nickel and zinc. The limitations are to be applied only to the flows discharged from metal-bearing process wastewaters (defined in the regulation and discussed below). Separate zinc limitations have been established for rayon manufacturers using the viscose process and acrylic fibers manufacturers using the zinc chloride/solvent process.

The proposed regulations and the July 1985 notice both set forth end-of-pipe concentration limitations for nine metals. The limits were based on end-of-pipe effluent data taken at plants using biological systems preceded in some cases by in-plant treatment for which neither raw waste nor in-plant treatment effluent metals data were available. For plants that do not use biological treatment, EPA solicited comment in the December 1986 notice on establishing limitations based upon the use of hydroxide precipitation data from several metals industries. For OCPSF wastestreams with complexed metals, EPA indicated that it was considering the use of sulfide precipitation to achieve the same limitations.

Industry commenters strongly criticized several aspects of EPA's proposed approach. First, they argued that most priority pollutant metals are not present in significant quantities in OCPSF wastewaters. They criticized the data base upon which EPA had estimated loadings for these pollutants. They argued that to the extent that EPA found metals in OCPSF wastewaters, these pollutants resulted not from OCPSF processes, many of which do not use metals, but rather from non-process wastewaters (e.g., zinc and chromium used as corrosion inhibitors and often contained in cooling water blowdown) or due to their presence in intake waters. The commenters concluded that EPA should regulate only those metals present in OCPSF process wastewaters as a result of the process use of the metals, applying the limits to those wastewaters only.

To address these comments, EPA has conducted a detailed analysis of the process wastewater sources of metals in the OCPSF industry. In response to criticism that EPA has relied too heavily on limited Master Process File metals data, EPA painstakingly reviewed the responses to the latest (1983) Section 308 survey to examine which metals were used as catalysts in particular OCPSF product/processes or were for other reasons likely to be present in the effluent from these processes. When necessary, EPA contacted plant personnel for additional information. The results of EPA's analysis, together with supporting documentation, are set forth in the rulemaking record and summarized in Section V of the Development Document.

Based upon this analysis, EPA has concluded that chromium, copper, lead, nickel and zinc are discharged from OCPSF process wastewaters at frequencies and levels that warrant national control. However, EPA agrees with the commenters that many OCPSF wastewaters do not contain these pollutants or contain them only at insignificant levels. At most plants, process wastewater flows containing these metals constitute only a small percentage of the total plant OCPSF process wastewater flow. As a result, end-of-pipe data obtained by EPA often do not reflect treatment but rather reflect the dilution of metal-bearing process wastewater by nonmetal-bearing wastewater. Thus, these data are not suitable for the purpose of setting effluent limitations reflecting the use of best available technology. Therefore, EPA has concluded, consistent with the industry comments, to focus its regulations on metal-bearing process wastewaters only.

The approach taken in the final regulation is to establish concentration-based limitations that apply only to metal-bearing process wastewaters (similar to the cyanide limitations). The permit writer will establish a mass

limitation by summing the flows of metal-bearing wastewaters and multiplying them by the concentration limitation. Compliance could be monitored in-plant or, after accounting for dilution by nonmetal-bearing process wastewater and nonprocess wastewaters, at the outfall. (Of course, the permit writer may on a case-by-case basis provide additional discharge allowances for metals in non-OCPSF process or other wastewaters where they are present at significant levels. When BAT limits have not been established, these allowances must be based upon the permit writer's best professional judgment of BAT as well). This approach is similar to that taken by EPA in other industry effluent limitations guidelines. (See 40 CFR Parts 433 and 439 for monitoring requirements related to their cyanide limitations).

EPA has listed the product/processes considered to have metal-bearing process wastewater in Appendix A of the regulation. This list is based on EPA's careful review of data in the record. However, EPA recognizes that at some sites process wastewaters not listed in Appendix A may contain significant levels of metals. In such cases, the NPDES program regulations authorize the permit writer to provide an allowance for these additional wastewaters, using the concentration limitations set forth in the regulation.

The concentration limitations are based upon the use of hydroxide precipitation technology, which is the standard metals technology that forms the basis for virtually all of EPA's BAT metals limitations for metal-bearing wastewaters. Because very little OCPSF data on the effectiveness of hydroxide precipitation technology is available, EPA has decided to transfer data for this technology from the Metal Finishing Industry. A comparison of the metals raw waste data from metal finishing plants with the validated product/process OCPSF raw waste data indicates that the concentrations of the metals of concern in the OCPSF industry are within the range of concentrations found at metal finishing plants. Also, the metal finishing wastewater matrices contain organic compounds which are used as cleaning solvents and plating bath additives. Some of these compounds serve as complexing agents and their presence is reflected in the metal finishing industry data base. This data base also contains hydroxide precipitation performance results from plants with waste streams from certain operations (electroless plating, immersion plating, and printed board circuit board manufacturing) containing complexing agents. This is important because the data base reflects both treatment of waste streams containing complexing agents and segregating these waste streams prior to treatment.

The transfer of technology and limitations from the Metal Finishing Industry category is further supported by the principle of precipitation. Given sufficient retention time and the proper pH (which is achieved by the addition of hydroxide, frequently in the form of lime), and barring the binding up of metals in strong organic complexes (see discussion below), a metal exceeding its solubility level in water can be removed to a particular level—that is, the effluent can be treated to a level approaching its solubility level for each constituent metal. This is a physical/chemical phenomenon which is relatively independent of the type of wastewater, barring the presence of strong complexing agents.

Some product/processes do have wastewaters that contain organic compounds which bind up the metals in stable complexes which are not amenable to optimal settling through the use of lime. EPA asked for comment in the December 1986 notice on the use of sulfide precipitation in these situations. Industry commenters argued that the effectiveness of this technology has not been demonstrated for highly stable, metallo-organic chemicals. EPA agrees. Strongly complexed priority pollutant metals are used or created, for instance, in the manufacture of metal complexed dyestuffs (metallized dyes) or metallized organic pigments. The most common priority pollutant metals found in these products are trivalent chromium and copper. The degree of complexing of these metals may vary among different product/processes. Consequently, each plant may need to use a different set of unique technologies to remove these metals. Thus metals limits are not set by this regulation, and must be established by permit writers on a case-by-case basis, for certain product/processes containing complexed metals. These product/processes are listed in Appendix B to the regulation.

The list in Appendix B has been compiled based upon an analysis contained in the rulemaking record. EPA has concluded that all other metal-bearing process wastewaters (whether listed in Appendix A to the regulation or established as metal-bearing by a permit writer) can be treated using hydroxide precipitation to the levels set forth in the regulation.

Finally, EPA has established a separate zinc limitation for rayon manufacturers using the viscose process and acrylic fibers manufacturers using the zinc chloride/solvent process. Process wastewaters from the rayon/viscose and acrylic/zinc chloride/solvent processes contain zinc at levels that are typically a hundred times the levels in other OCPSF wastewaters. EPA has collected data assessing the performance of chemical precipitation with lime and clarification in treating zinc in these discharges. The final limitations are based on these data.

d. *Other Organic Pollutants.* The Agency considered two in-plant technologies for the removal of organic pollutants other than those removed by steam stripping. These are activated carbon adsorption and in-plant biological treatment.

Activated carbon adsorption is a proven technology primarily used for the removal of organic chemical contaminants from individual process waste streams. The carbon has a very large surface area per unit mass and removes pollutants through adsorption and physical separation mechanisms. In addition to removal of most organic chemicals, activated carbon achieves limited removal of other pollutants such as BOD and metals. Carbon used in a fixed column, as opposed to being directly applied in a granular or powdered form to a waste stream, may also act as a filtration unit.

Eighteen OCPSF plants in the data base for this regulation are known to use activated carbon as an in-plant treatment technology. Although performance data for a specific individual in-plant carbon adsorption unit prior to biological treatment were not available, the Agency collected performance data during the 12-plant study from an in-plant (dedicated) carbon adsorption unit following steam stripping at an OCPSF facility for which the carbon adsorption unit treated a process-waste stream prior to discharge. This plant manufactures only inter-related products whose similar wastestreams are combined and sent to a physical/chemical treatment system consisting of steam stripping followed by activated carbon. The toxic pollutants associated with these waste streams are removed by either steam stripping or activated carbon, or a combination of them.

The Agency has decided to use these available performance data from the end-of-pipe carbon adsorption unit as the basis for establishing BAT limits for four pollutants (2-nitrophenol, 4-nitrophenol, 2-4-dinitrophenol and 4,6-dinitro-o-cresol) and for the combination of steam stripping and activated carbon adsorption for nitrobenzene. These data

show very good removals for the carbon adsorption unit of 4,6-dinitro-o-cresol, 2-nitrophenol and 4-nitrophenol. However, the data indicate that for 2,4-dinitrophenol and nitrobenzene, the carbon adsorption unit is experiencing competitive adsorption phenomena. This condition exists when a matrix contains adsorbable compounds in solution which are being selectively adsorbed, and desorbed. The data from the plant sampled by EPA and from another carbon adsorption unit for nitrobenzene at a plant which submitted data yield effluent limitations that are higher when compared to the other organic pollutant effluent limitations in this regulation. EPA believes that these are the limitations, based upon currently available data, that are generally achievable across the industry. Nonetheless, even this level of demonstrated treatment gives significant removals for these compounds. (Current discharge levels of 150,000 pounds annually for these two pollutants would be reduced to less than 10,000 pounds annually after BAT and PSES.) Therefore, limitations for 2,4-dinitrophenol and nitrobenzene are based upon the data available. Further work to identify additional technologies or use of carbon adsorption units in series for removal of these compounds will need to be conducted to determine whether removal of these compounds can be improved.

In-plant biological treatment is an effective and less costly alternative to carbon adsorption for control of certain toxic organic pollutants, especially those which are effectively absorbed into the sludge and are relatively biodegradable. In-plant biological treatment may require a longer detention time and certain species of acclimated biomass to be effective as compared to end-of-pipe biological treatment that is predominantly designed to treat BOD. EPA has determined that in-plant biological treatment with an acclimated biomass is as effective as activated carbon adsorption for removing priority pollutants such as polynuclear aromatics hydrocarbons, phthalate esters, acrylonitrile, phenol, and 2,4-dimethylphenol. EPA has thus selected this treatment for BAT control of these pollutants.

In-plant biological treatment is demonstrated at 33 plants in the OCPSF data base. Three plants' data were available for use in developing BAT limitations for the above pollutants based upon the performance of in-plant biological treatment. The performance data for in-plant biological treatment were taken from plants that treat major sources of polynuclear aromatic hydrocarbons, phthalate esters, acrylonitrile, phenol, and 2-4-dimethylphenol in dedicated biological treatment systems (i.e., with a minimum amount of dilution with other process wastewaters). The Agency has determined that these data are appropriate for use in characterizing the performance of in-plant biological treatment based upon the waste stream characteristics of the influent to the treatment systems. For the pollutants which have limits derived from this in-plant treatment technology data base, the limitations for the non-end-of-pipe biological treatment subcategory are more stringent than for the end-of-pipe biological treatment subcategory. Both biological treatment systems (end-of-pipe and the dedicated systems used for the in-plant biological treatment basis) remove these pollutants from the waste stream in most cases to levels at or below the analytical minimum level. However, available data indicate that the variability of the larger end-of-pipe biological systems in the data base is greater. This may be explained by the fact that the larger end-of-pipe systems receive commingled waste streams with a larger number of organic pollutants, and thus may be more susceptible to daily fluctuations in performance.

The Agency is also relying on the ability of end-of-pipe biological treatment to achieve some additional pollutant removal beyond carbon adsorption and in-plant biological treatment except in the case of 4,6-dinitro-o-cresol. For this pollutant only the in-plant activated carbon technology is used as a basis in both BAT subcategories. Thus, BAT limitations are lower for several pollutants regulated by the end-of-pipe biological treatment subcategory than are the limitations for the same pollutants regulated by the non-end-of-pipe biological treatment subcategory.

5. Pollutant Selection

In developing the OCPSF regulation, priority toxic pollutants of concern were identified through analytical programs to detect and quantify them in the raw wastewaters discharged from the product/process lines which were most important or most common in the industry. The initial work in determining the chemical constituents present in the process wastewaters began in 1977. EPA did not attempt to identify or quantify pollutants other than the priority toxic and conventional pollutants. The initial effort included screening process wastewaters for the presence of compounds on the priority pollutant list of compounds or classes of compounds covered by the NRDC Consent Decree.

Over the next several years data were gathered to further identify and quantify pollutants being discharged from specific processes and in combined discharges from facilities with multiple processes.

The final BAT OCPSF regulation for the end-of-pipe biological treatment subcategory sets limitations for the 63 toxic pollutants set forth in Subpart I of the regulation. Regulating such a large number of toxic pollutants is unprecedented in the effluent guidelines rulemaking program, reflecting the fact that many of the organic toxic pollutants are directly manufactured by OCPSF facilities as well as used as raw materials or generated as byproducts in industry processes. There are one metal priority pollutant (antimony) and three organic priority pollutants (2,4,6-trichlorophenol and 3,3'-dichlorobenzidine and dioxin) for which the Agency does not have sufficient data to regulate or exclude them in the end-of-pipe biological treatment subcategory.

The data base for the non-end-of-pipe biological treatment subcategory limitations (set forth in Subpart J) includes data from biological end-of-pipe subcategory plants if samples of the influent and effluent of the in-plant treatment were collected. Even with these data, there are eight priority pollutants for which the Agency does not have sufficient data to set limitations in the non-end-of-pipe biological treatment subcategory. For these 8 pollutants (2-chlorophenol, 2,4-dichlorophenol, 2,4-dinitrotoluene, and 2,6-dinitrotoluene and the four identified in the preceding paragraph), the Agency is not setting limits. Limitations for these pollutants are being reserved pending availability of additional information concerning their removal by in-plant physical/chemical treatment systems. Thus, the Subpart J limitations cover 59 toxic pollutants.

Readers should note that even though nonconventional pollutants and certain toxic pollutants are not directly limited by this regulation, they will nonetheless be indirectly controlled in many cases by the technologies used to comply with the promulgated limitations if they are present in treatable concentrations. While the degree of such indirect control will vary, in some cases unregulated pollutants will be substantially reduced by the operation of technologies installed to comply with limitations for related regulated pollutants.

In the final rule, EPA has decided that each discharger in a subcategory will be

subject to the effluent limitations for all pollutants regulated for that subcategory. Once a pollutant is regulated in the OCPSF regulation, it must also be limited in the NPDES permit issued to direct dischargers. See Sections 301 and 304 of the Act; see also 40 CFR 122.44(a). EPA recognizes that guidance on appropriate monitoring requirements for OCPSF plants would be useful, particularly to assure that monitoring will not be needlessly required for pollutants that are not likely to be discharged at a plant. EPA intends to publish guidance on OCPSF monitoring in the near future. This guidance will address the issues of compliance monitoring in general, of initially determining which pollutants should be subject only to infrequent monitoring based on a conclusion that they are unlikely to be discharged, and of determining the appropriate flow upon which to base mass permit requirements. This issue is addressed in more detail in Section X of this notice.

D. NSPS

EPA is promulgating new source performance standards that reflect use of the best available demonstrated technology for all new direct discharging sources. NSPS are established for conventional pollutants (BOD, TSS, and pH) on the basis of BPT model treatment technology. Priority pollutant limits are based on BAT model treatment technology. The standards are equivalent to the BPT and BAT limitations.

The Agency considered the same technology options as were discussed previously for BPT and BAT. BPT Options II and III were rejected because they are not adequately demonstrated in the OCPSF category. BAT Option I was rejected as the basis for priority pollutant limits for the same reason it was rejected for BAT, because it is not the best available demonstrated technology. BAT Option III was rejected because of its high cost and the relatively small incremental removal it would achieve, and because it is not well demonstrated as an end-of-pipe technology, either with or without end-of-pipe biological treatment technology.

The Agency is issuing conventional pollutant new source standards for the same seven subcategories for which BPT limits were established. These standards are equivalent to the limits established for BPT.

Priority pollutant new source performance standards are applied to new sources according to the same subcategorization scheme used in setting BAT limitations. The set of standards in the end-of-pipe biological treatment subcategory will apply to new sources that use biological treatment in order to comply with BOD and TSS standards. Standards are established for 63 priority pollutants. The subcategory for sources that do not use end-of-pipe biological treatment apply to new sources that will generate such low levels of BOD that they do not need end-of-pipe biological treatment or choose physical/chemical controls to comply with the BOD standard. These facilities will have priority pollutant standards for 59 priority pollutants which are based on the application of the in-plant control technologies with or without end-of-pipe physical/chemical treatment. In all cases the standards are equivalent to the limits established for BAT. The Agency has determined that NSPS will not cause a barrier to entry for any new source OCPSF plants.

E. PSES

PSES are applicable to indirect dischargers and are generally analogous to BAT limitations applicable to direct dischargers. The Agency is promulgating PSES for 47 priority pollutants which are determined to pass through POTWs. The standards apply to all existing indirect discharging OCPSF plants. EPA determines which pollutants to regulate in PSES on the basis of whether or not they pass through, interfere with, or are otherwise incompatible with the operation of POTWs (including interference with sludge practices).

1. Pass-Through Evaluation; Pollutants Selected for Regulation

The principal means by which the Agency evaluates pollutant pass through, and the general methodology used for this regulation, is to compare the pollutant percentage removed by well-operated POTWs with secondary treatment with the percentage removed by BAT technology.

As discussed previously in Sections IV and V of this notice, EPA proposed to determine that pass through occurs only if BAT technology removes at least five percent more than a well-operated POTW removes. In the July 17, 1985 notice EPA stated that it was considering modification of the pass through comparison to use a ten percent instead of a five percent removal differential. Finally, in the December 8, 1986 notice EPA announced that it would not use either a five or ten percent differential in making its pass through determinations. The Agency also stated that it was considering conducting the comparisons of removal using influent pollutant values from comparable influent concentration ranges for the industrial wastewater treatment system and the POTW.

EPA has decided not to use a five or ten percent removal differential for determining pollutants to regulate in PSES in the final rule. Some commenters have urged that due to analytical variability, data showing BAT performance slightly better than that of POTWs may not reflect a real difference in removal efficiency and may lead to unnecessary imposition of PSES requirements. Another commenter argued to the contrary that analytical variability, if any, can work in the opposite direction, i.e., data showing that POTWs perform as well or better than BAT may also be erroneous and lead to an inappropriate decision not to establish PSES for a pollutant. EPA has concluded that the most reasonable approach is to accept the available data as the best information on the relative percent removals achievable by industrial plants that employ BAT technology and by POTWs, and to perform BAT/POTW comparisons directly on the basis of differences in removal. Such an approach is unbiased in that it does not favor either over-regulation or under-regulation in determining which pollutants are regulated at PSES.

Other commenters urged EPA to use a five or ten percent differential to address the problem of low POTW effluent concentrations which may mask the full extent of POTW treatment. EPA noted in the proposal that in addition to analytical variability, a differential might be used because POTW influent concentrations are typically much lower than industry treatment system influent concentrations and many POTW effluent concentrations are below the analytical threshold level. When below this threshold, the effluent values are reported as being at the analytical threshold or "detection limit" (more precisely, the "minimum level" established in 40 CFR Part 136), which overestimates the effluent concentration and underestimates the percent removed. It is not possible in such situations to determine to what level below the detection limit the POTWs are actually treating the pollutants and thus it is not possible to determine the extent to which POTW removals are underestimated and to determine the effect, if any, on the outcome of a pass-through comparison. Thus, it is uncertain whether a compensating differential would be appropriate. Moreover, a five or ten percent differential could result in a determination of no pass-through where pass-through was occurring. It should be

noted that to allow even a few of the pollutants to go unregulated based upon the five percent differential may be significant in terms of the number of pounds of toxic pollutants discharged to receiving waters. Finally, the problem discussed by the commenters will be greatly mitigated by changes in the data editing criteria.

EPA has modified the criteria under which the data for conducting the pass-through comparison test were selected. In previous analyses, EPA used individual daily pairs and plant average pairs of influent and effluent data when influent concentrations exceeded 20 μg/l. For pollutants with low influent concentrations, i.e., not much higher than 20 μg/l, the effluent concentrations were consistently at or below the method detection limit (or, more precisely, the "minimum level" established in 40 CFR Part 136) and thus could not be quantified by using the applicable method. The conservative approach of adopting the "detection limit" or the analytical threshold as the effluent value for such measurements has the effect of underestimating the POTW's percent removal, perhaps greatly underestimating the removal. In many cases, in fact, both POTW and BAT treatment systems with relatively low influent concentrations yielded effluent measurements below detection, and the resulting percent removals were not true measures of treatment effectiveness, but rather were functions of influent concentrations. The percent removal comparison thus had the effect of determining pass through in some cases solely because the POTW had a lower pollutant influent concentration, rather than basing the determination on demonstrated differences in treatability. The POTW might be achieving as high a percent removal as the BAT level technology, but there was no basis for determining whether this was so or not.

A second concern with the 20 μg/l influent criterion was its inconsistency with the criteria used to select industrial data for assessing treatability and calculating BAT effluent limitations. One of EPA's criteria for selecting data to set BAT effluent limitations for direct dischargers is that the influent data for that plant must exceed ten times the pollutant's analytical threshold. (See Section X comment and response number 7 for a discussion of analytical thresholds.) When an influent concentration is below this level, effluent concentrations below the pollutant's analytical threshold often may be achieved using less than BAT-level treatment. The editing criterion helps to insure that BAT effluent limitations generally reflect the technical capability of BAT level treatment rather than low influent concentrations.

Consistent with the BAT data editing approach and the available POTW pollutant data above 100 ppb or "ten times the detection limit", EPA has also used the "ten times detection limit" criterion for pollutants in BAT-level industrial and POTW influents for purposes of selecting the data used to perform pass through comparisons for the final regulation for all of the pollutants for which such data are available. For most (24) of the pollutants which pass through, EPA has used data from the POTW data base with an influent concentration average greater than ten times the pollutant's detection limit. For 16 pollutants for which adequate POTW data are unavailable using the "ten times" approach, the pass through analysis uses data which remain after applying a 20 ppb editing criterion because no influent data above 100 ppb or "ten times the detection limit" exist for these pollutants.

EPA has also modified its approach to calculating plants' percent removals for purposes of comparing BAT-level industrial plant and POTW removals. EPA's earlier approach was to calculate a facility's percent removals by calculating daily removal estimates based on influent and effluent measurements taken on the same day, and then averaging these removals. We have concluded that this method of using daily removal estimates was inappropriate. First, many OCPSF biological systems have retention times exceeding one day's duration. Thus, comparison of influent and effluent samples taken on the same day is not a good indication of removal. Second, even if the retention time is shorter than a full day, any sampled influent, after mixture and dispersal within the biological system, cannot be traced to a particular sample leaving the system. In fact, in the typical biological treatment system, a portion of the biological solids are recirculated within the system, which further complicates the evaluation of removals based on comparison of daily influent and effluent samples. Third, due to the low concentrations frequently found in both OCPSF and POTW biological systems, small daily changes in pollutant concentrations result in larger changes in removal efficiency estimates; these changes are misleading in that they do not necessarily reflect significant variation in the system's operation. Therefore, EPA has modified its approach to calculate a plant's removal efficiency using the arithmetic averages of all influent samples and effluent samples.

EPA recognizes that it has used daily removal estimates in pass-through analyses for other industries. Since the primary pollutants of concern in these other industries (usually metals) were generally removed much more efficiently by BAT-level technology than by POTWs, the mode of analysis was not crucial to the determination of pass through. For the OCPSF industry, the BAT and POTW removal efficiencies for particular pollutants are frequently rather close to one another, and EPA has considered its approach more carefully. This consideration has led to the change in approach described above for this industry. The approach of using influent and effluent averages in removal estimates rather than averaging daily removal estimates is in fact consistent with EPA's approach for establishing percent removal requirements in certain other CWA regulations. (See 40 CFR Part 439 and 40 CFR 133.102).

Moreover, EPA disagrees with the commenter who argues that *NRDC* vs. *EPA*, 790 F.2d 289 (3rd Cir. 1986), compels the use of daily removal estimates in performing generalized BAT–POTW comparisons for purposes of deciding whether pollutants generally pass through so as to require PSES on a national basis. EPA believes that Congress did not require EPA to use a technically flawed comparison of BAT and POTW performance.

Some commenters argued that EPA should not find pass through and should not promulgate PSES for a pollutant when POTW removals are very high (e.g., 85 percent or higher), or when POTWs are specifically designed to treat industrial wastewaters efficiently. EPA does not accept these arguments. EPA is using the same criterion for pass-through in the OCPSF industry that it has used for many years to set PSES for other industries: whether POTW treatment efficiency is as great as BAT level industrial treatment efficiency. If BAT level treatment in industrial plants generally is more effective than POTW removal, a pollutant will be regulated in PSES. Section 307(b) of the Act provides that a particular POTW's removal of pollutants may be considered and that limitations for particular industrial users of POTWs may be revised if the POTW can demonstrate a consistent removal of pollutants in question and meet other requirements relating to sludge quality. The removal credits may be granted consistent with the removal efficiencies of individual POTWs on a case-by-case

basis. See *Cerro Copper Products Co. and Village of Sauget* v. *Ruckelshaus*, 762 F.2d 1060 (7th Cir. 1985). Moreover, EPA notes that no commenter provided adequate information on any particular POTW's removal of all the toxic pollutants found by EPA to generally pass through to form a basis for separate consideration (e.g., by subcategorization) of any POTW.

Another area in which the final regulation differs from the proposal concerns those pollutants for which EPA lacks sufficient field sampling data to perform the pass-through comparison. Despite the fact that EPA sampled 50 POTWs in addition to conducting the many OCPSF industry sampling efforts discussed in Section IV of this preamble, there are 3 pollutants that are regulated at BAT for which EPA lacks sufficient POTW treatment data to perform a pass-through analysis. These are in addition to the 8 pollutants discussed previously under BAT for which EPA lacks sufficient OCPSF industry treatment data to establish BAT limits. Another 3 pollutants listed in Appendix B, for which there are insufficient POTW treatment data, are excluded from regulation since industrial treatment data indicates that they are sufficiently controlled by existing industrial treatment technologies.

In the 1983 proposal, EPA adopted the approach of assuming pass through in the absence of data to the contrary. Some industrial commenters objected to this approach, arguing that section 307(b) authorizes EPA to promulgate pretreatment standards only for pollutants that pass through or interfere with the POTW, and that EPA is thus required to affirmatively find pass through or interference as a precondition to promulgating pretreatment standards. An environmental group argued to the contrary that EPA has an obligation to require pretreatment if there may be pass through or interference and that in the absence of adequate data, pass through must be assumed.

In subsequent notices, EPA requested comment on an alternative approach of using pilot and bench scale data in the absence of full-scale data to determine POTW removal rates, and to use those data for the comparative analysis. EPA made the alternative pilot and bench-scale data available for comment. After considering public comments on this approach and on the data to be used, EPA has decided in the final rule to use data based upon pilot and bench scale performance when adequate full scale data are lacking. The alternative data were used for 7 pollutants, and 4 of these were found to pass through.

EPA disagrees with the comment that EPA must assume pass through in the absence of full scale data to the contrary. Section 307(b) of the Act requires EPA to promulgate pretreatment standards "for those pollutants which are determined not to be susceptible to treatment by (the POTW) or which would interfere with the operation of such treatment works." Thus at least one reasonable interpretation of the statute is that EPA must make a determination of pass through or interference prior to promulgating pretreatment standards, rather than to assume pass through. In any event, the statute does not prohibit the use of pilot/bench-scale data when they are the best available data. Certainly, EPA has a preference for full-scale data and has expended considerable resources to obtain such data. However, to address remaining field data gaps, EPA believes that it is appropriate to use the best alternative information available.

Some industry commenters objected that the alternative data are of lesser quality than the full-scale data and have a larger range of potential error than the full-scale data. EPA acknowledges that this may be so; that is why EPA has relied upon full-scale data whenever available. However, EPA believes that the pilot/bench-scale data used here are of good technical quality and sufficient for use in the comparative analysis and may thus be used in the absence of adequate full scale data. Further, EPA does not agree that the use of a five or ten percent differential to compare BAT and POTW removal efficiencies is compelled when using pilot/bench-scale data. As discussed previously, any analytical inaccuracy in the data, regardless of the type of data used, can be in either direction.

The final pass through issue concerns three volatile pollutants (hexachlorobenzene, hexachloroethane, and hexachlorobutadiene) which are regulated at BAT based on technology and data transfer from other volatile pollutants that are treated by steam stripping technology. These pollutants are also regarded as passing through the POTW due to a determination of potential volatilization. Their "removal" from POTW wastewater includes some emissions of the pollutants to air rather than removal through treatment. This volatilization occurs in POTW sewer systems, equalization and other tanks, and secondary treatment systems. Therefore, EPA has established PSES for these pollutants.

EPA's decision is supported by the Conference Report which accompanied the Water Quality Act of 1987. The report states, with respect to conducting removal credit determinations:

"The purpose of removal credits under section 307(b)(1) is to allow reduced pretreatment requirements on the basis of treatment consistently achieved by the particular publicly owned treatment works. Dispersion into the air of toxic volatile organic chemicals does not constitute treatment of these pollutants. Consequently, removal credits cannot be issued for such pollutants on the basis of their emission from treatment works."

The basis for removal credits is analogous in some aspects to the basis for the pass through analysis. Essential to both is the calculation of POTW percent removal, the former on a local level and the latter on a national level. It was Congress' clear intent that POTW air emissions not be considered "removal" for purposes of relaxing pretreatment standards through removal credits, which strongly implies that such emissions should not be considered as POTW "removal" in calculating POTW removal efficiencies in conducting pass-through comparisons. (For the reasons discussed in Section X of this preamble, EPA is not establishing in-plant PSES for volatiles; thus, while steam stripping is the technology basis for controlling volatile pollutants, and the costs of steam stripping are taken into account in the regulatory decisions, some air emissions by indirect dischargers may occur before discharge to POTWs. Nevertheless, EPA believes that many plants will use steam stripping technology to comply with PSES for volatile pollutants and that this will result in substantial reductions in volatile emissions from indirect discharging OCPSF plants. PSES is thus an important step to controlling these emissions.)

EPA also considered regulating volatile pollutants on the basis of interference with POTWs in that they have the potential to threaten the health and safety of POTW workers. While there is some information in the record to support this basis, it is limited. Therefore, EPA is not relying on this basis, but notes that the information tends to support the decision made on grounds of pass through.

Similarly, EPA is not relying on interference with POTW sludge use and disposal options as a basis for determining to set pretreatment standards for particular pollutants. First, EPA's current sludge criteria are very limited. Second, POTWs' choices of

disposal options for sludge are site-specific. It was thus not feasible at this time to base nationally applicable selection of pollutants for PSES regulation on current impact of discharges of specific pollutants to POTWs by OCPSF facilities on POTWs' sludge disposal practices.

2. Technology Selection

Indirect dischargers generate wastewaters with the same pollutant characteristics as direct discharging plants; therefore the same technology options as were discussed previously for BAT are appropriate for consideration as the basis for PSES. The Agency is promulgating PSES for all indirect dischargers on the same technology basis as that adopted for the BAT non-end-of-pipe biological treatment subcategory. EPA is not including end-of-pipe biological treatment (i.e., biological treatment after application of in-plant treatment and before discharge to the POTW) in the final PSES model technology based on the following considerations. As a matter of treatment theory, end-of-pipe biological pretreatment may be largely redundant to the biological treatment provided by the POTW. The primary function of biological treatment is to reduce BOD loadings, whether at the OCPSF plant or at the POTW. Of course, an OCPSF system may be more acclimated to the types of wastes discharged by the OCPSF plant than is the POTW. However, this distinction is of limited importance once the OCPSF wastewaters are pretreated by BAT-level in-plant physical/chemical treatment.

The data indicate that biological pretreatment following in-plant treatment comprised in the model technology for the BAT and PSES regulation results in very modest incremental removals of priority toxic pollutants. This can be seen by comparing the BAT limitations for plants with and without end-of-pipe biological treatment. Since both sets of limitations are quite low for virtually all pollutants, the total incremental pounds of toxic pollutants removed by adding end-of-pipe biological treatment to in-plant treatment for all indirect dischargers would be less than 13,000 pounds. (The actual number of pounds removed would be less because, among other things, biological treatment could not be effectively used by a number of indirect dischargers with low BOD. They would thus in any event be subject only to limitations equivalent to BAT limits without end-of-pipe biological treatment.) The cost of achieving these removals would be $20.8 million annually. Moreover, this option would result in the closure of two additional plants, with 371 incremental job losses. Based upon a combination of these factors (relatively small incremental removals, high cost, economic impacts, and redundancy of treatment equipment), EPA is not promulgating PSES based upon end-of-pipe biological treatment.

In addition, while information is limited, EPA believes that at least some indirect dischargers located in urban areas may lack sufficient land to install end-of-pipe treatment. (Indirect dischargers tend to have more limited access to land than direct dischargers, although this is not always the case.)

Although EPA has rejected the option of adding end-of-pipe biological treatment, it should be recognized that EPA is using in-plant biological treatment as part of its model technology for the treatment of certain nonvolatile pollutants in particular waste streams. Specifically, for such pollutants, EPA has in some cases used in-plant biological treatment systems as an alternative to in-plant activated carbon adsorption for some absorbable and biodegradable organic pollutants. Thus EPA has in fact used biological treatment as part of PSES model treatment technology where appropriate.

3. Economic Impact

EPA has determined that the PSES promulgated today are economically achievable for OCPSF indirect dischargers as a whole. Moreover, EPA has decided not to exempt any sector of small plants from PSES. Consequently, all indirect dischargers must comply with PSES. For a detailed description of EPA's economic impact methodology and analysis, and small plant impact analysis, see Section VIII of this preamble.

The projected capital and annualized costs are $291.5 and $204.3 million respectively, with an estimated closure rate for all indirect discharging plants of 14 percent (52 product lines and plants out of the 362 plants for which sufficient information exists for costing). Projected job losses associated with these projected closures total 2,190. An additional 17 percent of the indirect plants will incur significant profitability reduction or cost-to-sales impacts. While these impacts are significant, the Agency does not believe they constitute economic unachievability for the indirect discharging segment of the OCPSF industry. Eighty-six percent of the indirect discharger segment of the industry will not suffer either plant or product line closures, and 69 percent of the indirect discharging plants will not be significantly impacted under any measure. A very large number of pounds of toxic pollutants (22.5 million pounds) will be removed by PSES from discharges to POTWs. EPA has therefore concluded that promulgation of PSES as described above is warranted for OCPSF indirect dischargers.

EPA considered exempting certain small plants from PSES, focusing particularly on the sector of plants producing less than or equal to five million pounds of products annually. These plants are projected to incur a closure rate of 26 percent (27 out of 105 plants) and other significant impacts of about 36 percent. Eight hundred twenty-three jobs in this sector would be lost due to the projected closures.

The closure rate of 26 percent for these small plants is higher than the 14 percent rate projected for indirect dischargers overall; however, this impact is not as severely disproportionate as was the impact exhibited by small direct discharging plants compared to all direct dischargers. Although the significant impacts other than closure show a clearer disproportion for the small indirect dischargers, they too are not so great as to clearly define this class of small plants as different in kind from the rest of the indirect dischargers. Indeed, in particular, plants that produce less than five million pounds annually do not suffer impacts at a significantly higher rate than plants that produce less than 10 or 15 million pounds annually.

Also, plants producing five million pounds or less of OCPSF product currently discharge about 2.54 million pounds of toxic pollutants to POTWs annually. Compliance with PSES by these plants would result in toxic pollutant removals of 2.53 million pounds annually. (For plants that produce less than 10 or 15 million pounds, compliance with PSES would result in pollutant removals of 4.87 million or 5.42 million pounds, respectively.) Although POTWs may remove a substantial portion of the pollutants discharged into receiving waters, the discharges that could be avoided by compliance with PSES would still be significant (about 1.0, 1.4, or 1.6 million pounds for production cutoff levels at 5, 10, or 15 million pounds produced, respectively).

The Agency considered a potential exemption for the smaller class of indirect discharging plants with annual production equal to or less than one million pounds. This group of plants is projected to experience a closure rate of 33 percent (14 plant and product line

closures) and a total significant impact rate of 81 percent. The projected employment loss is 161. Although the total significant impact percentage is very high, the disproportion of closures between this group of small indirect dischargers and all indirect dischargers (33 versus 14 percent) is considerably less than the disproportion in the case of small direct dischargers given less stringent BAT limitations and all direct dischargers (47 versus 7 percent). Moreover, the exemption of these plants would result in the failure to remove a very large amount of toxic pollutants—at least 315 thousand pounds and perhaps as many as 805 thousand pounds—from indirect discharges. Accordingly, EPA has decided not to establish a PSES exemption for this class of plants.

EPA considered a variety of less stringent technology options to determine whether it would be possible to afford substantial relief to some indirect dischargers while at the same time obtaining significant levels of pollutant reductions. For example, EPA considered the options of regulating only metals, or only metals and cyanide, and of reducing monitoring frequency. None of these options reduced projected closures or other impacts substantially. Thus the only real alternative to imposing full PSES requirements is a total exemption.

EPA believes that an exemption for small indirect dischargers is not compelled by the fact that a segment of small direct dischargers have received some regulatory relief in the form of a less stringent level of regulation. Small direct dischargers have since the mid-1970s been regulated by NPDES permits and will continue to be subject to BPT limitations, thereby assuring that most toxic pollutants will be removed from their wastewaters. In contrast, most indirect dischargers have to this day failed to install any pretreatment, thereby resulting in 22.6 million pounds of toxic pollutants being discharged into POTWs by all indirect dischargers annually; approximately 2.5 million pounds (11 percent) are discharged to POTWs by small indirect dischargers producing five million pounds or less of OCPSF products.

EPA has thus determined not to exempt small plants from PSES or to establish less stringent PSES for them. While the impacts on small plants are significant, they are in the Agency's opinion neither so high nor so disproportionate as to justify an exemption, especially in light of the continued discharge of substantial amounts of toxic pollutants that an exemption would permit.

4. PSES Compliance Deadline

EPA has established a three-year deadline for compliance with PSES. Design and construction of systems adequate for compliance with PSES will be a substantial undertaking for many indirect OCPSF dischargers, due to the technical complexity of the tasks of characterizing various plant wastewaters, assessing various treatment combinations, and installing different treatment units for particular product/processes and particular pollutants. Thus, EPA believes that a full three-year compliance period is appropriate.

F. PSNS

Just as PSES and BAT are to be based on comparable treatment, PSNS is generally analogous to NSPS. EPA is not including end-of-pipe biological treatment in its PSNS model treatment technology, for the same reasons discussed above with respect to PSES. The Agency is promulgating PSNS on the same technology basis as PSES and issuing standards for 47 priority pollutants that have been determined to pass through or otherwise interfere with the operation of POTWs. The Agency has determined that PSNS will not cause a barrier to entry for new source OCPSF plants.

VII. Pollutants Not Regulated

Paragraph 8 of the modified Settlement Agreement, approved by the District Court for the District of Columbia on March 9, 1979 (12 ERC 1833) contains provisions authorizing the exclusion from regulation, in certain instances, of priority pollutants and industry subcategories.

Paragraph 8(a)(iii) of the modified Settlement Agreement allows the Administrator to exclude from regulation priority pollutants not detected by Section 304(h) analytical methods or other state-of-the-art methods. The 28 priority pollutants not detected in the OCPSF plant or product/process effluents, and excluded from this regulation for this reason are listed in Appendix C of this notice. One additional priority pollutant (dioxin) was not detected at levels of detection being used at the time of the sampling work. This level of detection was 3×10^{-7} grams/liter which is five orders of magnitude higher than the detection limits of the analytical method presently being used to study dioxin (TCDD) in industrial wastewater discharges. Thus, dioxin is being reserved rather than excluded from regulation.

Paragraph 8(a)(iii) also allows exclusion of pollutants that are: (1) Detected in the effluent from a small number of sources and uniquely related to those sources; (2) present in only trace amounts not causing nor likely to cause toxic effects; (3) sufficiently controlled by existing technologies upon which are based other effluent limitations guidelines and standards; or (4) present in amounts too small to be effectively controlled by technologies known to the Administrator. Ninety-seven different priority pollutants were found in OCPSF plants product/process wastewater discharges during the numerous sampling programs. Twenty of these pollutants were found at treatable levels only in a small number of instances. In those instances, these levels were attributable to manufacturing activities that are uniquely related to the plants sampled. (Another 8 priority pollutants were found only in trace amounts which neither cause nor are likely to cause toxic effects.) Another 3 priority pollutants were found to be sufficiently controlled by existing technologies (in addition to the 3 listed in Appendix B) for PSES and PSNS only. These 31 pollutants are listed in Appendix D to this notice along with the particular reason for excluding them from regulation.

Paragraph 8(b) of the Settlement Agreement authorizes the Administrator to exclude from nationally applicable pretreatment standards a subcategory or category if (i) 95 percent or more of all point sources in the subcategory introduce into POTWs only pollutants that are susceptible to treatment by the POTW and which do not interfere with, do not pass through, or are not otherwise incompatible with such treatment work, or (ii) the toxicity and amount of incompatible pollutants (taken together) introduced by such point sources into POTWs is so insignificant as not to justify developing a national pretreatment regulation. Since indirect dischargers generate wastewaters with the same pollutant characteristics as direct discharge plants, EPA has reviewed available data from direct and indirect dischargers and is excluding the same 59 priority pollutants listed in Appendices C and D from nationally applicable pretreatment standards. Appendix E lists six additional pollutants that are regulated at BAT but not regulated at PSES because they do not pass-through or interfere with POTWs.

As noted in Section VI of this preamble, certain specific OCPSF process wastewaters contain certain

metals in complexed forms that are unique to those sources and for which appropriate treatment must be determined on a plant-specific basis. The metals and waste streams involved are listed in Appendix B to the OCPSF regulations and are excluded from regulation by § 414.11(f), pursuant to paragraph 8(a)(iii) of the Settlement Agreement.

VIII. Economic Considerations

A. Cost and Economic Impact

EPA's economic impact assessment is set forth in the report entitled "Economic Impact Analysis of Effluent Limitations and Standards for the Organic Chemicals, Plastics, and Synthetic Fibers Industry." This report presents the investment and annualized compliance costs for the plants covered by the OCPSF regulation. The report also estimates the probable economic effect of compliance costs in terms of plant and product line closures, employment changes, profitability impacts, and regulatory costs as a percent of sales. Local community impacts and international trade effects are also presented. A separate Regulatory Flexibility Analysis detailing the small business impacts has been conducted and is included in the Economic Impact Analysis for this industry.

EPA has identified 654 facilities that will incur costs as a result of this regulation. The costs of implementing the regulations are estimated on a plant-by-plant basis for all of the facilities that discharge wastewater. Of the facilities, 289 are direct dischargers and 365 are indirect dischargers. Total investment costs for BPT, BAT, and PSES are projected to be $855.4 million with annualized costs of $505.1 million, including depreciation and interest. These costs are in 1986 dollars and are based on the determination that plants will build on existing treatment. These costs reflect setting of BAT equal to BPT for the small production plants.

The number of plants costed is greater than the number of plants in the economic impact analysis because the production and shipment information needed for the analysis was not provided by a few companies despite follow-up requests after the 1983 308 survey questionnaires were submitted. For BPT, 214 plants are costed but the impact analysis includes only 209 of these facilities. For BAT, 289 plants are costed; the impact analysis covers 283. For PSES, 365 plants are costed; the impact analysis covers 362.

The Agency recognizes that its data base, which represents conditions in 1982, may not exactly reflect current conditions in the industry today and that plants may have changed product/process lines, or even gone out of business since the data were collected. Despite the fact that the technical and economic data are several years old and thus inevitably do not precisely match the present status of particular plants, EPA believes that the data provide a sound and reasonable basis for assessing the overall ability of the industry to achieve compliance with the regulations. The purpose of the impact analysis is to characterize the impact of these regulations for the industry as a whole and for major groupings within the industry. EPA does not believe that changes within the industry during the past few years significantly modify the technical, cost or economic conclusions underlying the regulation. However, where appropriate, the cost and impact analyses have considered recent trends affecting the industry.

B. Economic Methodology

The Economic Impact Analysis (EIA) uses three primary impact measures: closure, profitability and cost-to-sales. The values are estimated for almost all OCPSF plants (see above) using a combination of section 308 survey data and secondary sources, such as Dun & Bradstreet financial records, plus plant specific compliance costs developed by the Agency. The closure analysis uses a net present value approach which compares cash flow to salvage value. A closure is projected if the salvage value exceeds the present value of cash flow. Plant closure is projected when a plant's OCPSF employment is greater than 80 percent of total plant employment; product line closure is projected when a plant's OCPSF employment is less than or equal to 80 percent of plant employment.

The profitability impact measure indicates the extent to which OCPSF compliance costs affect plant profitability. A significant impact is counted if the compliance costs reduce the plant profits to the lowest decile value for all plants in a particular three digit SIC code.

The cost-to-sales impact measure compares compliance costs to plant sales, with a significant impact counted if the ratio exceeds five percent.

C. Significant Changes in the Economic Impact Methodology

There have been a number of substantive revisions to the economic analysis methodology and data base as a result of comments received on the December 1986 notice of availability. Key comments and methodological changes are summarized below.

Commenters stated that EPA used an inadequate financial data base for its economic analysis for facilities in the size group exceeding $10 million in sales. Based on the evaluation of this set of comments, the financial data base used to calculate discounted cash flow and liquidation values for OCPSF plants in the impact analysis was changed from FIN/STAT to Dun & Bradstreet. The previously used FIN/STAT data base, which covered the period 1976–1981, itself consisted of Dun & Bradstreet data and was developed by the Small Business Administration. The change to Dun & Bradstreet data both increased the total size of the entire data base used (from 61 plants to 190 plants) and increased the number of plants in the "greater than $10 million sales" category from 4 to 73.

Another set of comments stated that EPA used outdated financial data. By using the Dun & Bradstreet data, EPA has updated its financial information to cover the time period 1981 to 1986. (The FIN/STAT data covered the period 1976–1981).

Another set of comments stated that EPA's use of a single financial ratio for plants within a size grouping does not take into account plant-to-plant variability. EPA adopted an improved method for estimating cash flow and salvage value that takes into account plant-to-plant variability. Instead of using median financial ratios to relate these quantities to sales for arbitrary size groups within the industry, the Agency developed regression equations to relate each quantity to plant specific sales. The regression estimates use the full range of the data (now expanded to better characterize the full range of sales in the industry) and do not result in arbitrary gaps or jumps introduced by the previous method. The overall effect of the change in methodology has been to provide a better description of the consequences of the Agency's regulation.

One commenter stated that EPA's intended use of a profitability measure which identifies a significant impact as occurring if plant profitability falls by 25 percent is inappropriate because it does not consider the precompliance profit context. The definition of what constitutes a significant profit impact was changed from a profit decrease of 25 percent or more to any case where the compliance costs reduce plant profits to the lowest decile (10 percent) in a particular three digit SIC code. Since all plants in EPA's OCPSF economic data base are above the

lowest SIC decile prior to incurring compliance costs, this measure effectively identifies significant reductions in precompliance profitability resulting from the regulation.

Another set of comments stated EPA must revise its analysis to reflect changes in the new tax code enacted in 1986. The tax rates used in the final analysis reflect the new tax code enacted in 1986. The major changes reflect deletion of the investment tax credit and the reduction of the impact of compliance costs as an expense item.

D. Baseline Analysis

The baseline economic analysis evaluates each plant's financial operating condition prior to incurring compliance costs for this regulation. This analysis also takes into account certain estimated costs associated with other significant regulations which are not yet promulgated or provided for in annual operating expenses. Baseline costs include RCRA costs for relining surface impoundments that treat, store, and dispose of hazardous wastes. An estimated 41 plants are projected to incur RCRA costs in the baseline. Capital and annualized RCRA costs for these facilities total $25.2 and $8.8 million, respectively (1986 dollars). Other RCRA costs as well as Superfund requirements are assumed to be incorporated in annual operating costs because the financial data used reflect a time period (from 1981 to 1986) after these requirements became effective.

There are no significant economic impacts projected as a result of the baseline costs; therefore, all plants analyzed in the baseline are included in subsequent analyses. Had closures been projected to occur they would have reduced projected impacts from these regulations. The baseline RCRA costs are carried forward into subsequent analyses and are included in the preregulatory costs of a plant.

E. Economic Results

BPT

The capital and annualized costs of complying with the BPT limitations are $215.8 and $76.6 million, respectively, and affect 214 plants. No plant or product line closures are projected; 8 of the 209 direct discharging plants analyzed experience significant profitability or cost-to-sales impacts. Seventy-eight plants are expected not to incur incremental BPT costs or impacts. No job losses are expected to occur as a result of BPT.

BAT

The incremental capital and annualized costs of complying with BAT limitations are $348.1 and $224.2 million, respectively. Estimated plant and product line closures total 11, representing four percent of the 283 plants analyzed. Significant profitability and cost-to-sales impacts occur at an additional 11 plants resulting in a total of 22 significantly impacted plants or 8 percent of the direct discharging plants. Job losses totalling 1,197 are expected to occur as a result of the plant and product line closures. This employment loss represents 0.7 percent of OCPSF total employment. (These costs and impact results reflect the setting of BAT equal to BPT for plants producing five million pounds or less per year of production.)

PSES

For PSES, the total capital and annualized costs of compliance are $291.5 and $204.3 million, respectively. Estimated plant and product line closures total 52, representing 14.4 percent of the 362 plants analyzed. Significant profitability and cost-to-sales impacts are estimated to occur at an additional 63 plants resulting in a total significantly impacted universe of 115 or 31.8 percent of the indirect discharging plants. Job losses totalling 2,190 are expected to occur as a result of the plant and product line closures. This employment loss represents 1.2 percent of the OCPSF total employment.

PSNS and NSPS

For the control of toxic pollutants, the treatment options selected for direct and indirect discharging new sources are identical to those selected for existing sources except that no exemption will be provided for new direct discharging small plants.

For the control of conventional pollutants in NSPS, EPA has adopted the same technology bases as for BPT.

Planned new OCPSF plant construction in the U.S. over the time period 1986 to 1991 is estimated to be only 4.5 percent of total planned OCPSF construction worldwide. Most of this new construction will be in the form of renovation work or upgrading of existing product lines rather than construction of completely new plants. When new construction does occur, the capital costs of the regulation are estimated to represent between two and four percent of the costs of constructing a new plant. These cost increases are low and are not expected to be a barrier to entry.

F. Regulatory Flexibility Analysis

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.* Pub. L. 96-354) requires EPA to assess whether its regulations create a disproportionate effect on small businesses. In assessing the disproportionate effect for purposes of complying with the Regulatory Flexibility Act, EPA had to decide whether its analysis of impacts on small businesses would address all small plants or only those small plants operated by small firms. This issue arose because the OCPSF analysis is a plant specific analysis. In previous economic analyses the impacts were modeled, and the Agency did not have the ability to differentiate its assessment of disproportionate effect by ownership. The Agency had the ability to consider that distinction in developing this guideline. If the Agency did not take ownership into account in its definition of small businesses and treats all small plants as small businesses, the Agency would be consistent with previous approaches. If, however, a distinction is made between small single plant operations and small plants owned by large corporate entities, the Agency would be inconsistent with previous definitions of small businesses—definitions which were developed, necessarily, in the absence of knowledge of ownership.

The Agency presented this issue in the December 1986 **Federal Register** notice and solicited comment on whether small OCPSF plants owned by large companies are effectively run as small businesses—i.e., do companies tend to view individual plants as profit centers and decide on their continued operation based mainly on the plant's financial performance, or are plants more typically operated in the context of a firm's overall plan to satisfy product markets? The implication is that if small plants are run independently as profit centers, they should be included in the small business analysis along with single plant small businesses when the disproportionate effect of the regulation is assessed.

The Agency conducted an extensive analysis to address the issue of whether large companies could be anticipated, for a variety of reasons, to continue to operate a facility projected to be a closure in our Economic Impact Analysis. This could occur because firms which are vertically integrated require the output of all the plants in the corporate organization to fill its product lines. Among other reasons for maintaining unprofitable or marginal plants are the desire to remain in a

given product or geographic market, or the belief that the plant's product(s) will ultimately prove worth retaining.

Industry comments supported the notion that small plants are generally treated as independent financial units and that parent companies will usually not keep small plants open, especially in the long run, if they are unprofitable. Our analysis of the industry shows that small plants tend to experience about the same level of impacts, regardless of ownership, in the long run. This result occurs despite the fact that in our closure analysis the weighted average cost of capital assigned to plants owned by medium and large sized firms was from one to two percentage points lower than the weighted average cost of capital assigned to small single plant firms.

To understand better the incidence of impacts in relation to ownership, impacts on small plants (both direct and indirect discharging plants) were evaluated based both on plant production alone and on plant production in combination with aggregate company sales. The former approach captures impacts at small plants without regard to ownership. The latter approach captures impacts occurring at small plants owned by small firms. We evaluated all plants with production levels of ≤5 million pounds, ≤10 million pounds, and ≤15 million pounds (annual OCPSF production) irrespective of size of the firm owning the plant. We also evaluated production and parent company sales combinations of ≤5 million pounds and ≤20 million of sales and ≤10 million pounds and ≤$20 million of sales.

1. Results of Small Plant Analysis for Direct Dischargers

Under BAT, the analysis shows that, in the absence of the reduced requirements for plants producing five million pounds per year or less of product, provided for in the final rule, the impact of the regulation would be fairly similar with respect to plants with annual production less than or equal to 5 million pounds and plants with both annual production less than or equal to 5 million pounds and parent company sales less than $20 million annually. At these plants, significant impacts would occur at between 60 and 80 percent of the plants. This level of impact would be much greater than that experienced by direct discharging plants overall. The overall significant impact level for direct dischargers is 13 percent before special provision for plants with annual production less than or equal to five million pounds.

2. Results of Small Plant Analysis for Indirect Dischargers

Under PSES, the impact of the regulation is also very similar for plants with annual production less than or equal to five million pounds and plants with annual production less than or equal to five million pounds and parent company sales less than $20 million annually. Impacts occur at approximately 62 percent of the plants; impacts for all indirect dischargers are approximately 31 percent.

A complete description of the small plant analysis and its results is presented in the Economic Impact Analysis.

G. Cost Effectiveness Analysis

EPA has conducted an analysis of the incremental cost per pound equivalent for removal of the pollutants controlled by the OCPSF regulation. A pound-equivalent is calculated by multiplying the number of pounds of a pollutant by the toxic weighting factor for that pollutant. The weighting factors give relatively more weight to more highly toxic pollutants. Thus, for a given expenditure and pounds of pollutants removed, the cost per pound-equivalent removed would be lower when more highly toxic pollutants are removed than if less toxic pollutants are removed.

The cost effectiveness methodology used in this analysis, unlike that for previous effluent guidelines, takes into account reduction of air emissions of volatile organic chemicals expected to result from use of the model technology (specifically steam stripping) upon which the water discharge limitations and standards are based. Reductions in air emissions of these pollutants is counted in computing the cost-effectiveness of the regulation since the treatment technologies costed for the regulation reduce these emissions. (To the extent that some plants use less expensive treatment than steam stripping that results in greater-than-projected air emissions, the predicted reduction of air emissions is an overestimate. Correspondingly, the predicted costs and economic impacts would be overestimated as well.) The toxic weighting factors used take into account the toxicity and carcinogenicity of these chemicals and their effects on humans through inhalation.

The cost effectiveness values for the selected BAT and PSES options are $5 and $34 per pound-equivalent, respectively.

H. SBA Loans

The Agency continues to encourage small concerns to use Small Business Administration (SBA) financing as needed for pollution control equipment. The three basic programs are: (1) the Pollution Control Finance Guarantee Program, (2) the Section 503 Program and (3) the Regular Business Loan Program (Section 7(a)). Eligibility for SBA programs varies by industry.

For further information and specifics on the Pollution Control Finance Guarantee Program, contact the U.S. Small Business Administration, Office of Pollution Control Financing, 1441 L Street, NW., Washington, DC 20416, (202) 653–2548.

The Section 503 Program, as amended in July 1980, allows long-term loans to small and medium size businesses. These loans are made by SBA-approved local development companies.

Through SBA's Regular Business Loan Program (Section 7(a)), loans made available by commercial banks are guaranteed by SBA. This program has interest rates equivalent to market rates.

For additional information on the Regular Business Loan (Section 7(a)) and Section 503 Programs, contact the appropriate district or local SBA office. The coordinator at EPA Headquarters is Ms. Karen V. Brown, Small Business Ombudsman (A–149C), Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460; (703) 557–1938.

I. Executive Order 12291

Executive Order 12291 requires EPA and other agencies to perform regulatory impact analyses (RIAs) of major regulations. Major regulations are those that impose an annual cost to the economy of $100 million or more, or meet other criteria. Implementation of the promulgated regulation for the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) Industry has been projected to cost over $100 million annually and thus is considered a major regulation. In compliance with E.O. 12291, EPA has prepared an RIA which consists of a benefit-cost analysis and a water quality analysis. The benefit-cost analysis compares the costs of the regulation with its benefits. The aggregate benefits, both monetizable and non-monetizable, exceed or are at least reasonably commensurate with costs.

Benefits were grouped into three categories: (1) Non-quantified and non-monetized benefits; (2) quantified and non-monetized benefits and (3) quantified and monetized benefits.

The non-quantified and non-monetized benefits that were identified include: (1) Protecting and restoring the integrity of aquatic ecosystems (The EPA comparative risk project ranked

point source discharges as a relatively high risk to aquatic ecosystems); (2) reducing the potential health risks to swimmers from dermal exposure to surface waters containing pollutants from OCPSF discharges; (3) reducing the potential health risks to persons eating more than average amounts of fish contaminated with OCPSF-discharged pollutants; and (4) reducing the potential health risks to persons drinking contaminated drinking water from groundwater sources impacted by surface waters containing OCPSF discharges.

One benefit could be quantified but not monetized. With current treatment at OCPSF facilities forty-seven thousand people are estimated to be exposed through inhalation to volatile organic compound (VOC) priority pollutants above long term intake levels recommended by EPA and may experience health effects other than cancer. The OCPSF regulation would reduce these effects.

The monetized national water quality benefits that result from the implementation of BPT and BAT are estimated to range from $178–$330 million (1982 dollars) annually. These benefits are based on estimates of increased uses or improvements in recreational fishing and boating, commercial fishing, diversionary uses (i.e., irrigation) and intrinsic (non-use benefits). When estimates of health (cancer reduction) and environmental (smog protection) benefits that result from the reduction of air emissions are added, benefits estimated range from roughly $189–$393 million (1982 dollars).

The annualized costs to direct dischargers in the OCPSF industry of moving to BAT are estimated to be $270 million (in 1982 dollars).

There were many limitations in estimating the benefits: (1) The national water quality benefits were based on an assumed linear relationship between total pollutant loadings and benefits attributed to cleanup of surface waters in the U.S. (2) The environmental impacts of toxics on aquatic ecosystems are not well understood and the benefits of reducing toxics are likely to be underestimated in the monetized national water quality benefits. (3) Uncertainty exists regarding the magnitude of the intermedia transfer of both priority pollutant VOCs and nonpriority VOC pollutants from OCPSF direct discharge wastestreams to the air. Priority pollutant emission estimates range from 7,000 MT/yr to 20,600 MT/yr. Nonpriority VOC pollutant emission estimates from direct discharge plants range from 9,100 MT/yr to 36,600 MT/yr. (4) The air emissions and thus exposures to pollutants could be underestimated by not considering volatilization between point of product/process wastestream generation and point of influent into industrial treatment facilities.

In addition to the benefits analysis above, a water quality analysis was performed, which consisted of three studies. The first projected water quality impacts for 170 direct discharging OCPSF facilities discharging into 134 stream segments across the country. EPA's published water quality criteria for priority pollutants are used to assess water quality impacts. The analysis projected that under existing conditions 32 percent of the 134 receiving stream segments exceed water quality criteria. A total of 30 pollutants are projected to exceed instream criteria using a criterion for the carcinogens that is based on a 10^{-6} individual risk. Twenty-nine percent of the receiving stream segments are projected to exceed water quality criteria with the implementation of BAT treatment levels in this regulation. A total of 24 pollutants are projected to exceed instream criteria at BAT.

The second study evaluated the effects of 94 indirect discharging OCPSF facilities which discharge to 57 POTWs. At current loadings, treatment works inhibition and/or sludge contamination are projected to occur at 8 of the 57 POTWs as a result of five of the 22 pollutants which have inhibition/sludge contamination values. The implementation of PSES removes inhibition problems for all but one pollutant at one POTW and sludge contamination problems for all but one pollutant at one POTW. The POTW inhibition and sludge values used in this analysis are in general not regulatory values. They are based upon engineering or health-related guidance or guidelines published by EPA and FDA. Thus EPA is not basing its regulatory approach for PSES upon a finding that some pollutants interfere with POTWs by impairing their treatment effectiveness or causing them to violate applicable sludge limits for their chosen disposal methods. Rather, the PSES are based upon a determination of pass through as explained earlier in the preamble. However, the analysis does help indicate the potential benefits for POTW operation and sludge disposal that may result from compliance with PSES.

Also, the effects of POTW wastewater discharges of 56 priority pollutants on receiving streams were evaluated for 56 indirect discharging OCPSF facilities, which discharge to 42 POTWs on 41 stream segments. For these 41 segments, projected instream concentrations for each pollutant were compared to EPA water quality criteria. Instream concentrations are projected to exceed criteria in five of the stream segments under current conditions. A total of 14 priority pollutants are projected to exceed instream criteria using a criterion for carcinogens based on 10^{-6} individual risk. Priority pollutant instream concentrations after implementation of PSES are projected to exceed criteria in one receiving stream segment for two pollutants.

The third water quality study evaluated three stream segments in detail (Houston Ship Channel, Kanawha River and Lower Delaware River). Monetizable water quality benefits were calculated for these streams and compared to expected BAT costs for OCPSF direct discharging facilities. Comparison of benefits with BAT costs show disparate results across the sites. The Kanawha River results indicate that the estimated annual water quality benefits ($0.1 to $2.7 million) are commensurate with the annualized costs ($1.5 million). The Delaware River results indicate that the estimated annual water quality benefits ($2.1–$9.1 million) are significant but are less than the annualized costs of $18.7 million. The Houston Ship Channel monetized annual water quality benefits (<$1.0 million) are substantially less than annualized costs ($8.8 million), due largely to the commercial shipping usage of the Channel, which precludes many of the benefits evaluated. The monetized water quality benefits were based on estimates of increased use or improvements in recreational fishing and boating, commercial fishing and intrinsic (non-use) benefits. Health risks from the ingestion of contaminated fish tissue were also assessed in the three case studies, and for the Delaware River reductions in drinking water health risks were considered. (The Delaware River case study was the only case study where active drinking water intakes were present in the vicinity of OCPSF dischargers.) Due to the difficulty in extrapolating the results of these case studies to a national scale covering all regulated plants in the OCPSF industry and all impacted receiving waters, the monetized national water quality benefits assessment (described above) was employed.

IX. 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 this regulation:

A. *Air Pollution*

The effect of BPT, if viewed alone, would likely be a moderate increase in emissions of volatile organic compounds, and thus in 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 equalization basins and thus more effectively driving off volatile organic compounds. This effect will be more than offset, we believe, by the effect of compliance efforts to meet 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. These in-process controls would be accompanied by effective air pollution controls. Thus, we expect a net decrease in both air loadings and in concentrations of volatile organic compounds in the treated effluents from and BAT combined, and we expect similar effects as a result of PSES as well. A description of these loadings are contained in previous (Section IV) portions of this preamble. In addition, Section X (commenter issues section) of this preamble contains more discussion on the volatile pollutants.

B. *Solid Waste*

EPA has considered the effect these regulations would have on the production of solid waste, including hazardous waste defined under Section 3001 of the Resource Conservation and Recovery Act (RCRA). EPA estimates that increases in total solid waste, including hazardous waste, resulting from the OCPSF regulation will be insignificant compared to current levels.

C. *Energy Requirements*

EPA estimates that the attainment of BPT, BAT, NSPS, PSES and PSNS will increase energy consumption by a small increment over present industry use.

Further details are set forth in Section VIII of the Development Document.

X. Public Participation and Summary of Responses to Major Comments

Public participation in the development of the OCPSF effluent limitation guidelines and standards has been extensive. Throughout the development of this regulation, EPA has made numerous documents available to the public for comment and has held meetings for the purpose of providing information and receiving information and views from many individuals and organizations.

Prior to publication of the proposed regulation on March 21, 1983, EPA made publicly available a variety of major documents. These included EPA's Guidelines Establishing Test Procedures for the Analysis of Pollutants at 40 CFR Part 136 which detailed analytical methods to be used by EPA to analyze samples of OCPSF industry wastewaters, and a Background Document consisting of three volumes and appendices, providing much of the technical and costing foundation for EPA's subsequent regulatory proposal. EPA also discussed its data and methodology at various meetings and workshops with interested members of the public, enabling them to submit detailed comments on this information prior to the publication of the proposal. Thus in the proposal, EPA was able to take the unusual step of publishing responses to 51 preproposal public comments. See 48 FR 11853–61 (March 21, 1983).

The public comment period for the proposal, set originally for three months, was extended to provide for a total of four and a half months for comment. A total of 756 technical comments, totalling approximately 2000 pages, were submitted by industry, government, environmental and other groups and individuals. Partly in response to these comments and partly to incorporate supplemental data (as urged by many commenters), EPA modified its data base, methodologies and regulatory approaches and discussed these changes in a Notice of Availability and request for comments on July 17, 1985 (50 FR 29068). EPA followed this shortly with an additional Notice of Availability on October 11, 1985 (50 FR 41528) in which EPA made extensive additional documentation available to the public to enable fully informed comment on the modifications. The total comment period for the two notices was five and a half months. In response, EPA received over 1,100 technical comments from 72 members of the public.

Finally, on December 8, 1986 (51 FR 44082), EPA published yet another notice discussing several issues and proposed modifications to the previously discussed approaches. EPA provided a 2-month comment period, and received as a result 163 technical comments from 37 members of the public.

Throughout this rulemaking, EPA has not only welcomed the submission of comments but also solicited data that could be used to supplement, correct, or fill gaps in EPA's data base. Where adequately documented data of sufficient quality were submitted, EPA used the data along with other data it had collected. EPA believes that it has made all reasonable efforts to obtain public input on this rule.

Included in the record for this rule is a large response to comments document. The sheer volume of comments precludes the publication of EPA's responses to all of them in this preamble. EPA has discussed and responded to many comments earlier in this preamble. Set forth below are responses to some additional significant comments. Other comments are responded to in the separate response to comments document mentioned above. Finally, the various data compilations, editing and other information contained in the record for this rule address (and in some instances were obtained or acquired specifically for the purpose of addressing) the public comments.

1. Percent Removal vs. Concentration-Based BPT Limitations

Comment: A number of industry commenters have stated that the Agency should base BPT limitations on a combination of percent reduction and maximum concentration limitations to control the discharge of BOD from OCPSF facilities.

(A plant's BPT TSS limitation would be some multiple of its percent reduction derived BOD limit). The commenters favored an average percent reduction limitation of 95 percent for some dischargers coupled with a maximum long-term concentration level of 50 mg/l for others. High raw waste load plants (those having average raw waste concentrations over 1000 mg/l) would have to achieve a 95 percent BOD reduction from raw waste levels while low raw waste load plants (those below 1000 mg/l) would have to meet a 50 mg/l concentration limit. The commenters maintained that the imposition of concentration limitations on all discharges including those with high raw waste loads, inhibits water conservation efforts and unfairly discriminates against plants which engage in water conservation practices. They also maintained that percent reduction limitations would better

reflect the inherent variability of OCPSF process operations than would concentration limitations.

Response: Effluent limitations guidelines can be in the form of percent reduction, concentration, or production based mass limitations. Selection of an appropriate approach is within EPA's discretion and is based upon its judgement as to which is most appropriate for a particular industry and data set. Thus for example, limitations can be based solely on the performance of applicable treatment systems or on treatment system performance and production. When the available production data for a category can be correlated with pollutant discharges, EPA can develop mass limitations based on both treatment system performance and production. This approach, however, is not appropriate for the OCPSF category because of the large number of different products involved, the constantly changing nature of the product mix, and the lack of any established strong correlation between production type and pollutant discharge. Thus for the OCPSF BPT regulation, EPA has promulgated concentration-based limitations rather than mass-based limitations.

EPA also prefers concentration-based limitations over percent-reduction limitations for this industry. EPA believes that percent reduction limitations would allow plants with high raw waste loads to discharge very high concentrations of BOD on a long-term average basis. Yet the data collected by EPA demonstrates that even high raw waste loads can be reduced to low concentrations through the use of BPT technology. Concentration limitations describe the limits of performance of this technology better than percent removal requirements do.

For example, a plant with an average raw waste BOD concentration of 2,000 mg/l would be allowed by a 95 percent reduction requirement to discharge a long-term average concentration of BOD of 100 mg/l (after applying a variability factor, the actual daily limit would be substantially higher). Such concentrations are unacceptably high; this is indicated by the fact that some OCPSF plants with average raw waste BOD concentrations greater than 2,000 mg/l achieve long-term average BOD effluent concentrations of less than 100 mg/l.

Percent-reduction limitations also discourage the efficient operation of biological treatment systems. From an engineering point of view, optimally designed systems are designed to meet target BOD levels, not a specific percent reduction in BOD. That is how systems are generally designed and costed by wastewater engineering firms.

The Agency does not agree with the assertion that concentration limitations discourage water conservation. The Agency notes that commenters did not support this assertion with quantitative or qualitative data demonstrating how and to what extent water conservation is practiced and how such practices would be impacted by concentration limitations. The comment ignores the fact that water conservation is often practiced for a variety of sound reasons of efficiency and economy, and that wastewater treatment costs themselves may be substantially reduced by reducing the flow which must be treated. The resulting cost savings may outweigh any increased cost that arguably results from being required to treat the more concentrated stream to meet an effluent concentration limitation. The record before the Agency does not demonstrate that the concentration limitations will discourage water conservation.

Commenters contend that percent-reduction limitations would accommodate variations in BOD loading caused by process changes better than concentration limits do. The commenters' insistence that percent reduction limitations are more accommodative to process changes ignores the fact that most plants have equalization basins on the front end of treatment systems for the express purpose of dampening surges in raw waste BOD due to process events (spills, etc.) and changes. The effect of these basins is to smooth out BOD loadings. The remaining variability has been accommodated by the variability factor developed by EPA for the BOD concentration limitations. In developing percent reduction limitations, there is a danger that the variability due to process changes may be over-compensated for and that the resulting limitations could be met by poorly operated plants.

Percent reduction limitations might penalize plants which utilize in-plant methods to treat raw waste BOD. The reduction in raw waste BOD achieved in-plant could only be measured if all the individual product/process effluents were analyzed prior to in-plant treatment on a regular basis, a practical impossibility for some plants and an unwarranted burden for many others. As a result, it would be very difficult to credit these plants with in-plant removal.

Finally, the development of percent reduction limitations requires that influent as well as effluent data descriptive of treatment technology performance be available, whereas concentration limitations require only that effluent data be available. In the case of the OCPSF categories, considerably less influent than effluent data are available. The Agency believes that in order to establish percent reduction limitations for a category or subcategory, the influent data should be comparable to the effluent data in quantity and quality and should provide as much coverage of the category as the effluent data. This would be necessary to correctly reflect the variability of production operations and treatment performance within the category. Moreover, if EPA were to develop percent reduction limitations using the available BPT data base, the resulting limitations would be less representative of the OCPSF categories because many plants employing numerous product/processes would be deleted from the limitation development data base due to lack of daily raw waste data. This consideration also argues in favor of issuing the concentration approach, for which more data is available.

2. The Effect of Temperature in Achieving BPT Permit Limits

Comment: EPA has incorrectly evaluated the effect of temperature on biological treatment plants and has concluded that it is not important in the context of effluent limitations guidelines. One element of this incorrect analysis was EPA's deletion of nine plants from the data base simply because they had summer/winter NPDES permits. This step is arbitrary and virtually assures that the effect of temperature will not be considered in the estimation of effluent variability. Also, the commenter argued that a number of plants in the 308 data base showed statistically significant temperature effects.

Response: EPA has studied the effects of temperature variations on biological treatment system performance in the OCPSF industry. In warm climates, the Agency believes that warmer than average temperatures do not have any significant effect on biological treatment efficiency or variability. However, algae blooms can be a wastewater treatment problem in ponds located in warm climates. Nonetheless, polishing ponds are not part of the technology basis for BPT limitations. Also, EPA was not able to associate algae bloom problems with any elements of biological treatment (aerated lagoons, clarification, equalization, basins, etc.). Consequently, EPA believes that algae growth problems in warm climates are not relevant to the final BPT regulations.

In order to evaluate winter performance of biological treatment systems, EPA has analyzed BOD removal efficiency, BOD effluent, and operational changes for 21 plants located in various parts of the country and reporting daily data. These analyses indicate that there is a slight reduction in average BOD removal efficiency and a small increase in average effluent BOD during January and February for some plants. However, many plants were able to maintain a BOD removal efficiency of 95 percent or greater and effluent BOD concentrations characteristic of good operation during the entire year. The analysis also suggests that the plants with lower efficiencies are affected as much by inefficient operating practices as by winter temperature considerations. Indeed, plants in colder climates, with the widest annual temperature fluctuation, generally achieved more consistent year-round performance than plants in middle latitudes. A discussion of inefficient operating practices used by some plants as well as practices employed by plants achieving superior all year performance may be found in Section VII of the Development Document. The adoption of practices used by plants with higher winter efficiencies should result in improved winter efficiency.

EPA has determined that temperature effects can be mitigated by operational and technological changes, so that compliance with BPT limitations using biological treatment is possible for all OCPSF plants with well-designed and well-operated biological systems. Section VII of the final development document contains a thorough discussion of summer/winter effects and how individual OCPSF plants have dealt with this problem. In addition, EPA has developed costs for plants which need to upgrade their winter-time biological treatment operation to comply with final BPT limitations.

Regarding the deletion of nine summer/winter plant's data from the data base, the Agency notes that because these plants were subject to meeting two different sets of permit limits, they had no incentive to attempt to achieve uniform limitations throughout the year. Not surprisingly, then, the daily data from these plants exhibit a two-tier pattern. These data can be characterized by two means, and the variability of these data over a 12 month period is fundamentally different from the data from plants required to meet only one set of permit limits. Consequently, the data generated during these periods is not representative of well-operated biological treatment, which as noted above is capable of uniform treatment throughout the year as demonstrated by a number of plants. Another problem with daily data from these plants is that during certain periods of the spring and fall, these plants may be able to operate their treatment plants at less than full efficiency because they are required to meet the less stringent set of permit limits.

In summary, the Agency believes that it has accounted adequately for the effect of temperature changes on biological treatment performance in its variability analysis by including in the variability data base a number of plants from climates with significant temperature variation. The inclusion of data from plants with summer/winter permits would result in an overestimate of the variability of biological treatment operations in the OCPSF categories.

3. Representativeness of the Data Base Used to Establish BAT Effluent Guidelines

Comment: Industry commenters claimed that the Agency's BAT data base was not adequate to represent wastewater treatability across the wide variety of product/process effluents discharged by the OCPSF industry.

Response: EPA has determined that the data base supporting the OCPSF regulations is representative of OCPSF industry wastewaters, treatment technologies, processes, and products. EPA conducted four major sampling programs during the development of BAT limitations. In total, 186 plants were sampled in the Agency's screening, verification, 5-plant and 12-plant studies. After editing the data base so that only good quality data (i.e., having adequate Quality Assurance/Quality Control) representing BAT treatment were used, the edited BAT data base contains sampling data for 36 OCPSF plants (including industry supplied data) representing 232 product/processes. These 36 plants account for approximately 26 percent of production volume and 24 percent of the process wastewater flow of the entire industry. The types of product/processes utilized by these 36 plants represent approximately 13 percent of the types of OCPSF product/processes in use. Since the products manufactured by these facilities are manufactured at other OCPSF facilities, the data obtained from these plants represent even greater percentages of total industry production and flow. Thus, about 68 percent of OCPSF industry production (in total pounds) is represented and about 57 percent of the OCPSF industry wastewater is accounted for by the products and processes utilized by the 36 plants in the data base. Products that could be manufactured by the 232 product/processes utilized at the 36 plants account for 84 percent of industry production and 76 percent of process wastewater.

It is estimated that the OCPSF industry manufactures more than 20,000 individual products; however, overall production is concentrated in a limited number of high-volume chemicals. Excluding consideration of plastics, resins, and synthetic fibers, EPA has identified 36 organic chemicals that are manufactured in quantities greater than one billion pounds per year. These chemicals are referred to as commodity chemicals. Two hundred eighteen organic chemicals are manufactured in quantities between 40 million and one billion pounds per year. These chemicals are referred to as bulk chemicals. Together, these 254 chemicals account for approximately 91 percent of total annual production volume of organic chemicals as reported in the 308 questionnaire data base for the OCPSF industry. By sampling OCPSF plants which manufacture many of these high-volume chemicals, as well as other types of OCPSF plants, EPA has, in fact, gathered sampling data which is representative of production in the entire industry.

In addition to their general coverage of major industry product/processes and products, the BAT sampling programs have focused on OCPSF plants, product/processes and products known or believed to be associated with priority pollutant discharges. EPA evaluated the 176 product/processes sampled during the screening sampling effort in order to determine predictability of priority pollutant occurrence based on product/process chemistry. The Agency determined that priority pollutants could appear in waste streams of plants utilizing various product/processes if priority pollutants were involved as reactants, products, by-products, catalysts, or reagent contaminants in these product/processes. The information obtained from the review of the screening plant sampling was used by EPA to select plants for its later sampling efforts that would represent as much as possible priority pollutant discharge in the OCPSF industry. In selecting plants and product/processes for sampling during the Verification Study, EPA gave priority to product/processes involving the manufacture of either priority pollutant or high-volume chemicals derived from priority pollutants. Similarly, EPA selected

plants for sampling during the EPA/CMA Five-Plant Study and the subsequent Twelve Plant Study based in part upon the known or suspected presence of certain priority pollutants at significant concentrations in plant wastewaters. As a result, the existing BAT data base adequately represents priority pollutant discharges by the entire OCPSF industry.

The current BAT data base also provides broad coverage of the major wastewater treatment technologies employed by the OCPSF industry. The Verification Study emphasized data collection on raw process wastewaters and the principal treatment configurations (i.e., preliminary treatment and biological treatment) for combined plant wastewaters. The EPA/CMA Five-Plant Study was designed to assess the effectiveness of biological treatment in removing organic priority pollutants. The final phase of the sampling program, the Twelve Plant Study, provided additional data on many nonbiological treatment technologies, including in-plant controls and end-of-pipe treatment technologies, and supplemental long-term performance data for other treatment technologies.

In developing its BAT data base, EPA did not sample wastewaters and treatment systems for all plants in the OCPSF industry. The considerable expense associated with the sampling of toxic pollutants, especially organic pollutants, has imposed practical constraints on the scope of OCPSF sampling programs. Resource concerns also reflect the need for rigorous quality assurance/quality control procedures (e.g., blank samples, duplicate samples, etc.) at each stage of sampling/analysis to ensure the highest possible quality for sampling data. These procedures significantly increase the cost of sampling and analysis. As a result, the OCPSF sampling program has been designed with the intention of collecting the greatest possible quantity of data without sacrificing data quality.

Due to its concern that the earlier versions of the BAT data base may not adequately address the variety of priority pollutant loadings in OCPSF industry wastewaters, EPA has at each stage in the rulemaking solicted additional data on the presence, concentrations, and treatability of priority pollutants in OCPSF plant wastewaters. Valid data (as determined by editing and quality assurance rules) submitted by industry were incorporated in the BAT data base and utilized in the calculation of BAT effluent limitations. During the OCPSF rulemaking efforts, each affected OCPSF plant or industry segment had the opportunity to comment and submit sampling data which it believed should be added to the data base considered by EPA.

Finally, it should be noted that the number of plants from which data are used to develop BAT limitations is necessarily limited by the fact that a large portion of the industry does not currently have well-designed, well-operated BAT treatment in place. Since BAT must be based upon the best available technology in the industry, the data must inevitably be limited to only the best performers in the industry.

4. Establishment of Effluent Limitations and Monitoring Requirements in NPDES Permits for OCPSF Facilities

Comment: Some commenters have argued that a plant should be subject to limitations only for those pollutants that it discharges at significant levels. They argue that the imposition of limits will inevitably result in compliance monitoring for pollutants that are not present in the discharge, and that this imposes unnecessary costs. In the July 17, 1985 Notice, EPA sought to address this concern by proposing a monitoring scheme whereby monitoring for pollutants could be drastically reduced if preliminary monitoring and other information indicated that the pollutants would not be discharged at significant levels.

The July 17, 1985 proposal of a monitoring scheme provoked substantial comments from both sides of the issue. Some argued that the scheme required more initial monitoring than was necessary to determine whether pollutants were likely to be present in the discharge during the permit term. Many of these commenters also argued that EPA's test for determining which pollutants would require more frequent monitoring was too stringent (i.e., too inclusive). In contrast, one commenter argued that the test did not adequately account for discharge variability and thus would result in the incorrect conclusion that certain pollutants were not likely to be discharged (were not "pollutants of concern") when in fact they would be discharged at levels and frequencies that warrant frequent compliance monitoring.

Response: The final OCPSF regulations regulate 63 toxic pollutants at BAT and 47 toxic pollutants for PSES. Regulating such a large number of the toxic priority pollutants is unprecedented in the effluent guidelines rulemaking program, reflecting the fact that many of the organic toxic pollutants are directly manufactured by OCPSF facilities as well as used as raw materials or generated as byproducts in industry processes.

As discussed elsewhere EPA has determined that the OCPSF industry should not be subcategorized based on product mix for the BAT regulation because the pollutants are treatable to comparable levels for a wide variety of plants within the industry. (See Section IV of the Development Document.) However, EPA is promulgating BAT limitations for two subcategories which are largely determined by raw waste characteristics (see Section VI.C.1. of this notice). Nevertheless, most OCPSF plants routinely discharge only a limited subset (e.g., 5–15) of the pollutants regulated at BAT. Thus, in the case of a typical plant in the industry, the regulations impose limitations for many pollutants that are not in fact discharged by the plant.

In the final regulation, EPA has decided that each discharger in a subcategory will be subject to the effluent limitations for all pollutants regulated for that subcategory. First, EPA recognizes the difficulty in guaranteeing that a plant will never during the permit term discharge a pollutant regulated for the applicable subcategory. Many factors do cause changes in the nature of OCPSF plant wastewater discharges, such as process changes, raw material changes, and product line changes, as well as more subtle factors that may result in changes in the wastewater matrix. Inserting a limitation in a plant's permit for a pollutant not generally expected (based on initial information) to be discharged assures that in fact the plant will be vigilant not to introduce the pollutant into its discharge without adequate treatment. Second, the limitations on these pollutants are fair, since in the event that a plant does discharge such a pollutant, EPA has determined that each of the regulated pollutants can be successfully treated by OCPSF dischargers by the use of the best available technology economically achievable.

Once a pollutant is regulated in the OCPSF regulation for dischargers in a particular subcategory, it must also be limited in the NPDES permit issued to any discharger in that subcategory. See Sections 301 and 304 of the Act; see also 40 CFR 122.44(a). The question remains, however, as to how much monitoring will be required for the various pollutants regulated by the permit.

EPA believes that industry's concern that OCPSF dischargers not be required to expend unnecessary resources to monitor for non-existent pollutants is

legitimate. While dischargers will normally monitor frequently for at least some toxic pollutants that are expected to be discharged, their monitoring costs would increase if other toxic pollutants were also to be monitored frequently. Whether the cost increase would be significant would depend on several factors, including whether the plant used GC/CD or GC/MS methods (which in turn depends on the number of organic pollutants discharged by the plant) and whether the additional pollutants were members of the same class of compounds as the pollutants that would be monitored in any event. The incremental cost of monitoring using Methods 1624 and 1625 for organics and atomic adsorption for metals could range from $295 for one organic compound and one metal to $1,350 for a scan of all regulated organic and metal priority pollutants. Thus it certainly is desirable to minimize unnecessary monitoring. However, as discussed above and in the July 17, 1985 notice, there is legitimate concern that pollutants may be discharged even if some initial information (e.g., a permit application) suggests that they are not currently discharged.

After considering the comments submitted on both sides of the issue raised by the July 17, 1985 notice, EPA has decided that the appropriate monitoring scheme for plants in this industry, as in other industries for which EPA has promulgated effluent limitations guidelines and standards in the past, is best determined on a case-by-case basis. EPA has generally refrained from setting inflexible monitoring requirements in effluent guideline regulations for other industries, and the NPDES permit regulations have similarly been written to allow the permit writer to establish in the permit (subject to all the procedural and substantive safeguards afforded by the NPDES permit procedures of 40 CFR Parts 122 and 124 and by the judicial review provision of section 509(b) of the Act) a set of monitoring requirements that are appropriately tailored to the plant. See 40 CFR 122.44(i) and 122.48.

The NPDES regulations set forth monitoring and reporting requirements for NPDES dischargers. Section 122.48 requires that each permit specify requirements regarding monitoring type, intervals and frequency sufficient to yield data which are representative of the monitored activity. Section 122.44(i) adds that the monitoring results must be reported with a frequency depending on the nature and effect of the discharge, but in no case less than once per year. Sections 122.41, 122.44 and 122.48 contain numerous other requirements concerning monitoring and reporting.

However, the NPDES regulations do not establish more specific requirements as to the frequency of monitoring that should be required. The frequency with which compliance monitoring should be performed will normally depend upon a variety of factors. One factor, of course, is the level at which particular pollutants are likely to be discharged in the event that the plant fails to treat its effluent adequately. This level would depend on production-, process- and raw material-related factors, as discussed above and elsewhere in the record for this regulation. Other factors relevant to setting monitoring requirements include the size of the plant, the size of the plant's flow, the nature and sensitivity of standards applicable to the receiving water, and other site-specific factors. Permit writers have throughout the history of the NPDES permit program made judgments as to the appropriate monitoring frequencies for particular plants, based upon these site-specific considerations. EPA believes that this approach remains the most appropriate for the OCPSF industry as it has been for all other industries.

EPA recognizes that specific guidance on appropriate monitoring requirements for OCPSF plants would be useful, particularly to assure that monitoring not be needlessly required for pollutants that are not discharged at a plant. One noteworthy factor is the monitoring scheme assumed by EPA for purposes of estimating the costs of complying with the OCPSF regulation. EPA has assumed that all plants would monitor their toxic pollutants four times per month. In addition, EPA has assumed that three of the four analyses would include only those toxic pollutants expected to be present at levels of regulatory concern. However, the fourth monthly analysis included all regulated toxic pollutants.

In assessing wastewater data as part of the analysis for developing appropriate monitoring frequencies for toxic pollutants, permit writers should take special care to account for the effects of dilution, which may indicate the absence of pollutants which in fact may be discharged. For example, as mentioned earlier in this preamble, an indication on a Form 2C permit application that a pollutant is absent or is present only at very low concentrations may reflect dilution and may fail to reveal that the pollutant is genuinely associated with and discharged from particular plant processes in significant amounts and thus needs to be monitored frequently. Thus, permit writers should obtain in-plant, pre-dilution data when necessary to properly characterize the wastewater for purposes of establishing monitoring requirements.

To address issues of particular concern, EPA intends to publish guidance on OCPSF monitoring in the near future.

This guidance will address both the issues of compliance monitoring generally and of initially determining which pollutants should be subject only to infrequent monitoring based on a conclusion that they are unlikely to be discharged.

5. Air Emissions of Volatile Pollutants

Comment: In the July 17, 1985 **Federal Register** notice (50 FR at 29083), EPA discussed its concerns about the "substantial impacts that may result from volatile air emissions at OCPSF biological treatment plants." EPA stated that available information strongly indicated that biological treatment systems fail to treat substantial portions of volatile and semi-volatile pollutants but rather transfer them to the air. In light of this information, EPA stated that it was seriously considering promulgating, in addition to the end-of-pipe effluent limitations, an additional set of in-plant, pre-biological limitations for a set of 20 volatile and semi-volatile pollutants. EPA stated that if it promulgated in-plant limitations, they would be applied prior to any biological treatment system, and control authorities would require compliance monitoring prior to the biological system. However, EPA acknowledged that even this approach might not result in a significant reduction of air emissions. This might occur, EPA said, if sources choose to use in-plant control techniques other than steam stripping which meet the BAT limitations but do not result in any significant reduction of air emissions. Therefore, EPA noted that if warranted, EPA may use Clean Air Act ("CAA") authority to address volatile air emissions.

In the subsequent October 11, 1985 **Federal Register** notice (50 FR at 41529), EPA extended its discussion of the OCPSF volatile air emissions issue. EPA re-emphasized that setting pre-biological limitations, while serving to discourage the substitution of air stripping for treatment, would not absolutely preclude air stripping. For example, some facilities use air strippers, or achieve some degree of air stripping in equalization basins and other devices, prior to biological treatment. EPA reiterated that it was therefore considering addressing this problem

through the Clean Air Act. However, EPA also stated that it would consider three additional options for addressing the problem under the Clean Water Act.

The first option was to require that the in-plant limitations apply at a point prior to any unit or process that is capable of transferring significant quantities of pollutants to the air. Alternatively, a certain level of emissions (e.g., the air stripping of 20 percent or more of the pollutants in question) might be designated as significant, resulting in applying the limits prior to the point where such emissions occur.

The second option was to specify in the regulation that technologies that involve significant levels of air stripping are not BAT because they result in significant adverse non-water quality (air) impacts. This would have been accomplished by listing particular technologies or specifying numerical criteria for determining significant levels of air emissions.

The third option was to specify technologies, such as steam stripping with recovery, that must be employed to remove volatile organic pollutants. EPA acknowledged that the Agency has historically disfavored specifying technologies and has relied exclusively upon effluent limitations and standards reflecting the selected model technologies to achieve particular control levels. Indeed, EPA noted that Congress intended that numerical criteria be the method generally used to set standards. However, since the CWA does not explicitly forbid the specification of technology, and given the extraordinary situation where numerical limitations alone may be incapable of assuring the use of the best available technology from an overall environmental perspective, EPA believed that this option may be legally acceptable.

EPA stated that it would continue to explore both the legal issues and the practical difficulties presented by the above options and invited comment on them. EPA received many comments in response, which are summarized below.

Commenters disagreed widely as to EPA's legal authority to promulgate in-plant limits to control emissions of volatile air pollutants as part of this regulation under the CWA. One commenter argued that EPA is legally required to establish in-plant limitations for OCPSF plants. The commenter did not cite any statutory authority that directly authorizes controls on air emissions under the CWA. However, the commenter argued that control measures and practices are not the "best", as required by the statute, if they allow substantial air emissions while alternative technologies are available which do not result in such emissions. The commenter pointed out that section 304(b) of the Clean Water Act includes "non-water quality environmental impact" as one of the factors to be taken into account in promulgating effluent limitations. In this regard, the commenter cited legislative history accompanying this provision to the effect that water pollution controls should not result in overall environmental degradation.

In contrast, numerous other commenters argued that EPA lacks authority to set limitations under the CWA that are designed to control air emissions. Moreover, these commenters argued, the CAA is the statutory vehicle chosen by Congress for regulating air emissions, and EPA should confine itself to acting under the CAA, if any action is warranted. (Several commenters noted that the Resource Conservation and Recovery Act (RCRA) is an appropriate regulatory vehicle for addressing at least some air emissions related to some OCPSF dischargers managing hazardous wastes.) These commenters noted that the CWA does not contain any provisions explicitly authorizing the specification of technology, the direct limitation of air emissions, or the establishment of in-plant limitations for the purpose of controlling air emissions. Some commenters argued further that in-plant limitations were beyond EPA's statutory authority, which, they asserted, authorizes only the limitation of discharges, i.e., the addition of pollutants to waters of the United States. Some of these commenters argued further that the statutory requirement that nonwater quality environmental factors be considered is: (1) Intended to preclude effluent limitations that result in net adverse environmental impacts but not to authorize specific limitations for the purpose of controlling air emissions, and (2) intended to address primarily adverse energy impacts.

Many industry commenters disagreed with the Agency's preliminary assessment that the air emissions from OCPSF plants constituted a significant environmental problem. They argued that while the Agency's preliminary assessment was that eight million pounds of pollutants are emitted annually from OCPSF biological treatment systems, this figure is minute as compared with total VOC (volatile organic compounds) emissions nationwide. Moreover, they argued that most OCPSF plant emissions are very small and in any event are insignificant in that they do not result in significant increases in ozone levels in the ambient air. These commenters also argued that EPA overestimated the total volatile pollutants emitted to the air noting that EPA's estimates were based upon estimated relative rates of biodegradation and volatilization.

Industry commenters also argued that EPA had incorrectly calculated the costs incurred to meet the in-plant limits. In particular, they asserted that significant energy costs would be incurred to generate the required steam and that steam generation would itself result in air emissions from boilers, with associated control costs.

Finally, industry commenters argued that the in-plant limitations would have the effect of denying plants the opportunity to use biological treatment to treat their organic pollutants, since they would require that dischargers meet limits prior to the point where the wastewaters entered the biological treatment plant.

Response: To address this multimedia issue, EPA held many meetings among the various EPA offices that implement statutory programs that may have some relevance to the issue of air emissions from OCPSF wastewater treatment facilities. After considering the broad variety of technical, policy, and legal issues involved, EPA has decided that the issue of volatile air emissions from OCPSF facilities is best addressed under laws that specifically direct EPA to control air emissions. The primary statutes providing such directions are the CAA and, in the case of facilities managing hazardous waste, RCRA. (The Toxic Substances Control Act may also be used to control air emissions where EPA determines that it would be in the public interest to use this authority.)

As a preliminary matter, the nature of the volatile emissions from OCPSF wastewater treatment systems must be understood. In the absence of any wastewater treatment, OCPSF facilities would discharge wastewaters containing volatile and semi-volatile organic pollutants into the receiving waters or into POTWs, without removal of these pollutants. These pollutants would be contained initially in the receiving waters or the POTWs, but a significant percentage of them would ultimately volatilize from the receiving waters or POTWs into the atmosphere. Because most direct discharging OCPSF plants in fact already have wastewater treatment facilities, most of these volatile pollutants are not discharged and volatilized downstream, but rather are taken out of the wastewater prior to discharge through biodegradation, recovery, accumulation in sludge, or

volatilization. While the volatilization from existing wastewater treatment systems may tend to concentrate residual volatile pollutants near the plant, it would be offset by the BPT and BAT regulations' combined effect. Efforts to comply with BPT and BAT regulations are expected to enhance the performance of the existing wastewater treatment facilities. It appears likely that they will generally cause a net decrease in air emissions. In many cases they will result in the increased use of technologies such as steam stripping that will lessen air emissions. At worst, they will fail to address an existing air pollution problem.

The issue before the Agency, then, is not so much whether the Agency should address an air pollution problem that is created through the promulgation of OCPSF wastewater treatment requirements. Rather, the principal issue is whether, in setting CWA requirements to limit the discharge of volatile organic pollutants in wastewaters, EPA should simultaneously use CWA authority to restrict the air emissions of these pollutants as well. As discussed below, EPA has decided that it would be most appropriate to address the air emissions issue directly by using the statutory authorities designed explicitly for this purpose, rather than to attempt indirect regulation through the Clean Water Act.

The legal and practical difficulties associated with attempting to regulate air emissions under the Clean Water Act are considerable. First, the statute provides no explicit authority for specifying technology, such as steam stripping, to control wastewater discharges. Rather, the statute calls for regulation that establishes effluent limitations and standards (with certain exceptions, such as best management practice (BMP) requirements under section 304(e) of the CWA), rather than specific management requirements. Indeed, the legislative history of the Act indicates that Congress did not want EPA to specify technology but rather wanted EPA to allow dischargers to select the means by which they would comply with effluent limitations. See, e.g., 1972 Legislative History at 311, 794–95 and at 1477.

Setting in-plant limitations to address air emissions has its own set of problems under the CWA. Neither the statute nor its legislative history provides explicit authority or a sense of Congress that EPA should directly control air emissions through effluent limitations promulgated under the CWA. The CWA clearly gives EPA authority to consider potential adverse nonwater quality environmental impacts before promulgating effluent limitations. However, the legislative history and case law examining this section 304(b) factor focus on the need to avoid the creation of significant adverse nonwater quality effects, or to consider the costs of mitigating such effects, rather than making it clear that the CWA could be used as statutory authority for controlling these nonwater quality effects. See, e.g., 1972 Legis. Hist. at 232 and 268–69, and 1977 Legis. Hist. at 412. See also, *Weyerhaeuser Co.* v. *Costle*, 690 F.2d 1011, 1044–53 (D.C. Cir. 1978); *American Paper Institute* v. *Train*, 543 F.2d 328, 339–40 (3rd Cir. 1976); *C&H Sugar Co.* v. *EPA*, 553 F.2d 280, 289–90 (2d Cir. 1977); *FMC Corp.* v. *Train* 539 F.2d 973, 979 (4th Cir. 1976); *Kennecott Copper* v. *EPA*, 612 F.2d 1232, 1246 (10th Cir. 1979) (cases upholding regulations in which EPA considered nonwater quality impacts and in some cases suggested means of mitigating those impacts); *AISI* v. *EPA*, 968 F.2d 284, 308 (3rd Cir. 1977); *Hooker Chemicals and Plastics Corp.* v. *Train*, 537 F.2d 620, 638 (2nd Cir. 1976) (cases remanding regulation where EPA gave no consideration at all to nonwater quality impacts). Indeed, the legislative history indicates that the section 304(b) requirement to consider non-water quality effects was designed to assure that EPA's internal structure and personnel attitudes were sensitized to the existence of such effects to assure that the net results of all of EPA's programs enhanced the environment and to temper effluent limitations, if necessary to prevent such effects. See *Weyerhaeuser, supra*, 690 F.2d at 1044–53. In the present case, this requirement has in fact had the effect of focusing the Agency as a whole on the issue of OCPSF air emissions. As discussed below, EPA is currently collecting data and considering regulations under a variety of legal authorities to address OCPSF air emissions.

Thus, while it is not clear that EPA is precluded from promulgating in-plant limits to control air emissions under the CWA, such action is not required and indeed is not explicitly authorized by the CWA. This points toward our conclusion that it is most appropriate to use the legal authorities that are more directly applicable and more clearly suited to the problem at hand, such as the Clean Air Act.

Another potential problem in using in-plant limits under the CWA is that it is inconsistent with the general approach taken by EPA under the CWA of determining compliance with effluent limitations at the end of pipe or, at least, at the point at which no more process wastewater treatment occurs. This approach is, as industry commenters have noted, consistent with the general statutory scheme of controlling discharges from point sources. EPA certainly is empowered to monitor internal waste streams. See, e.g., *Mobil Oil Corp.* v. *EPA*, 716 F.2d 1187 (7th Cir. 1983) (EPA may monitor internal waste streams to gain information as to which pollutants are being discharged and to better assess a plant's treatment efficiency). Moreover, EPA may establish limits on internal waste streams when end-of-pipe limits are impractical or infeasible, such as where the final discharge point is inaccessible (e.g., under 10 meters of water), so diluted as to make monitoring inpracticable, or subject to interferences that render detection and quantification inpracticable. See 40 CFR 122.45(h). However, EPA has never to date established in-plant limits for the purpose of addressing air emissions. The legal issues raised by such a regulatory approach are difficult and need not be reached given the fact that Congress has provided EPA with broad authority to regulate air emissions directly under other statutes.

The CAA and RCRA provide a broad array of regulatory tools to address the wide variety of air emissions. Clean Air Act regulatory programs include State Implementation Plans (SIPs) to implement National Ambient Air Quality Standards (NAAQS), National Emission Standards for Hazardous Air Pollutants (NESHAPS), and New Source Performance Standards (NSPS). In addition, two major different permit programs have been established to deal with new sources, one in areas that have obtained compliance with NAAQS (Prevention of Significant Deterioration-PSD) and the other in non-attainment areas. The CAA contains a variety of other authorities not discussed here.

RCRA also provides explicit, direct authority to regulate air emissions from hazardous waste treatment, storage and disposal (TSD) facilities. For example, section 3004(n) requires EPA to promulgate regulations for the monitoring and control of air emissions at TSD facilities as may be necessary to protect human health and the environment.

EPA believes that the use of authorities other than the CWA to address air emissions from OCPSF wastewater is preferable for several reasons. First and foremost, as noted above, statutes such as the CAA and RCRA specifically authorize and require EPA to regulate air emissions; the CWA does not. Second, these other authorities

provide for a more direct and effective means of controlling air emissions than does the CWA. Even under a broad reading of the CWA, EPA would be limited to indirectly controlling the air emissions through in-plant wastewater discharge limits, giving rise to some of the practical implementation problems discussed in the July and October 1985 notice. The CAA and RCRA, in contrast, clearly authorize the direct control of the emission itself. Third, because the CAA and to some extent the RCRA authorities provide broad authorization to regulate a wide variety of emission sources, they provide a better context for regulatory activity than does the CWA.

While multimedia issues are clearly raised in this rulemaking, they are similarly inherent in many other Agency regulations, including previously promulgated effluent guidelines. The decision not to use CWA authority to control air emissions here is consistent with longstanding Agency practice to regulate adverse effects in media other than the one being directly addressed through applying statutory authorities expressly established to address those other media. For example, EPA has consistently recognized that wastewater treatment often produces residues that may present environmental problems in other media unless properly controlled (e.g., hazardous sludges). EPA has not regulated disposal in these other media under the CWA but rather has regulated disposal under other directly applicable statutory authorities (e.g., RCRA). In promulgating this and other effluent guidelines, EPA has considered the associated costs of disposing of wastewater treatment residues in compliance with applicable requirements.

It is important to reemphasize that EPA has based the effluent limitations for volatile pollutants on the use of steam stripping with product recovery or destruction rather than on techniques that would allow air emissions, and has developed the compliance costs for this regulation based on the use of this more expensive treatment technology. This is based on the Agency's conclusion, taking into account the air emission aspects of wastewater treatment, that steam stripping with product recovery or destruction better represents the use of "best available technology." To the extent that some OCPSF plants choose to comply with the effluent limitations by using techniques that result in some air emissions (whether through volatilization from biological treatment or through prior air stripping), EPA's estimated costs and economic impacts will be overstated. However, EPA highly recommends that plants incorporate steam stripping with product recovery or destruction into their wastewater treatment systems at this time, to limit air emissions presently and in order to avoid costly retrofit requirements that may be subsequently imposed under the CAA, RCRA or other appropriate statute. EPA's current activities assessing this issue in detail, which will form the basis for subsequent regulatory activity, are summarized below.

Extensive efforts are underway to evaluate and regulate volatile organic pollutant emissions from wastewater in the organic chemicals, plastics, and synthetic fibers industry. Volatile organic compounds (VOCs) emitted from wastewater at OCPSF plants can pose air pollution problems by directly causing human health effects and/or by contributing to the formation of ozone, which then adversely affects human health and the environment. Pollutants emitted from OCPSF wastewater which directly cause human health effects include two organic compounds which are listed as hazardous air pollutants under section 112 of the Clean Air Act (vinyl chloride and benzene) and eight organics for which EPA has published a notice stating an intent to list them as hazardous air pollutants (methylene chloride, ethylene dichloride, ethylene oxide, butadiene, carbon tetrachloride, trichloroethylene, chloroform, and perchloroethylene). Organic compounds which contribute to ozone formation are referred to as volatile organic compounds, and include most organic compounds except for those specifically exempted through a series of notices which have appeared in the Federal Register. Also, the EPA currently is examining certain chemicals that may be contained in volatile organic compound emissions and their role as potential depleters of stratospheric ozone. Stratospheric ozone depletion may result in increased cases of skin cancer in humans and significant environmental effects as well. The Agency is continuing to study stratospheric ozone depletion and its environmental and health risk impacts. The reduction in VOC emissions from OCPSF wastewaters may also reduce emissions of potential ozone depleters, thus assisting in the protection of stratospheric ozone.

Volatile organic compounds are emitted from wastewater beginning at the point where the wastewater first contacts air. Thus, air pollutants from wastewater may be of concern immediately as the wastewater is discharged from the process unit. Emissions occur from sewers, junction boxes, screens, settling basins, equalization basins, biological treatment systems, air or steam strippers lacking product recovery and any other units where the wastewater is in contact with the air. In addition, those pollutants not emitted near the point of discharge may volatilize subsequently from the receiving waters.

In an effort being led by EPA's Office of Air and Radiation, EPA is evaluating the magnitude of the VOC emissions from OCPSF plants primarily by reviewing data already collected under the Clean Water and Clean Air Acts, but is also collecting additional data specifically for this purpose. Data on the organic content of wastewater can be used to estimate emissions. Data collected under the authority of section 308 of the Clean Water Act on the priority pollutant concentrations in wastewater are being reviewed along with sampling data obtained by EPA to support the OCPSF effluent guidelines. Analysis of these data indicates that for purposes of developing air emission controls that information on the volatile organic content of individual wastewater streams at the point of discharge from the process units is limited. It is important to realize that these data were designed to measure wastewater treatment effectiveness and thus focus mostly on the concentrations of priority pollutants in the wastewater in the influent and effluent of wastewater treatment systems. Further, due to the potential for emissions between the point of discharge from a process and the influent to end-of-pipe treatment systems, as well as the likelihood of organic emissions other than priority pollutants, the data underestimate air emissions.

In an attempt to improve the basis for estimating emissions, EPA sent questionnaires to nine OCPSF companies in July 1986 requesting that they submit existing data or provide estimates of the organic content in the wastewater at the process unit discharge. Data were requested for both volatile organics and for the specific organic pollutants referred to earlier which have been listed or are being considered for listing under section 112 of the Clean Air Act. (These are referred to as hazardous air pollutants and potentially hazardous air pollutants, respectively. Other pollutants may also become listed or considered for listing as hazardous air pollutants as better health effects data become available in the future.) Responses to this request contained data for the hazardous or potentially hazardous air pollutants, but

for the most part the quantities of VOCs and priority pollutants in the discharges were estimated or not provided.

The responses indicated that the VOC content would probably be at least ten times greater than that of the CWA priority pollutants. If this is the case, the VOC emissions based on a ten-fold increase in the air loadings derived from the section 308 data would amount to 70,000 metric tons/year. The EPA considers emissions of 70,000 tons/year of VOC from an emission source category to be significant, especially since approximately 50 percent of the OCPSF wastewater VOC emissions occur in areas where the National Ambient Air Quality Standard for ozone is not being attained (non-attainment areas). In addition, preliminary estimates indicate that risk and incidence of adverse effects resulting from potentially hazardous air pollutants emitted at OCPSF wastewater treatment facilities are significant.

The responses to the July 1986 data request also indicate that the majority of the emissions are due to a small percentage of the wastewater streams. This suggests that sizable emission reductions can be obtained through treatment of a relatively small percentage of OCPSF plant wastewaters. As a result, the EPA has initiated a program to identify wastewater streams that contain relatively high concentrations of VOCs and to determine the cost of removing the VOCs. The EPA believes that emission controls will be most effective from both an environmental and cost standpoint if applied at the point of maximum VOC concentration. This will generally be at the process unit discharge. Air pollution controls can be used at this point to reduce emissions from wastewater line junctions, open troughs, and other possible emission points in the collection system and from all downstream treatment and processing points. Since treatment costs are directly related to the amount of wastewater, VOC removal is most cost effective if performed prior to being mixed with other wastewaters that contain little or no VOCs. This information will be incorporated into a technical document which can then be used for standards development.

The EPA is presently evaluating whether the Clean Air Act, Resource Conservation and Recovery Act or a combination of these and perhaps other statutes should be used as a basis for regulating emissions from wastewater. RCRA requires the regulation of air emissions at treatment, storage, and disposal facilities, but has several statutory and regulatory exemptions which affect wastewater. As noted above, potential Clean Air Act authorities to employ include section 111 (New Source Performance Standards), Section 112 (National Emission Standards for Hazardous Air Pollutants), and/or State Implementation Plans and State regulations based on control technique guidance issued by EPA. While EPA is evaluating which regulatory authority or authorities to use for control of emissions from wastewater, additional efforts to collect data and develop air sampling procedures (which are the same regardless of regulatory authority) are proceeding.

It should be noted that in the interim, while EPA is proceeding with regulatory development, OCPSF wastewater treatment systems may be subject to new source review under the Clean Air Act. This may be required where new systems are installed to attain the effluent limitations and standards being promulgated in this **Federal Register** notice. These systems may be required to install air pollution control technology to meet best available control technology (BACT) requirements in ozone attainment areas and/or lowest achievable emission reduction (LAER) requirements in ozone nonattainment areas. Information currently being gathered by EPA to support regulatory development could be used by States in making these determinations.

Finally, readers should note that, consistent with the above discussion, EPA has already begun to regulate air emissions of VOC from wastewater systems. On May 4, 1987, EPA published proposed new source performance standards under section 111 of the Clean Air Act to limit emissions of VOC from new, modified, and reconstructed refinery wastewater systems (52 FR 16334). The proposed standards require the refinery wastewater systems to use the "best demonstrated technology", as that term is defined in the Clean Air Act, to reduce volatile organic emissions.

6. Use of Different Analytical Methods

Comment: Some commenters have stated that the various analytical methods used by EPA to generate the data used to develop the limitations are varied and not comparable. For example the methods used include a variety of GC/CD methods and GC/MS procedures.

Response: EPA acknowledges that a variety of methods have been used to develop the limitations. There are several reasons for this. First, different methods are more appropriate or more cost-effective in different wastewater matrices. For example, GC/CD may be cheaper for a wastewater with only a few priority pollutants belonging to the same class of compounds, while GC/MS is cheaper for analyzing for a wide range of compounds. Second, analytical methods for organic compounds have been evolving and improving throughout the period of the OCPSF rulemaking. As available procedures were refined, EPA took advantage of these refinements. Third, EPA was unable to promulgate standard methods for most of these compounds (in a separate rulemaking) in 40 CFR Part 136 until after some of the data used to develop the OCPSF limits were collected.

It is not possible to directly compare and contrast these various methods in the sense of determining a numerical relationship of data generated by one method to that of another. Each method used by EPA to generate the data being used has represented EPA's judgement as to the best method to use at the time for the given purpose of data development in light of the evolving state of the art. Data collected by procedures deemed inadequate were subsequently dropped from the data base. EPA believes that it is most appropriate to treat all the data retained after editing as equally appropriate for use in establishing the limitations. Dischargers by using the technologies upon which the limitations are based, should be able to demonstrate compliance with these limitations using the Part 136 analytical methods.

7. Definition of Analytical Levels of Detection and Their Use in Rulemaking

Comment: A number of commenters were critical of the manner in which EPA dealt with analytical levels of detection and low pollutant concentrations. Many commenters expressed the view that the 1985 proposal established limits below what the commenters term the "limit of quantification" (LOQ). Many commenters also stated that the limits proposed by EPA are at, near, or below the "Method Detection Limit" (MDL), the "limit of detection" (LOD), or the "detection limit." Commenters cited journal articles from "Analytical Chemistry," 52, December 1980, p. 2243; "Analytical Chemistry" 55, December 1983, page 2217 and "Spectrachem" Acta. B, 33B, 1978, page 242.

Response: The Agency's position is that the definitions of MDL, LOD and LOQ cited by commenters contain a number of ambiguities that make their use in rulemaking problematic. The exception is the definition of MDL

provided by EPA (40 CFR Part 136). The other definitions do not provide explicit step by step procedures including computational formulae that are sufficiently specific that a reader can follow and obtain a result. At various points in the other definitions the reader must make assumptions and interpretations that can be translated into operational steps to obtain a result.

In approaching development of analytical methods to be used for regulation of the OCPSF and other industries, EPA sought a means by which low concentrations of organic pollutants in wastewaters could be reliably measured, and sought to avoid the ambiguities associated with the definitions of LOQ, LOD, and detection limit.

For recent measurements of organic pollutants in this industry, EPA used isotope dilution GC/MS Methods 1624 and 1625 (40 CFR Part 136; 49 FR 43234). These methods specify the exact levels at which the instrument must be calibrated (see Section 7 "Calibration" in either method), and specify the "Minimum Level" at which the entire analytical system must give recognizable signals for the pollutant and acceptable calibration points. (See the footnotes to table 2 of Method 1624 and to tables 3 and 4 of Method 1625).) These Minimum Levels are specified in the methods and are not statistically based, nor are they the same as the LOD as one commenter suggests. These minimum levels are based on EPA's experience with pollutant levels that can be measured with near 100 percent certainty in every laboratory EPA employs using these methods.

The minimum levels are pollutant specific and are different for different pollutants. Of the pollutants listed in Methods 1624 and 1625, approximately 22 percent have Minimum Levels of greater than 10 μg/l; the remaining approximately 78 percent have Minimum Levels of 10 μg/l. (Note, however, that the MDL for these pollutants is generally much lower than the Minimum Levels.)

EPA recognizes that it has used in some of its programs an analytical approach related to the LOQ, called PQL ("practical quantification level"), which is generally some multiple of the MDL. This is done, for example in the recently promulgated drinking water standards ("maximum contaminant levels") for volatile organic chemicals (52 FR 25690, July 8, 1987). That regulation established PQLs generally at levels of 5 μg/l, which is in fact lower than the minimum levels established for the corresponding pollutants under the Part 136 regulations. (They are generally to be used for cleaner water matrices than OCPSF wastewaters).) Similarly, EPA has published PQLs as part of its recently revised hazardous waste groundwater monitoring regulations (52 FR 25942; July 9, 1987). However, the PQLs in that regulation have not undergone as extensive a validation procedure as the Part 136 methods, and they are not to be used for any regulatory purpose; they were published primarily to provide guidance to analytical laboratories. (Moreover, these PQLs are based upon analytical procedures that do not reflect the state of the art as fully as the Part 136 methods do.)

In using the minimum level approach for developing the OCPSF effluent guidelines, EPA has used the approach established in the analytical procedures which it has promulgated in Part 136 and which are described above. The promulgated Part 136 methods are required to be used by NPDES permittees; thus it is the use of the Part 136 method's approach to Minimum Levels that is relevant in evaluating whether particular concentrations can be monitored for and thus may appropriately be established as regulatory limits. Moreover, it is notable that, in any event, the limitations and standards established in this rule compare favorably with a variety of analytical detection/quantification definitions. No effluent limitation is less than the minimum level that can be measured reliably with isotope dilution methods; similarly, the limitations are above the MDL for every pollutant in every method and are above the LOQ for at least one method alternate to the isotope dilution methods. Therefore, the Agency concludes that pollutants can be reliably measured at the promulgated levels.

8. Complex Matrices

Comment: Industry commented that the analytical measurement at low levels is highly matrix dependent; i.e., interferences in the sample from other pollutants and other substances can preclude measurement of pollutant levels at the promulgated effluent limits. One commenter submitted data that purport to show that the analytical methods EPA uses will not permit accurate measurement of the effluent limits EPA has set because of the complex matrices. Other commenters state that the proposed effluent limits are too low for measurement in complex wastewaters and that the methods were developed using reagent water and not wastewater matrices.

Finally, one commenter states that EPA has not demonstrated that its methods would prevent nonregulated compounds from coeluting with regulated compounds during the analysis of a complex OCPSF industry wastewater.

Response: EPA agrees that matrix interferences can make measurement difficult for a few of the pollutants at the 10 μg/L level in a few effluents, but not in many. EPA has found that well-designed, well-operated treatment systems that include in-plant treatment (e.g., steam stripping; precipitation) followed by biological treatment reduce the matrix effects so that the sample behaves in the analysis process in nearly the same way as does reagent water, so that matrix interferences do not present a problem. The limitations and standards that EPA is promulgating today are based on well-designed and well-operated treatment system performance.

For dischargers who do not use end-of-pipe biological treatment, matrix interferences are also not likely to be a problem. Effluent limitations below 50 ppb are established primarily for two types of groups, volatile pollutants treated by steam stripping and organic pollutants treated by in-plant biological treatment. In both cases, the limitations are based upon data that demonstrate that the pollutants have been and thus can be measured at the regulatory levels. If situations remain in particular wastewaters where such measurement is difficult, the pollutants can be monitored at the effluent from the in-plant steam stripper or biological treatment unit. In such a case, significant problems from matrix interferences are unlikely.

To establish an effluent limit for daily maximum or monthly average, the data used are in most cases below the effluent limit because the limit allows for the variability of the data about the average of the data (generally referred to as the long-term average). For analytical results reported below the Minimum Level (i.e., the level that EPA can reliably measure consistent with the 40 CFR Part 136 methods), the effluent data was set at the Minimum Level, thus assuring that the effluent limitations would not be based upon values below a level that can be measured reliably. EPA has used its analytical methods to measure pollutant levels, in the presence of a wide variety of sample matrices, and EPA's data establish that these measurements can be made.

EPA acknowledges that a portion of its Part 136 analytical method development was conducted using reagent water. As industry commenters correctly point out, every wastewater

sample from every plant in every industry is different. EPA must, however, use samples and analytical measurements as the fundamental mechanism for obtaining information used in the Agency's rulemaking. EPA's analytical methods were developed not only for regulating the OCPSF industry, but for all industries discharging pollutants into wastewater. As a partial solution to this problem, EPA used reagent water as a reference sample matrix, because reagent water can be made reliably and reproducibly in analytical laboratories and is therefore globally available. EPA also tested treated wastewaters in developing its methods, and found that its methods produced results nearly indistinguishable from results produced with reagent water, as stated above. Further, EPA uses reagent water as a reference matrix in nearly all of its methods, and measures deviations from the results produced with reagent water as an indicator of method performance (e.g., see section 8 of Methods 601–613, 624–625, and 1624–1625).

In addition to providing analytical methods that permit measurement of pollutants at or below the effluent limitations and standards that EPA is today promulgating, EPA has provided flexibility in its analytical methods to further deal with complex matrix problems that may arise. This flexibility is permitted in two forms. First, a permittee may apply to the Administrator for use of an alternate test procedure under 40 CFR 136.4 and 136.5. As of January 21, 1987, more than 800 applications for an alternate test procedure have been made. Second, use of alternate chromatographic columns and other minor changes to the methods are considered within the scope of the methods, provided that the quality assurance criteria in the methods are met.

EPA cannot develop a generic method that would prevent every non-regulated compound from interfering (coeluting) with every regulated compound, because of the sheer number of chemical compounds. (More than 8,000,000 have been registered with the Chemical Abstracts Service.) Rather, as noted above, EPA has provided flexibility in its methods, in terms of alternate methods, cleanup procedures, and the use of selective detectors. EPA also permits the user of its methods to improve the separations or lower the cost of measurements provided that the quality control requirements of the method are met. This flexibility allows laboratory chemists to apply their expertise in developing and using wastewater-specific techniques that are appropriate to addressing the specific co-eluting compounds for that wastewater.

EPA disagrees with the commenter that provided the results of a survey of detection limits in commercial analytical laboratories. This survey purports to show that laboratories cannot detect the pollutants at the effluent limits EPA has proposed, because of complex matrix problems. The values reported in this survey are estimates, based on unsupported judgements, and are not measured values. As indicated in a footnote to the table of data, the results are "based on a potential need for a tenfold dilution of wastewater samples." EPA assumes no need for such dilution, and has set effluent limits on the basis of pollutant levels actually measured, not on estimates.

In Methods 1624 and 1625, EPA has made provisions for dilution of "untreated effluents and other samples". These provisions were made so that the Agency could determine the efficiency of various treatment systems in removing the toxic organic pollutants. This efficiency is determined by measuring the influent to, and the effluent from, the treatment system. The influents to treatment contain higher concentrations and a greater variety of pollutants at measurable levels than the effluents, and the methods permit dilution of these influents to permit reliable measurement of the pollutant concentrations. EPA has not promulgated influent limits. EPA regulates effluents and has reliably measured pollutant concentrations in effluents without the need for dilution.

9. EPA Should Modify Its Approach to Determining Compliance

Comment: Some commenters have argued that the effluent limitations and standards do not reflect the entire range of variability that can be expected from well-designed, well-operated facilities. They recommend that some relief should be provided to facilities in the form of higher limits or a formal policy that allows periodic exceedances of the limits.

Response: The issue raised here by commenters is not unique to the OCPSF regulation. It has in fact been raised in comments on many other effluent guideline rulemakings and in NPDES permit proceedings. Moreover, it has been the subject of numerous lawsuits in various United States Courts of Appeals. Because the issue is really a generic Clean Water Act regulatory issue addressed by NPDES regulations rather than a specific OCPSF issue, EPA's response is outlined only briefly below. However, a detailed response is set forth in the Response to Comments document for this rulemaking.

Historically, in the face of comments by industries similar to those raised here by the OCPSF industry, EPA has not modified its basic conceptual approach to setting effluent limitations, but rather has provided explicitly in the NPDES regulations that demonstration of a treatment system upset in compliance with certain criteria and procedures shall constitute an affirmative defense to an enforcement action. See the discussion below in Section XII of this preamble and the cases cited therein. EPA's approach in this regard is consistent with all judicial decisions on this issue to date.

EPA has decided here to act consistently with its historical practice. The final limitations and standards have not been made less stringent to allow dischargers increased latitude. EPA believes that the current limits, developed by multiplying long-term averages by variability factors, adequately allow for discharge variability and should be achieved consistently by OCPSF dischargers.

Many techniques exist for minimizing waste stream variability, including frequent inspection and repair of equipment and the use of back-up systems; operator training and performance evaluations; management control; careful communication and coordination among production and wastewater treatment personnel; spill diversion and holding systems; equalization basins to make effluent flow and quality more uniform; and quality assurance/quality control (QA/QC) to minimize analytical variability. The use of these techniques should result in compliance at all times, apart from instances of upsets.

EPA believes that the suggestions offered by the commenters have serious drawbacks. Raising permit limits to allow increased variability would inevitably result in less vigilant day-to-day wastewater treatment and, on average, increased discharges of pollutants. This is directly contrary to the Congressional intent that dischargers consistently employ the best available technology economically achievable. Similarly, an enforcement policy that allows periodic exceedances of limits (a policy which would be generic and outside the scope of this OCPSF rulemaking) would be fraught with the potential for mischief. First, it could result in periodically excessive discharges. Second, it could result in time-consuming fact-finding disputes in enforcement cases as to the nature,

extent and frequencies of each alleged violation rather than the swift, factually simplified enforcement action envisioned by Congress.

10. Alternate BAT Limits or Pretreatment Standards for Small Plants

Comment: EPA lacks statutory authority to create alternative BAT limits or PSES for small plants even if they suffer greater economic impact than larger plants.

Response: EPA agrees with the comment that the Regulatory Flexibility Act does not provide independent authority for the fashioning of alternative BAT or PSES standards for small plants. The alternative BAT requirements promulgated today, i.e., BAT equals BPT for direct discharging plants with annual production of five million pounds or less, have been established solely under the authority of the Clean Water Act.

In its effluent guidelines program, EPA has often considered disproportionate small plant impacts and, where appropriate, fashioned alternative requirements or outright exemptions for small plants. For example, the electroplating pretreatment standards contained less stringent requirements for all electroplaters with flows less than 10,000 gallons per day. The Court in *National Association of Metal Finishers* v. *EPA*, 719 F.2d 624 (3rd Cir. 1983), noted this relaxed requirement with approval in the course of upholding EPA's regulation against an industry challenge that the regulation as a whole was not economically achievable.

The Act clearly requires EPA to consider economic impacts in setting BAT limitations. BAT means "best available technology *economically achievable*" (emphasis added). (CWA section 301(b)(2)(H)) Where economic impacts are significant, EPA is not only authorized but compelled to consider them.

The commenter argues that economic achievability can be considered only on an industry category-wide basis, not on a subcategory basis. EPA disagrees. EPA typically has considered a broad range of factors as bases for segmenting an industry for regulatory purposes: Section 304(b) of the Act authorizes the EPA Administrator to consider a variety of enumerated technical factors (mostly relevant to the "best available technology" aspect of the BAT definition), plus "such other factors as the Administrator deems appropriate." As mentioned previously, the Administrator has deemed it appropriate in many effluent guidelines regulations to consider plant size as a factor in considering segmentation/subcategorization, among other things to better take into account both technology availability and economic achievability. Where a particular size-based segment of the industry is so impacted by regulation as to bring into question whether the regulation is economically achievable for that segment, EPA may consider economic achievability in setting limitations for that segment. Nothing in the statute or legislative history precludes EPA from considering such a factor in establishing the regulations.

The commenter argues that while the Act provides for consideration of economic impacts upon an industry as a whole, certain statutory provisions and the Act's legislative history indicate that if a regulation is economically achievable for the industry as a whole, particular plants may not be exempt based upon their particular inability to comply. EPA agrees and notes that Congress clearly expected that some plants would be unable to comply and would be forced to close. (Indeed in this rulemaking, EPA projects closures as a result of compliance with BAT as well as with PSES.) However, EPA believes that this expectation extended only to the effect of requirements on particular plants; it did not imply a prohibition on taking adverse economic impact into account in defining and segmenting entire classes of plants. In fashioning alternative requirements for a segment of small direct dischargers, EPA has considered the fact that about half of the plants in that segment are projected to close and most of the remaining plants in the segment would suffer other significant economic impacts, while for the rest of the direct dischargers, the impacts are quite low. This strongly supports the conclusion that the class of small plants is significantly different from the larger plants because of their size and therefore appropriate to be treated as a separate group for regulatory purposes. Statutory provisions such as section 301 (c) and (n) limiting the consideration of economic factors in issuing permits to individual dischargers are irrelevant to the question of appropriate bases for segmenting industrial groups for regulations.

XI. Best Management Practices (BMPs)

Section 304(e) of the Clean Water Act authorizes the Administrator to prescribe "best management practices" (BMPs), described under Legal Authority and Background, above. EPA is not promulgating BMPs for the OCPSF category at this time.

XII. Upset and Bypass Provisions

A recurring issue is whether industry limitations and standards should include provisions that authorize noncompliance during "upsets" or "bypasses." An upset, sometimes called an "excursion," is unintentional noncompliance beyond the reasonable control of the permittee. EPA believes that upset provisions are appropriate because upsets will sometimes occur, despite proper operation of industrial processes and pollution control equipment. Because technology-based limitations can require only what technology can achieve, many claim that liability for upsets is improper. When confronted with this issue, courts have been divided on the questions of whether an explicit upset or excursion exemption is necessary or whether upset or excursion incidents may be handled through EPA's enforcement discretion. Compare *Marathon Oil Co.* v. *EPA*, 564 F.2d 1253 (9th Cir. 1977), with *Weyerhaeuser* v. *Costle, supra* and *Corn Refiners Association, et al.* v. *Costle*, 594 F.2d 1223 (8th Cir. 1979). See also *Sierra Club* v. *Union Oil Co.*, 813 F.2d 1480 (9th Cir. 1987), *American Petroleum Institute* v. *EPA*, 540 F.2d 1023 (10th Cir. 1976), *CPC International, Inc.* v. *Train*, 540 F.2d 1320 (8th Cir. 1976), and *FMC Corp.* v. *Train*, 539 F.2d 973 (4th Cir. 1976).

An upset, as noted above, is an unintentional episode during which effluent limits are exceeded; a bypass, however, is an act of intentional noncompliance during which waste treatment facilities are circumvented in emergency situations. EPA has, in the past, included bypass provisions in NPDES permits.

EPA has determined that both upset and bypass provisions should be included in NPDES permits and has promulgated permit regulations that include upset and bypass permit provisions. See 40 CFR 122.41. The upset provision establishes an upset as an affirmative defense to prosecution for violation of, among other requirements, technology-based effluent limitations. The bypass provision authorizes bypassing to prevent loss of life, personal injury, or severe property damage. Consequently, although permittees in the OCPSF industry will be entitled to upset and bypass provisions in NPDES permits, this regulation does not address these issues. Upset and Bypass provisions are also contained in the General Pretreatment regulation, 40 CFR Parts 125 and 403.

XIII. Variances and Modifications

Once the OCPSF regulation is in effect, the numerical effluent limitations for the appropriate subcategory must be applied in all Federal and State NPDES permits thereafter issued to OCPSF direct dischargers. The pretreatment standards are directly applicable to indirect dischargers and become effective as discussed in § 414.12 of the regulation.

For the BPT effluent limitations, the only exception to the limitations contained in the regulation is EPA's "fundamentally different factors" variance. See *E. I. duPont de Nemours and Co.* v. *Train*, 430 U.S. 112 (1977); *Weyerhaeuser Co.* v. *Costle, supra*. This variance recognizes factors concerning a particular discharger that are fundamentally different from the factors considered in this rulemaking. However, the economic ability of the individual operator to meet the compliance cost for BPT standards is not a consideration for granting a variance. See *National Crushed Stone Association* v. *EPA*, 449 U.S. 64 (1980). Although this variance clause was originally set forth in EPA's 1973–1976 categorical industry regulations, it is now included in the general NPDES regulations and will not be included in the OCPSF or other specific industry regulations. See 40 CFR Part 125, Subpart D.

The BAT limitations in this regulation also are subject to EPA's "fundamentally different factors" variance. However, section 306 of the Water Quality Act of 1987 added a new section 301(n) to the Act which somewhat limits the availability of FDF variances from BAT effluent limitations guidelines. An FDF application must be based solely on information and supporting data submitted to EPA during the rulemaking establishing the limitations that discussed the fundamentally different factors, or on information and supporting data that the applicant did not have a reasonable opportunity to submit during the rulemaking. The alternative requirement must be no less stringent than justified by the fundamental difference and must not result in markedly more adverse non-water quality environmental impacts than those considered by EPA in establishing the guideline.

Indirect dischargers subject to PSES are also eligible for the "fundamentally different factors" variance. See 40 CFR 403.13. They are subject to essentially the same new statutory provisions for FDF variances as discussed above for BAT.

Readers should note that EPA has not yet amended its FDF variance regulation to conform to the provisions of the Water Quality Act of 1987. The regulation promulgated today refers to the existing regulatory sections. However, EPA recognizes that the new section 301(n) of the Act overrides the existing FDF regulation to the extent of any inconsistency, and EPA does intend to modify the FDF regulation to conform to the new statutory requirements.

Indirect dischargers subject to PSES and PSNS are eligible for credits for toxic pollutants removed by a POTW. See section 307(b) of the CWA and 40 CFR 403.7. The removal credits regulation was remanded to EPA in *Natural Resources Defense Council* v. *EPA*, 790 F.2d 289 (3rd Cir. 1986). The court held that some of the means by which EPA considered local POTW removal efficiencies were not sufficiently stringent and that credits for POTW removals may not be authorized until comprehensive regulations for the use and disposal of sludge are promulgated under section 405(d) of the CWA. However, it should be noted that pretreatment standards for the OCPSF industry, like other categorical pretreatment standards, have been promulgated based upon the assumptions that indirect dischargers will be required to comply with the standards without removal credits, and thus that they are subject to the full costs of complying with PSES.

XIV. Implementation of Limitations and Standards

A. Flow Basis

The limitations promulgated today are concentration-based and thus do not regulate flow. The permit writer must use a reasonable estimate of process wastewater flows and the concentration limitations to develop mass limitations for the NPDES permit. Process wastewater discharge is defined in the regulation (40 CFR 401.11) to include wastewaters resulting from manufacture of OCPSF products that come in direct contact with raw materials, intermediate products, or final products, and surface runoff from the immediate process area that has the potential to become contaminated. Noncontact cooling waters, utility wastewaters, general site surface runoff, ground waters, and other nonprocess waters generated on site are specifically excluded from the definition of process wastewater discharges. In cases where the process wastewater flow claimed by industry may be excessive, the permit writer may develop a more appropriate process wastewater flow for use in computing the mass effluent or internal plant limitations. The following items should be considered in developing the more appropriate process wastewater flow:

1. A review of the component flows to insure that the claimed flows are, in fact, process wastewater flows as defined by the regulation;

2. A review of plant operations to insure that sound water conservation practices are being followed. Examples are: minimization of process water uses; cascading or countercurrent washes or rinses, where possible; reuse or recycle of intermediate process waters or treated wastewaters at the process area and in wastewater treatment operations (pump seals, equipment and area washdowns, etc.).

3. A review of barometric condenser use at the process level. Often, barometric condensers will generate relatively large volumes of water contaminated at low levels. Replacement of barometric condensers with surface condensers can reduce wastewater volumes significantly and result in collection of condensates that may be returned to the process.

The final NPDES permit limitations will be the sum of the mass effluent limitations derived as described above and any mass effluent limitations developed on a case-by-case basis using best professional judgment by the permit writer to take into account nonprocess wastewater discharges.

B. Relationship to NPDES Permits

The BPT and BAT limitations and NSPS in this regulation will be applied to individual OCPSF plants through NPDES permits issued by EPA or approved state agencies under section 402 of the Act. As discussed in the preceding section of this preamble, these limitations must be applied in all new, modified and reissued Federal and State NPDES permits except to the extent that variances are expressly authorized. Other aspects of the interaction between these limitations and NPDES permits are discussed below.

One subject that has received different judicial rulings 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 establish effluent limitations on a case-by-case basis. This regulation provides a technical and legal base for new or modified or reissued permits.

One issue that warrants consideration is the effect of this regulation on the powers of NPDES permit-issuing authorities. EPA has developed the limitations and standards in this

regulation to cover typical facilities in the OCPSF point source category. In specific cases, the NPDES permitting authority may have to establish permit limits on toxic or nonconventional pollutants that are not covered by this regulation. The promulgation of this regulation will not restrict the power of any permitting authority to act in any manner consistent with law or these or any other EPA regulations, guidelines, or policy. For example, even 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 purposes of the Act. In addition, to the extent that 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 limitations on covered pollutants), the permit-issuing authority must apply those limitations.

A second topic that warrants discussion is the operation of EPA's NPDES enforcement program, many aspects of which were 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 efforts.

C. Indirect Dischargers

For indirect dischargers, PSES and PSNS are implemented under National Pretreatment Program procedures outlined in 40 CFR Part 403. The brief glossary below may be of assistance in resolving questions about the operation of that program.

A "request for category determination" is a written request, submitted by an indirect discharger or its POTW, for a determination of which categorical pretreatment standard applies to the indirect discharger. This assists the indirect discharger in knowing which PSES or PSNS limits it will be required to meet. See 40 CFR 403.6(a).

A request for "fundamentally different factors variance" is a mechanism by which a categorical pretreatment standard may be adjusted, making it more or less stringent, on a case-by-case basis. If an indirect discharger, a POTW, or any interested person believes that factors relating to a specific indirect discharger are fundamentally different from those factors considered during development of the relevant categorical pretreatment standard and that the existence of those factors justifies a different discharge limit from that specified in the categorical standard, then they may submit a request to EPA for such a variance. See the discussion above in Section XIII of this preamble. See 40 CFR 403.13.

A "baseline monitoring report" is the first report an indirect discharger must file following promulgation of an applicable standard. The baseline report includes: An identification of the indirect discharger; a description of its operations; a report on the flows of regulated streams and the results of sampling analyses to determine levels of regulated pollutants in those streams; a statement of the discharger's compliance or noncompliance with the standard; and a description of any additional steps required to achieve compliance. See 40 CFR 403.12(b).

A "report on compliance" is required of each indirect discharger within 90 days following the date for compliance with an applicable categorical pretreatment standard. The report must indicate the concentration of all regulated pollutants in the facility's regulated process wastestreams; the average and maximum daily flows of the regulated streams; and a statement of whether compliance is consistently being achieved, and if not, what additional operation and maintenance and/or pretreatment is necessary to achieve compliance. See 40 CFR 403.12(d).

A "periodic compliance report" is a report on continuing compliance with all applicable categorical pretreatment standards. It is submitted twice per year (June and December) by indirect dischargers subject to the standards. The report must provide the concentrations of the regulated pollutants in its discharge to the POTW; the average and maximum daily flow rates of the facility; the methods used by the indirect discharger to sample and analyze the data; and a certification that these methods conform to the methods outlined in the regulations. See 40 CFR 403.12(e).

XV. Availability of Technical Information

The basis for this regulation is detailed in four major documents each of which in turn is supported by additional information and analyses in the record. Analytical methods are discussed in "Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants." EPA's technical foundation for the regulations is detailed in the "Development Document for Effluent Guidelines, New Source Performance Standards, and Pretreatment Standards for the Organic Chemicals, Plastics and Synthetic Fibers Point Source Category." The Agency's economic analysis is presented in the "Economic Impact Analysis Report for the Effluent Guidelines and Standards for the Organic Chemicals, Plastics and Synthetic Fibers Industry." A detailed response to the public comments received on the proposed regulation and subsequent notices is presented in a report entitled "Responses to Public Comments on the Proposed Organic Chemicals, Plastics and Synthetic Fibers Effluent Limitations Guidelines and Standards." Copies of the technical document and economic document may be obtained from the National Technical Information Service, Springfield, Virginia 22161, (703) 487–4600. Additional information concerning the economic impact analysis may be obtained from Ms. Kathleen Ehrensberger, Economic Analysis Branch (WH–586), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460 or by calling (202) 382–5397. Technical information may be obtained from Mr. Elwood H. Forsht, Industrial Technology Division (WH–552), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460 or by calling (202) 382–7190.

XVI. Office of Management and Budget (OMB) Review

This regulation and the Regulatory Impact Analysis were submitted to the Office of Management and Budget for review as required by Executive Order 12291. The regulation does not contain any information collection requirements. There are information collection requirements associated with the general pretreatment requirements and permit requirements. These information collection requirements have been approved by OMB.

List of Subjects

40 CFR Part 414

Organic chemicals manufacturing, Plastics manufacturing, Synthetic fibers manufacturing, Water pollution control, Water treatment and disposal.

40 CFR Part 416

Plastics materials and synthetics, Waste treatment and disposal, Water pollution control.

Dated: October 2, 1987.

Lee M. Thomas,

Administrator.

Appendices

Appendix A—Abbreviations, Acronymns, 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 under section 304(b)(2)(B) of the Act.

BCT—The best conventional pollutant control technology under section 304(b)(4) of the Act.

BOD—For the purposes of this notice, BOD refers to 5-day biochemical oxygen demand.

BMP—Best management practices under section 304(e) of the Act.

BPT—The best practicable control technology currently available under section 304(b)(1) of the Act.

Clean Water Act—The Federal Water Pollution Control Act Amendments of 1972, as amended by the Clean Water Act of 1977 (Pub. L. 95–217) and Water Quality Act of 1987 (Pub. L. 100–4) (33 U.S.C. 1251 *et seq.*).

Direct Discharger—A facility which discharges or may discharge pollutants into waters of the United States.

Indirect Discharger—A facility which discharges or may discharge pollutants into a publicly owned treatment works.

NPDES Permit—A National Pollutant Discharge Elimination System permit issued under section 402 of the Act.

NSPS—New source performance standards under section 306 of the Act.

POTW—Publicly owned treatment works.

PSES—Pretreatment standards for existing sources of indirect discharges under section 307(b) of the Act.

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

RCRA—Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976 (Pub. L. 94–580) and as further amended (42 U.S.C. 6901 *et seq*).

Appendix B—Toxic Pollutants Excluded from PSES and PSNS Because They Are Sufficiently Controlled by Existing Technologies

2,4-Dinitrophenol
Benzo(k)fluoranthene
Acenaphthylene

Appendix C—Toxic Pollutants Not Detected in the Treated Effluents of Direct Dischargers or in Wastewaters from Process Sources

Hexachlorocyclopentadiene
N-Nitrosodimethylamine
Aldrin
Dieldrin
Chlordane
4,4'-DDT
4,4'-DDE
4,4'-DDD
alpha-Endosulfan
beta-Endosulfan
Endosulfansulfate
Endrin
Endrin aldehyde
Heptachlor
Heptachlor epoxide
alpha-BHC
beta-BHC
gamma-BHC
delta-BHC
Toxaphene
PCB–1242 (Arochlor 1242)
PCB–1254 (Arochlor 1254)
PCB–1221 (Arochlor 1221)
PCB–1232 (Arochlor 1232)
PCB–1248 (Arochlor 1248)
PCB–1260 (Arochlor 1260)
PCB–1016 (Arochlor 1016)
Asbestos

Appendix D—Toxic Pollutants (1) Detected in Treated Effluents From a Small Number of Discharge Sources and Uniquely Related to Those Sources, (2) Present Only in Trace Amounts and Neither Causing Nor Likely to Cause Toxic Effects, or (3) Sufficiently Controlled by Existing Technologies

Acrolein (1)
Benzidine (1)
Bis (2-chloroethyl)ether (2)
2-Chloroethyl vinyl ether (1)
2-Chloronaphthalene (1)
Parachlorometa cresol (1)
4-Chlorophenyl phenyl ether (1)
4-Bromophenyl phenyl ether (1)
1,2-Diphenylhydrazine (1)
Bis (2-chloroethoxy) methane (1)
Methylbromide (1)
Bromoform (2)
Dichlorobromomethane (2)
Chlorodibromomethane (2)
N-Nitrosodiphenylamine (1)
N-Nitrosodi-n-propylamine (1)
Pentachlorophenol (2)
Butyl benzyl phthalate (1)
Di-n-octyl phthalate (2)
Arsenic (1)
Beryllium (1)
Cadmium (1)
Mercury (1)
Selenium (1)
Silver (1)
Thallium (1)
Benzo(ghi)perylene (3)
Dibenzo(a,h) anthracene (3)
Indeno(1,2,3-c,d)pyrene (3)
Isophorone (2)
1,1,2,2-Tetrachloroethane (2)

Appendix E—Toxic Pollutants That Do Not Pass Through or Interfere With POTWs

Benzo(a) anthracene
Benzo(a) pyrene
Chrysene
Chromium
Copper
Nickel

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

1. 40 CFR Part 414 is revised to read as follows:

PART 414—ORGANIC CHEMICALS, PLASTICS, AND SYNTHETIC FIBERS

Subpart A—General

Sec.

Subpart B—Rayon Fibers

Subpart C—Other Fibers

Authority: Sections 301, 304, 306, 307, and 501, Pub. L. 92-500, 86 Stat. 816, Pub. L. 95-217, 91 Stat. 156, Pub. L. 100-4, 101 Stat. 7 (33 U.S.C. 1311, 1314, 1316, 1317, and 1361).

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.

(c) "Priority pollutants" means the toxic pollutants listed in 40 CFR 401.15.

§ 414.11 Applicability.

(a) The provisions of this part are applicable to process wastewater discharges from all establishments or portions of establishments that manufacture the organic chemicals, plastics, and synthetic fibers (OCPSF) products or product groups covered by Subparts B through H of this regulation and are included within the following U.S. Department of Commerce Bureau of the Census Standard Industrial Classification (SIC) major groups:

(1) SIC 2821—Plastic Materials, Synthetic Resins, and Nonvulcanizable Elastomers,

(2) SIC 2823—Cellulosic Man-Made Fibers,

(3) SIC 2824—Synthetic Organic Fibers, Except Cellulosic,

(4) SIC 2865—Cyclic Crudes and Intermediates, Dyes, and Organic Pigments,

(5) SIC 2869—Industrial Organic Chemicals, Not Elsewhere Classified.

(b) The provisions of this part are applicable to wastewater discharges from OCPSF research and development, pilot plant, technical service and laboratory bench scale operations if such operations are conducted in conjunction with and related to existing OCPSF manufacturing activities at the plant site.

(c) Notwithstanding paragraph (a) of this section, the provisions of this part are not applicable to discharges resulting from the manufacture of

OCPSF products if the products are included in the following SIC subgroups and have in the past been reported by the establishment under these subgroups and not under the SIC groups listed in paragraph (a) of this section:

(1) SIC 2843085—bulk surface active agents;

(2) SIC 28914—synthetic resin and rubber adhesives;

(3) Chemicals and Chemical Preparations, not Elsewhere Classified:

(i) SIC 2899568—sizes, all types

(ii) SIC 2899597—other industrial chemical specialties, including fluxes, plastic wood preparations, and embalming fluids;

(4) SIC 2911058—aromatic hydrocarbons manufactured from purchased refinery products; and

(5) SIC 2911632—aliphatic hydrocarbons manufactured from purchased refinery products.

(d) Notwithstanding paragraph (a) of this section, the provisions of this part are not applicable to any discharges for which a different set of previously promulgated effluent limitations guidelines and standards in this subchapter apply, unless the facility reports OCPSF products under SIC codes 2865, 2869, or 2821, and the facility's OCPSF wastewaters are treated in a separate treatment system or discharged separately to a publicly owned treatment works.

(e) The provisions of this part do not apply to any process wastewater discharges from the manufacture of organic chemical compounds solely by extraction from plant and animal raw materials or by fermentation processes.

(f) Discharges of chromium, copper, lead, nickel, and zinc in "complexed metal-bearing waste streams," listed in Appendix B of this part, are not subject to the requirements of this part.

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

All dischargers subject to PSES in this part must comply with the standards by no later than three years after date of promulgation in the **Federal Register**.

Subpart B—Rayon Fibers

§ 414.20 Applicability; description of the rayon fibers subcategory.

The provisions of this subpart are applicable to process wastewater discharges resulting from the manufacture of rayon fiber by the viscose process only.

§ 414.21 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (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 (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

Effluent characteristics	BPT effluent limitations [1]	
	Maximum for any one day	Maximum for monthly average
BOD5	64	24
TSS	130	40
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.

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

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

(a) The Agency has determined that for existing point sources whose total OCPSF production defined by § 414.11 is less than or equal to five (5) million pounds of OCPSF products per year, the BPT level of treatment is the best available technology economically achievable. Accordingly, the Agency is not promulgating more stringent BAT limitations for these point sources.

(b) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.91 of this part.

(c) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.101 of this part.

§ 414.24 New source performance standards (NSPS).

(a) Any new source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.91 of this part and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

(b) Any new source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.101 of this part and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

Effluent characteristics	NSPS [1]	
	Maximum for any one day	Maximum for monthly average
BOD5	64	24
TSS	130	40
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.

§ 414.25 Pretreatment standards for existing sources (PSES).

(a) Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

(b) In the case of lead, zinc, and total cyanide the discharge quantity (mass) shall be determined by multiplying the concentrations listed in the following table for the metal pollutants times the flow from metal-bearing waste streams for metals and times the flow from the cyanide-bearing waste streams for total cyanide. The metal-bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional process wastewater streams identified by the control authority on a case-by-case basis as metals or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and

(2) That the combination of such streams, prior to treatment, with the Appendix A waste streams would result

in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Effluent characteristics	Pretreatment standards [1]	
	Maximum for any one day	Maximum for monthly average
Acenaphthene	47	19
Benzene	134	57
Carbon Tetrachloride	380	142
Chlorobenzene	380	142
1,2,4-Trichlorobenzene	794	196
Hexachlorobenzene	794	196
1,2-Dichloroethane	574	180
1,1,1-Trichloroethane	59	22
Hexachloroethane	794	196
1,1-Dichloroethane	59	22
1,1,2-Trichloroethane	127	32
Chloroethane	295	110
Chloroform	325	111
1,2-Dichlorobenzene	794	196
1,3-Dichlorobenzene	380	142
1,4-Dichlorobenzene	380	142
1,1-Dichloroethylene	60	22
1,2-Trans-dichloroethylene	66	25
1,2-Dichloropropane	794	196
1,3-Dichloropropylene	794	196
2,4-Dimethylphenol	47	19
Ethylbenzene	380	142
Fluoranthene	54	22
Methylene Chloride	170	36
Methyl Chloride	295	110
Hexachlorobutadiene	380	142
Naphthalene	47	19
Nitrobenzene	6,402	2,237
2-Nitrophenol	231	65
4-Nitrophenol	576	162
4,6-Dinitro-o-cresol	277	78
Phenol	47	19
Bis(2-ethylhexyl) phthalate	258	95
Di-n-butyl phthalate	43	20
Diethyl phthalate	113	46
Dimethyl phthalate	47	19
Anthracene	47	19
Fluorene	47	19
Phenanthrene	47	19
Pyrene	48	20
Tetrachloroethylene	164	52
Toluene	74	28
Trichloroethylene	69	26
Vinyl Chloride	172	97
Total Cyanide	1,200	420
Total Lead	690	320
Total Zinc [2]	2,610	1,050

[1] All units are micrograms per liter.

[2] Total Zinc for Rayon Fiber Manufacture that uses the viscose process is 6,796 μg/l and 3,325 μg/l for maximum for any one day and maximum for monthly average, respectively.

§ 414.26 Pretreatment standards for new sources (PSNS).

(a) Except as provided in 40 CFR 403.7 any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed above in § 414.25.

(b) In the case of lead, zinc, and total cyanide the discharge quantity (mass) shall be determined by multiplying the concentrations listed above in § 414.25 for the metal pollutants times the flow from metal-bearing waste streams and times the flow from the cyanide-bearing waste streams for total cyanide. The metal-bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional process wastewater streams identified by the control authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and

(2) That the combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Subpart C—Other Fibers

§ 414.30 Applicability; description of the other fibers subcategory.

The provisions of this subpart are applicable to the process wastewater discharges resulting from the manufacture of the following SIC 2823 cellulosic man-made fibers and fiber groups, except Rayon, and SIC 2824 synthetic organic fibers and fiber groups. Product groups are indicated with an asterisk (*).

*Acrylic Fibers (85% Polyacrylonitrile)
*Cellulose Acetate Fibers
*Fluorocarbon (Teflon) Fibers
*Modacrylic Fibers
*Nylon 6 Fibers
Nylon 6 Monofilament
*Nylon 66 Fibers
Nylon 66 Monofilament
*Polyamide Fibers (Quiana)
*Polyaramid (Kevlar) Resin-Fibers
*Polyaramid (Nomex) Resin-Fibers
*Polyester Fibers
*Polyethylene Fibers
*Polypropylene Fibers
*Polyurethane Fibers (Spandex)

§ 414.31 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (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 (mass) quantity determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

Effluent characteristics	BPT effluent limitations [1]	
	Maximum for any one day	Maximum for monthly average
BOD5	48	18
TSS	115	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.

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

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

(a) The Agency has determined that for existing point sources whose total OCPSF production defined by § 414.11 is less than or equal to five (5) million pounds of OCPSF products per year, the BPT level of treatment is the best available technology economically achievable. Accordingly, the Agency is not promulgating more stringent BAT limitations for these point sources.

(b) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.91 of this part.

(c) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.101 of this part.

§ 414.34 New source performance standards (NSPS).

(a) Any new source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.91 of this part,

and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

(b) Any new source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.101 of this part, and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

Effluent characteristics	NSPS [1]	
	Maximum for any one day	Maximum for monthly average
BOD5	48	18
TSS	115	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.

§ 414.35 Pretreatment standards for existing sources (PSES).

(a) Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

(b) In the case of lead, zinc, and total cyanide the discharge quantity (mass) shall be determined by multiplying the concentrations listed in the following table for the metals pollutants times the flow from metal-bearing waste streams for metals and times the flow from the cyanide-bearing waste streams for total cyanide. The metal-bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional process wastewater streams identified by the control authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and that

(2) The combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Effluent characteristics	Pretreatment standards [1]	
	Maximum for any one day	Maximum for monthly average
Acenaphthene	47	19
Benzene	134	57
Carbon Tetrachloride	380	142
Chlorobenzene	380	142
1,2,4-Trichlorobenzene	794	196
Hexachlorobenzene	794	196
1,2-Dichloroethane	574	180
1,1,1-Trichloroethane	59	22
Hexachloroethane	794	196
1,1-Dichloroethane	59	22
1,1,2-Trichloroethane	127	32
Chloroethane	295	110
Chloroform	325	111
1,2-Dichlorobenzene	794	196
1,3-Dichlorobenzene	380	142
1,4-Dichlorobenzene	380	142
1,1-Dichloroethylene	60	22
1,2-trans-Dichloroethylene	66	25
1,2-Dichloropropane	794	196
1,3-Dichloropropylene	794	196
2,4-Dimethylphenol	47	19
Ethylbenzene	380	142
Fluoranthene	54	22
Methylene Chloride	170	36
Methyl Chloride	295	110
Hexachlorobutadiene	380	142
Naphthalene	47	19
Nitrobenzene	6,402	2,237
2-Nitrophenol	231	65
4-Nitrophenol	576	162
4,6-Dinitro-o-cresol	277	78
Phenol	47	19
Bis(2-ethylhexyl) phthalate	258	95
Di-n-butyl phthalate	43	20
Diethyl phthalate	113	46
Dimethyl phthalate	47	19
Anthracene	47	19
Fluorene	47	19
Phenanthrene	47	19
Pyrene	48	20
Tetrachloroethylene	164	52
Toluene	74	28
Trichloroethylene	69	26
Vinyl Chloride	172	97
Total Cyanide	1,200	420
Total Lead	690	320
Total Zinc [2]	2,610	1,050

[1] All units are micrograms per liter.
[2] Total zinc for the manufacture of acrylic fibers using the zinc chloride/solvent process is 6,796 μg/l and 3,325 μg/l for maximum for any one day and maximum for monthly average, respectively.

§ 414.36 Pretreatment standards for new sources (PSNS).

(a) Except as provided in 40 CFR 403.7 any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed above in § 414.35.

(b) In the case of lead, zinc, and total cyanide the discharge quantity (mass) shall be determined by multiplying the concentrations listed above in § 414.35 for the metal pollutants times the flow from metal-bearing waste streams for metals and times the flow from the cyanide-bearing waste streams for total cyanide. The metal-bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional process wastewater streams identified by the control authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and that

(2) The combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Subpart D—Thermoplastic Resins

§ 414.40 Applicability; description of the thermoplastic resins subcategory.

The provisions of this subpart are applicable to the process wastewater discharges resulting from the manufacture of the following SIC 28213 thermoplastic resins and thermoplastic resin groups. Product groups are indicated with an asterisk (*).

*Abietic Acid—Derivatives
*ABS Resins
*ABS-SAN Resins
*Acrylate-Methacrylate Latexes
*Acrylic Latex
*Acrylic Resins
*Cellulose Acetate Butyrates
Cellulose Acetate Resin
*Cellulose Acetates
*Cellulose Acetates Propionates
Cellulose Nitrate
Cellulose Sponge
*Ethylene-Methacrylic Acid Copolymers
*Ethylene-Vinyl Acetate Copolymers
*Fatty Acid Resins
*Fluorocarbon Polymers
Nylon 11 Resin
*Nylon 6—66 Copolymers
*Nylon 6—Nylon 11 Blends
Nylon 6 Resin
Nylon 612 Resin

Nylon 66 Resin
*Nylons
*Petroleum Hydrocarbon Resins
*Polyvinyl Pyrrolidone—Copolymers
*Poly(Alpha)Olefins
Polyacrylic Acid
*Polyamides
*Polyarylamides
Polybutadiene
*Polybutenes
Polybutenyl Succinic Anhydride
*Polycarbonates
*Polyester Resins
*Polyester Resins, Polybutylene Terephthalate
*Polyester Resins, Polyoxybenzoate
Polyethylene
*Polyethylene—Ethyl Acrylate Resins
*Polyethylene—Polyvinyl Acetate Copolymers
Polyethylene Resin (HDPE)
Polyethylene Resin (LPDE)
Polyethylene Resin, Scrap
Polyethylene Resin, Wax (Low M.W.)
Polyethylene Resin, Latex
Polyethylene Resins
*Polyethylene Resins, Compounded
*Polyethylene, Chlorinated
*Polyimides
*Polypropylene Resins
Polystyrene (Crystal)
Polystyrene (Crystal) Modified
*Polystyrene—Copolymers
*Polystyrene—Acrylic Latexes
Polystyrene Impact Resins
Polystyrene Latex
Polystyrene, Expandable
Polystyrene, Expanded
*Polysulfone Resins
Polyvinyl Acetate
*Polyvinyl Acetate—PVC Copolymers
*Polyvinyl Acetate Copolymers
*Polyvinyl Acetate Resins
Polyvinyl Alcohol Resin
Polyvinyl Chloride
Polyvinyl Chloride, Chlorinated
*Polyvinyl Ether-Maleic Anhydride
*Polyvinyl Formal Resins
*Polyvinylacetate—Methacrylic Copolymers
*Polyvinylacetate Acrylic Copolymers
*Polyvinylacetate-2-Ethylhexylacrylate Copolymers
Polyvinylidene Chloride
*Polyvinylidene Chloride Copolymers
*Polyvinylidene-Vinyl Chloride Resins
*PVC Copolymers, Acrylates (Latex)
*PVC Copolymers, Ethylene-Vinyl Chloride
*Rosin Derivative Resins
*Rosin Modified Resins
*Rosin Resins
*SAN Resins
*Silicones: Silicone Resins
*Silicones: Silicone Rubbers
*Styrene Maleic Anhydride Resins
Styrene Polymeric Residue
*Styrene-Acrylic Copolymer Resins
*Styrene-Acrylonitrile-Acrylates Copolymers
*Styrene-Butadiene Resins
*Styrene-Butadiene Resins (<50% Butadiene)
*Styrene-Butadiene Resins (latex)
*Styrene-Divinyl Benzene Resins (Ion Exchange)
*Styrene-Methacrylate Terpolymer Resins
*Styrene-Methyl Methacrylate Copolymers
*Styrene, Butadiene, Vinyl Toluene Terpolymers
*Sulfonated Styrene-Maleic Anhydride Resins
*Unsaturated Polyester Resins
*Vinyl Toluene Resins
*Vinyl Toluene-Acrylate Resins
*Vinyl Toluene-Butadiene Resins
*Vinyl Toluene-Methacrylate Resins
*Vinylacetate-N-Butylacrylate Copolymers

§ 414.41 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (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 (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

Effluent characteristics	BPT Effluent Limitations [1]	
	Maximum for any one day	Maximum for monthly average
BOD5	64	24
TSS	130	40
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.

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

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

(a) The Agency has determined that for existing point sources whose total OCPSF production defined by § 414.11 is less than or equal to five (5) million pounds of OCPSF products per year, the BPT level of treatment is the best available technology economically achievable. Accordingly, the Agency is not promulgating more stringent BAT limitations for these point sources.

(b) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.91 of this part.

(c) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.101 of this part.

§ 414.44 New source performance standards (NSPS).

(a) Any new source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.91 of this part, and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

(b) Any new source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.101 of this part, and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

Effluent characteristics	NSPS [1]	
	Maximum for any one day	Maximum for monthly average
BOD5	64	24
TSS	130	40
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.

§ 414.45 Pretreatment standards for existing sources (PSES).

(a) Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

(b) In the case of lead, zinc, and total cyanide the discharge quantity (mass) shall be determined by multiplying the concentrations listed in the following table for the metal pollutants times the flow from metal-bearing waste streams for metals and times the flow from the cyanide-bearing waste streams for total cyanide. The metal-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional process wastewater streams identified by the control authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and that

(2) The combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Effluent characteristics	Pretreatment standards [1]	
	Maximum for any one day	Maximum for monthly average
Acenaphthene	47	19
Benzene	134	57
Carbon Tetrachloride	380	142
Chlorobenzene	380	142
1,2,4-Trichlorobenzene	794	196
Hexachlorobenzene	794	196
1,2-Dichloroethane	574	180
1,1,1-Trichloroethane	59	22
Hexachloroethane	794	196
1,1-Dichloroethane	59	22
1,1,2-Trichloroethane	127	32
Chloroethane	295	110
Chloroform	325	111
1,2-Dichlorobenzene	794	196
1,3-Dichlorobenzene	380	142
1,4-Dichlorobenzene	380	142
1,1-Dichloroethylene	60	22
1,2-trans-Dichloroethylene	66	25
1,2-Dichloropropane	794	196
1,3-Dichloropropylene	794	196
2,4-Dimethylphenol	47	19
Ethylbenzene	380	142
Fluoranthene	54	22
Methylene Chloride	170	36
Methyl Chloride	295	110
Hexachlorobutadiene	380	142
Naphthalene	47	19
Nitrobenzene	6,402	2,237
2-Nitrophenol	231	65
4-Nitrophenol	576	162
4,6-Dinitro-o-cresol	277	78
Phenol	47	19
Bis(2-ethylhexyl) phthalate	258	95
Di-n-butyl phthalate	43	20
Diethyl phthalate	113	46
Dimethyl phthalate	47	19
Anthracene	47	19
Fluorene	47	19
Phenanthrene	47	19
Pyrene	48	20
Tetrachloroethylene	164	52
Toluene	74	28
Trichloroethylene	69	26
Vinyl Chloride	172	97
Total Cyanide	1,200	420
Total Lead	690	320
Total Zinc	2,610	1,050

[1] All units are micrograms per liter.

§ 414.46 Pretreatment standards for new sources (PSNS).

(a) Except as provided in 40 CFR 403.7 any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed above in § 414.45.

(b) In the case of lead, zinc, and total cyanide the discharge quantity (mass) shall be determined by multiplying the concentrations listed above in § 414.45 for the metal pollutants times the flow from metal-bearing waste streams for metals and times the flow from the cyanide-bearing waste streams for total cyanide. The metal bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional process wastewater streams identified by the control authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and that

(2) The combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Subpart E—Thermosetting Resins

§ 414.50 Applicability; description of the thermosetting resins subcategory.

The provisions of this subpart are applicable to the process wastewater discharges resulting from the manufacture of the following SIC 28214 thermosetting resins and thermosetting resin groups. Product groups are indicated with an asterisk (*).

*Alkyd Resins
Dicyanodiamide Resin
*Epoxy Resins
*Fumaric Acid Polyesters
*Furan Resins
Glyoxal-Urea Formaldehyde Textile Resin
*Ketone-Formaldehyde Resins
*Melamine Resins
*Phenolic Resins
*Polyacetal Resins
Polyacrylamide
*Polyurethane Prepolymers
*Polyurethane Resins
*Urea Formaldehyde Resins
*Urea Resins

§ 414.51 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (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 (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

Effluent characteristics	BPT effluent limitations [1]	
	Maximum for any one day	Maximum for monthly average
BOD5	163	61
TSS	216	67
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.

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

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

(a) The Agency has determined that for existing point sources whose total OCPSF production defined by § 414.11 is less than or equal to five (5) million pounds of OCPSF products per year, the BPT level of treatment is the best available technology economically achievable. Accordingly, the Agency is not promulgating more stringent BAT limitations for these point sources.

(b) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.91 of this part.

(c) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.101 of this part.

§ 414.54 New source performance standards (NSPS).

(a) Any new source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.91 of this part, and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

(b) Any new source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.101 of this part, and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

Effluent characteristics	NSPS [1]	
	Maximum for any one day	Maximum for monthly average
BOD5	163	61
TSS	216	67
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.

§ 414.55 Pretreatment standards for existing sources (PSES).

(a) Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

(b) In the case of lead, zinc, and total cyanide the discharge quantity (mass) shall be determined by multiplying the concentrations listed in the following table for the metal pollutants times the flow from metal-bearing waste streams for metals and times the flow from the cyanide-bearing waste streams for total cyanide. The metal-bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional process wastewater streams identified by the control authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and that

(2) The combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Effluent characteristics	Pretreatment standards [1]	
	Maximum for any one day	Maximum for monthly average
Acenaphthene	47	19
Benzene	134	57
Carbon Tetrachloride	380	142
Chlorobenzene	380	142
1,2,4-Trichlorobenzene	794	196
Hexachlorobenzene	794	196
1,2-Dichloroethane	574	180
1,1,1-Trichloroethane	59	22
Hexachloroethane	794	196
1,1-Dichloroethane	59	22
1,1,2-Trichloroethane	127	32
Chloroethane	295	110
Chloroform	325	111
1,2-Dichlorobenzene	794	196
1,3-Dichlorobenzene	380	142
1,4-Dichlorobenzene	380	142
1,1-Dichloroethylene	60	22
1,2-Trans-Dichloroethylene	66	25
1,2-Dichloropropane	794	196
1,3-Dichloropropylene	794	196
2,4-Dimethylphenol	47	19
Ethylbenzene	380	142
Fluoranthene	54	22
Methylene Chloride	170	36
Methyl Chloride	295	110
Hexachlorobutadiene	380	142
Naphthalene	47	19
Nitrobenzene	6,402	2,237
2-Nitrophenol	231	65
4-Nitrophenol	576	162
4,6-Dinitro-o-cresol	277	78
Phenol	47	19
Bis(2-ethylhexyl) phthalate	258	95
Di-n-butyl phthalate	43	20
Diethyl phthalate	113	46
Dimethyl phthalate	47	19
Anthracene	47	19
Fluorene	47	19
Phenanthrene	47	19
Pyrene	48	20
Tetrachloroethylene	164	52
Toluene	74	28
Trichloroethylene	69	26
Vinyl Chloride	172	97
Total Cyanide	1,200	420
Total Lead	690	320
Total Zinc	2,610	1,050

[1] All units are micrograms per liter.

§ 414.56 Pretreatment Standards for New Sources (PSNS).

(a) Except as provided in 40 CFR 403.7 any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed above in § 414.55.

(b) In the case of lead, zinc, and total cyanide the discharge quantity (mass) shall be determined by multiplying the concentrations listed above in § 414.55 for the metal pollutants times the flow from metal-bearing waste streams for metals and times the flow from the cyanide-bearing waste streams for total cyanide. The metal-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional process wastewater streams identified by the control authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and that

(2) The combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Subpart F—Commodity Organic Chemicals

§ 414.60 Applicability; description of the commodity organic chemicals subcategory.

The provisions of this subpart are applicable to the process wastewater discharges resulting from the manufacture of the following SIC 2865 and 2869 commodity organic chemicals and commodity organic chemical groups. Product groups are indicated with an asterisk (*).

(a) Aliphatic Organic Chemicals

Acetaldehyde
Acetic Acid
Acetic Anhydride
Acetone
Acrylonitrile
Adipic Acid
*Butylenes (Butenes)
Cyclohexane
Ethanol
Ethylene
Ethylene Glycol
Ethylene Oxide
Formaldehyde
Isopropanol
Methanol
Polyoxypropylene Glycol
Propylene
Propylene Oxide
Vinyl Acetate
1,2-Dichloroethane
1,3-Butadiene

(b) Aromatic Organic Chemicals

Benzene
Cumene
Dimethyl Terephthalate
Ethylbenzene
m-Xylene (impure)
p-Xylene
Phenol
*Pitch Tar Residues
*Pyrolysis Gasolines
Styrene
Terephthalic Acid
Toluene
*Xylenes, Mixed
o-Xylene

(c). Halogenated Organic Chemicals

Vinyl Chloride

§ 414.61 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (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 (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

Effluent characteristics	BPT Effluent limitations [1]	
	Maximum for any one day	Maximum for monthly average
BOD5	80	30
TSS	149	46
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.

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

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

(a) The Agency has determined that for existing point sources whose total OCPSF production defined by § 414.11 is less than or equal to five (5) million pounds of OCPSF products per year, the BPT level of treatment is the best available technology economically achievable. Accordingly, the Agency is not promulgating more stringent BAT limitations for these point sources.

(b) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.91 of this part.

(c) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.101 of this part.

§ 414.64 New source performance standards (NSPS)

(a) Any new source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.91 of this part, and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

(b) Any new source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.101 of this part, and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

Effluent characteristics	NSPS [1]	
	Maximum for any one day	Maximum for monthly average
BOD5	80	30
TSS	149	46
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.

§ 414.65 Pretreatment standards for existing sources (PSES).

(a) Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

(b) In the case of lead, zinc, and total cyanide the discharge quantity (mass) shall be determined by multiplying the concentrations listed in the following table for the metal pollutants times the flow from metal-bearing waste streams for metals and times the flow from the cyanide-bearing waste streams for total cyanide. The metal-bearing and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional process wastewater streams identified by the control authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and that

(2) The combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Effluent characteristics	Pretreatment standards [1]	
	Maximum for any one day	Maximum for monthly average
Acenaphthene	47	19
Benzene	134	57
Carbon Tetrachloride	380	142
Chlorobenzene	380	142
1,2,4-Trichlorobenzene	794	196
Hexachlorobenzene	794	196
1,2-Dichloroethane	574	180
1,1,1-Trichloroethane	59	22
Hexachloroethane	794	196
1,1-Dichloroethane	59	22
1,1,2-Trichloroethane	127	32
Chloroethane	295	110
Chloroform	325	111
1,2-Dichlorobenzene	794	196
1,3-Dichlorobenzene	380	142
1,4-Dichlorobenzene	380	142
1,1-Dichloroethylene	60	22
1,2-trans-Dichloroethylene	66	25
1,2-Dichloropropane	794	196
1,3-Dichloropropylene	794	196
2,4-Dimethylphenol	47	19
Ethylbenzene	380	142
Fluoranthene	54	22
Methylene Chloride	170	36
Methyl Chloride	295	110
Hexachlorobutadiene	380	142
Naphthalene	47	19
Nitrobenzene	6,402	2,237
2-Nitrophenol	231	65
4-Nitrophenol	576	162
4,6-Dinitro-o-cresol	277	78
Phenol	47	19
Bis(2-ethylhexyl) phthalate	258	95
Di-n-butyl phthalate	43	20
Diethyl phthalate	113	46
Dimethyl phthalate	47	19
Anthracene	47	19
Fluorene	47	19
Phenanthrene	47	19
Pyrene	48	20
Tetrachloroethylene	164	52
Toluene	74	28
Trichloroethylene	69	26
Vinyl Chloride	172	97
Total Cyanide	1,200	420
Total Lead	690	320
Total Zinc	2,610	1,050

[1] All units are micrograms per liter.

§ 414.66 Pretreatment standards for new sources (PSNS).

(a) Except as provided in 40 CFR 403.7 any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed above in § 414.65.

(b) In the case of lead, zinc, and total cyanide, the discharge quantity (mass) shall be determined by multiplying the concentrations listed above in § 414.65 for the metal pollutants times the flow from metal-bearing waste streams for metals and times the flow from the cyanide-bearing waste streams for total cyanide. The metal-bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this Part, plus any additional process wastewater streams identified by the control authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and that

(2) The combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Subpart G—Bulk Organic Chemicals

§ 414.70 Applicability; description of the bulk organic chemicals subcategory.

The provisions of this subpart are applicable to the process wastewater discharges resulting from the manufacture of the following SIC 2865 and 2869 bulk organic chemicals and bulk organic chemical groups. Product groups are indicated with an asterisk (*).

(a) Aliphatic Organic Chemicals

*Acetic Acid Esters
*Acetic Acid Salts
Acetone Cyanohydrin
Acetylene
Acrylic Acid
*Acrylic Acid Esters
*Alkoxy Alkanols
*Alkylates
*Alpha-Olefins
Butane (all forms)
*C–4 Hydrocarbons (Unsaturated)
Calcium Stearate
Caprolactam
Carboxymethyl Cellulose
Cellulose Acetate Butyrates
*Cellulose Ethers
Citric Acid
Cumene Hydroperoxide
Cyclohexanol
Cyclohexanol, Cyclohexanone (Mixed)
Cyclohexanone
Cyclohexene
*C12–C18 Primary Alcohols
*C5 Concentrates
*C9 Concentrates
Decanol
Diacetone Alcohol
*Dicarboxylic Acids—Salts
Diethyl Ether
Diethylene Glycol
Diethylene Glycol Diethyl Ether
Diethylene Glycol Dimethyl Ether
Diethylene Glycol Monoethyl Ether
Diethylene Glycol Monomethyl Ether
*Dimer Acids
Dioxane
Ethane
Ethylene Glycol Monophenyl Ether
*Ethoxylates, Misc.
Ethylene Glycol Dimethyl Ether
Ethylene Glycol Monobutyl Ether
Ethylene Glycol Monoethyl Ether
Ethylene Glycol Monomethyl Ether
*Fatty Acids
Glycerine (Synthetic)
Glyoxal
Hexane
*Hexanes and Other C6 Hydrocarbons
Isobutanol
Isobutylene
Isobutyraldehyde
Isophorone
Isophthalic Acid
Isoprene
Isopropyl Acetate
Ligninsulfonic Acid, Calcium Salt
Maleic Anhydride
Methacrylic Acid
*Methacrylic Acid Esters
Methane
Methyl Ethyl Ketone
Methyl Methacrylate
Methyl Tert-Butyl Ether
Methylisobutyl Ketone
*n-Alkanes
n-Butyl Alcohol
n-Butylacetate
n-Butyraldehyde
n-Butyric Acid
n-Butyric Anhydride
*n-Paraffins
n-Propyl Acetate
n-Propyl Alcohol
Nitrilotriacetic Acid
Nylon Salt
Oxalic Acid
*Oxo Aldehydes—Alcohols
Pentaerythritol
Pentane
*Pentenes
*Petroleum Sulfonates
Pine Oil
Polyoxybutylene Glycol
Polyoxyethylene Glycol
Propane
Propionaldehyde
Propionic Acid
Propylene Glycol
Sec-Butyl Alcohol
Sodium Formate
Sorbitol
Stearic Acid, Calcium Salt (Wax)
Tert-Butyl Alcohol
1-Butene

1-Pentene
1,4-Butanediol
Isobutyl Acetate
2-Butene (Cis and Trans)
2-Ethyl Hexanol
2-Ethylbutyraldehyde
2,2,4-Trimethyl-1,3-Pentanediol

(b) Amine and Amide Organic Chemicals

2,4-Diaminotoluene
*Alkyl Amines
Aniline
Caprolactam, Aqueous Concentrate
Diethanolamine
Diphenylamine
*Ethanolamines
Ethylamine
Ethylenediamine
Ethylenediaminetetracetic Acid
*Fatty Amines
Hexamethylene Diamine
Isopropylamine
m-Toluidine
Melamine
Melamine Crystal
*Methylamines
Methylene Dianiline
n-Butylamine
N,N-Diethylaniline
N,N-Dimethylformamide
*Nitroanilines
Polymeric Methylene Dianiline
Sec-Butylamine
Tert-Butylamine
Toluenediamine (Mixture)
*Toluidines
o-Phenylenediamine
2,6-Dimethylaniline
4-(N-Hydroxyethylethylamino)-2-Hydroxyethyl Analine
4,4'-Methylenebis (N,N'-dimethyl)-aniline
4,4'Methylenedianiline

(c) Aromatic Organic Chemicals

Alpha-Methylstyrene
*Alkyl Benzenes
*Alkyl Phenols
*Alkylbenzene Sulfonic Acids, Salts
Aminobenzoic Acid (Meta and Para)
Aspirin
Beta-Naphthalene Sulfonic Acid
Benzenedisulfonic Acid
Benzoic Acid
Bis(2-Ethylhexyl)Phthalate
Bisphenol A
BTX-Benzene, Toluene, Xylene (Mixed)
Butyl Octyl Phthalate
Coal Tar
*Coal Tar Products (Misc.)
Creosote
*Cresols, Mixed
Cyanuric Acid
*Cyclic Aromatic Sulfonates
Dibutyl Phthalate
Diisobutyl Phthalate
Diisodecyl Phthalate
Diisooctyl Phthalate
Dimethyl Phthalate
Dinitrotoluene (Mixed)
Ditridecyl Phthalate
m-Cresol
Metanilic Acid
Methylenediphenyldiisocyanate
Naphthalene
*Naphthas, Solvent
Nitrobenzene
Nitrotoluene
Nonylphenol
p-Cresol
Phthalic Acid
Phthalic Anhydride
*Tars—Pitches
Tert-Butylphenol
*Toluene Diisocyanates (Mixture)
Trimellitic Acid
o-Cresol
1-Tetralol, 1-Tetralone Mix
2,4-Dinitrotoluene
2,6-Dinitrotoluene

(d) Halogenated Organic Chemicals

1,4-Phenylenediamine Dihydrochloride
Allyl Chloride
Benzyl Chloride
Carbon Tetrachloride
*Chlorinated Paraffins, 35–64 PCT, Chlorine
Chlorobenzene
*Chlorobenzenes (Mixed)
Chlorodifluoroethane
Chloroform
*Chloromethanes
2-Chloro-5-Methylphenol (6-chloro-m-cresol)
*Chlorophenols
Chloroprene
Cyanogen Chloride
Cyanuric Chloride
Dichloropropane
Epichlorohydrin
Ethyl Chloride
*Fluorocarbons (Freons)
Methyl Chloride
Methylene Chloride
Pentachlorophenol
Phosgene
Tetrachloroethylene
Trichloroethylene
Trichlorofluoromethane
Vinylidene Chloride
1,1-Dichloroethane
1,1,1-Trichloroethane
2,4-Dichlorophenol

(e) Other Organic Chemicals

Adiponitrile
Carbon Disulfide
Dithiophosphates, Sodium Salt
Fatty Nitriles
*Organo-Tin Compounds
*Phosphate Esters
Tetraethyl Lead
Tetramethyl Lead
*Urethane Prepolymers
*Waxes, Emulsions—Dispersions

§ 414.71 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (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 (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

Effluent characteristics	BPT Effluent limitations [1]	
	Maximum for any one day	Maximum for monthly average
BOD5	92	34
TSS	159	49
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.

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

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

(a) The Agency has determined that for existing point sources whose total OCPSF production defined by § 414.11 is less than or equal to five (5) million pounds of OCPSF products per year, the BPT level of treatment is the best available technology economically achievable. Accordingly, the Agency is not promulgating more stringent BAT limitations for these point sources.

(b) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.91 of this part.

(c) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.101 of this part.

§ 414.74 New source performance standards (NSPS)

(a) Any new source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.91 of this part,

and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

(b) Any new source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.101 of this part, and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

Effluent characteristics	NSPS [1]	
	Maximum for any one day	Maximum for monthly average
BOD5	92	34
TSS	159	49
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.

§ 414.75 Pretreatment standards for existing sources (PSES).

(a) Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

(b) In the case of lead, zinc, and total cyanide, the discharge quantity (mass) shall be determined by multiplying the concentrations listed in the following table for the metal pollutants times the flow from metal-bearing waste streams for metals and times the flow from the cyanide-bearing waste streams for total cyanide. The metal-bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional process wastewater streams identified by the control authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and that

(2) The combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Effluent characteristics	Pretreatment standards [1]	
	Maximum for any one day	Maximum for monthly average
Acenaphthene	47	19
Benzene	134	57
Carbon Tetrachloride	380	142
Chlorobenzene	380	142
1,2,4-Trichlorobenzene	794	196
Hexachlorobenzene	794	196
1,2-Dichloroethane	574	180
1,1,1-Trichloroethane	59	22
Hexachloroethane	794	196
1,1-Dichloroethane	59	22
1,1,2-Trichloroethane	127	32
Chloroethane	295	110
Chloroform	325	111
1,2-Dichlorobenzene	794	196
1,3-Dichlorobenzene	380	142
1,4-Dichlorobenzene	380	142
1,1-Dichloroethylene	60	22
1,2-trans-Dichloroethylene	66	25
1,2-Dichloropropane	794	196
1,3-Dichloropropylene	794	196
2,4-Dimethylphenol	47	19
Ethylbenzene	380	142
Fluoranthene	54	22
Methylene Chloride	170	36
Methyl Chloride	295	110
Hexachlorobutadiene	380	142
Napthalene	47	19
Nitrobenzene	6,402	2,237
2-Nitrophenol	231	65
4-Nitrophenol	576	162
4,6-Dinitro-o-cresol	277	78
Phenol	47	19
Bis(2-ethylhexyl) phthalate	258	95
Di-n-butyl phthalate	43	20
Diethyl phthalate	113	46
Dimethyl phthalate	47	19
Anthracene	47	19
Fluorene	47	19
Phenanthrene	47	19
Pyrene	48	20
Tetrachloroethylene	164	52
Toluene	74	28
Trichloroethylene	69	26
Vinyl Chloride	172	97
Total Cyanide	1,200	420
Total Lead	690	320
Total Zinc	2,610	1,050

[1] All units are micrograms per liter.

§ 414.76 Pretreatment standards for new sources (PSNS).

(a) Except as provided in 40 CFR 403.7 any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed above in § 414.75.

(b) In the case of lead, zinc, and total cyanide the discharge quantity (mass) shall be determined by multiplying the concentrations listed above in §414.75 for the metal pollutants times the flow from metal-bearing waste streams for metals and times the flow from the cyanide-bearing waste streams for total cyanide. The metal-bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional process wastewater streams identified by the control authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and that

(2) The combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Subpart H—Specialty Organic Chemicals

§ 414.80 Applicability; description of the specialty organic chemicals subcategory.

The provisions of this subpart are applicable to the process wastewater discharges resulting from the manufacture of all SIC 2865 and 2869 organic chemicals and organic chemical groups which are not defined as commodity or bulk organic chemicals in § 414.60 and § 414.70, respectively.

§ 414.81 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (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 (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

Effluent characteristics	BPT effluent limitations [1]	
	Maximum for any one day	Maximum for monthly average
BOD5	120	45
TSS	183	57

Effluent characteristics	BPT effluent limitations [1]	
	Maximum for any one day	Maximum for monthly average
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.

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

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

(a) The Agency has determined that for existing point sources whose total OCPSF production defined by § 414.11 is less than or equal to five (5) million pounds of OCPSF products per year, the BPT level of treatment is the best available technology economically achievable. Accordingly, the Agency is not promulgating more stringent BAT limitations for these point sources.

(b) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.91 of this part.

(c) Except as provided in paragraph (a) of this section and in 40 CFR 125.30 through 125.32, any existing point source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.101 of this part.

§ 414.84 New source performance standards (NSPS).

(a) Any new source that uses end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.91 of this part, and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

(b) Any new source that does not use end-of-pipe biological treatment and is subject to this subpart must achieve discharges in accordance with § 414.101 of this part, and also must not exceed the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

Effluent characteristics	NSPS [1]	
	Maximum for any one day	Maximum for monthly average
BOD5	120	45
TSS	183	57
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.

§ 414.85 Pretreatment standards for existing sources (PSES).

(a) Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed in the following table.

(b) In the case of lead, zinc, and total cyanide the discharge quantity (mass) shall be determined by multiplying the concentrations listed in the following table for the metal pollutants times the flow from metal-bearing waste streams for metals and times the flow from the cyanide-bearing waste streams for total cyanide. The metal-bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this Part, plus any additional process wastewater streams identified by the control authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and that

(2) The combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Effluent characteristics	Pretreatment standards [1]	
	Maximum for any one day	Maximum for monthly average
Acenaphthene	47	19
Benzene	134	57
Carbon Tetrachloride	380	142
Chlorobenzene	380	142
1,2,4-Trichlorobenzene	794	196
Hexachlorobenzene	794	196
1,2-Dichloroethane	574	180
1,1,1-Trichloroethane	59	22
Hexachloroethane	794	196
1,1-Dichloroethane	59	22
1,1,2-Trichloroethane	127	32
Chloroethane	295	110
Chloroform	325	111
1,2-Dichlorobenzene	794	196
1,3-Dichlorobenzene	380	142
1,4-Dichlorobenzene	380	142
1,1-Dichloroethylene	60	22
1,2-trans-Dichloroethylene	66	25
1,2-Dichloropropane	794	196
1,3-Dichloropropylene	794	196
2,4-Dimethylphenol	47	19
Ethylbenzene	380	142
Fluoranthene	54	22
Methylene Chloride	170	36
Methyl Chloride	295	110
Hexachlorobutadiene	380	142
Naphthalene	47	19
Nitrobenzene	6,402	2,237
2-Nitrophenol	231	65
4-Nitrophenol	576	162
4,6-Dinitro-o-cresol	277	78
Phenol	47	19
Bis(2-ethylhexyl) phthalate	258	95
Di-n-butyl phthalate	43	20
Diethyl phthalate	113	46
Dimethyl phthalate	47	19
Anthracene	47	19
Fluorene	47	19
Phenanthrene	47	19
Pyrene	48	20
Tetrachloroethylene	164	52
Toluene	74	28
Trichloroethylene	69	26
Vinyl Chloride	172	97
Total Cyanide	1,200	420
Total Lead	690	320
Total Zinc	2,610	1,050

[1] All units are micrograms per liter.

§ 414.86 Pretreatment standards for new sources (PSNS).

(a) Except as provided in 40 CFR 403.7 any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentration listed above in § 414.85.

(b) In the case of lead, zinc, and total cyanide, the discharge quantity (mass) shall be determined by multiplying the

concentrations listed above in § 414.85 for the metal pollutants times the flow from metal-bearing waste streams for metals and times the flow from cyanide-bearing waste streams for total cyanide. The metal-bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional process wastewater streams identified by the control authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and that

(2) The combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Subpart I—Direct Discharge Point Sources That Use End-of-Pipe Biological Treatment

§ 414.90 Applicability; description of the subcategory of direct discharge point sources that use end-of-pipe biological treatment.

The provisions of this subpart are applicable to the process wastewater discharges resulting from the manufacture of the OCPSF products and product groups defined by § 414.11 from any point source that uses end-of-pipe biological treatment or installs end-of-pipe biological treatment to comply with BPT effluent limitations.

§ 414.91 Toxic pollutant effluent limitations and standards for direct discharge point sources that use end-of-pipe biological treatment.

(a) Any point source subject to this subpart must achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

(b) In the case of chromium, copper, lead, nickel, zinc, and total cyanide, the discharge quantity (mass) shall be determined by multiplying the concentrations listed in the following table for these pollutants times the flow from metal-bearing waste streams for the metals and times the flow from cyanide-bearing waste streams for total cyanide. Metal-bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional process wastewater streams identified by the permitting authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and that

(2) The combination of such streams, prior to treatment, with the Appendix A waste streams will result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Effluent characteristics	Effluent limitations BAT and NSPS [1]	
	Maximum for any one day	Maximum for monthly average
Acenaphthene	59	22
Acrylonitrile	242	96
Benzene	136	37
Carbon Tetrachloride	38	18
Chlorobenzene	28	15
1,2,4-Trichlorobenzene	140	68
Hexachlorobenzene	28	15
1,2-Dichloroethane	211	68
1,1,1-Trichloroethane	54	21
Hexachloroethane	54	21
1,2-Dichloroethane	59	22
1,1,1-Trichloroethane	54	21
Chloroethane	268	104
Chloroform	46	21
2-Chlorophenol	98	31
1,2-Dichlorobenzene	163	77
1,3-Dichlorobenzene	44	31
1,4-Dichlorobenzene	28	15
1,1-Dichloroethylene	25	16
1,2-trans-Dichloroethylene	54	21
2,4-Dichlorophenol	112	39
1,2-Dichloropropane	230	153
1,3-Dichloropropylene	44	29
2,4-Dimethylphenol	36	18
2,4-Dinitrotoluene	285	113
2,6-Dinitrotoluene	641	255
Ethylbenzene	108	32
Fluoranthene	68	25
Bis(2-Chloroisopropyl) ether	757	301
Methylene Chloride	89	40
Methyl Chloride	190	86
Hexachlorobutadiene	49	20
Naphthalene	59	22
Nitrobenzene	68	27
2-Nitrophenol	69	41
4-Nitrophenol	124	72
2,4-Dinitrophenol	123	71
4,6-Dinitro-o-cresol	277	78
Phenol	26	15
Bis(2-ethylhexyl) phthalate	279	103
Di-n-butyl phthalate	57	27
Diethyl phthalate	203	81
Dimethyl phthalate	47	19
Benzo(a)anthracene	59	22
Benzo(a)pyrene	61	23
3,4-Benzofluoranthene	61	23
Benzo(k)fluoranthene	59	22
Chrysene	59	22
Acenaphthylene	59	22
Anthracene	59	22
Fluorene	59	22
Phenanthrene	59	22
Pyrene	67	25
Tetrachloroethylene	56	22
Toluene	80	26
Trichloroethylene	54	21
Vinyl Chloride	268	104
Total Chromium	2,770	1,110
Total Copper	3,380	1,450
Total Cyanide	1,200	420
Total Lead	690	320
Total Nickel	3,980	1,690
Total Zinc [2]	2,610	1,050

[1] All units are micrograms per liter.

[2] Total Zinc for Rayon Fiber Manufacture that uses the viscose process and Acrylic Fiber Manufacture that uses the zinc chloride/solvent process is 6,796 μg/l and 3,325 μg/l for maximum for any one day and maximum for monthly average, respectively.

Subpart J—Direct Discharge Point Sources That Do Not Use End-of-Pipe Biological Treatment

§ 414.100 Applicability; description of the subcategory of direct discharge point sources that do not use end-of-pipe biological treatment.

The provisions of this subpart are applicable to the process wastewater discharges resulting from the manufacture of the OCPSF products and product groups defined by § 414.11 from any point source that does not use end-of-pipe biological treatment and does not install end-of-pipe biological treatment to comply with BPT effluent limitations.

§ 414.101 Toxic pollutant effluent limitations and standards for direct discharge point sources that do not use end-of-pipe biological treatment.

(a) Any point source subject to this subpart must achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart times the concentrations in the following table.

(b) In the case of chromium, copper, lead, nickel, zinc, and total cyanide, the discharge quantity (mass) shall be determined by multiplying the concentrations listed in the following table for these pollutants times the flow

from metal-bearing waste streams for the metals and times the cyanide-bearing waste streams for total cyanide. Metal-bearing waste streams and cyanide-bearing waste streams are defined as those waste streams listed in Appendix A of this part, plus any additional process wastewater streams identified by the permitting authority on a case-by-case basis as metal or cyanide bearing based upon a determination—

(1) That such streams contain significant amounts of the pollutants identified above and

(2) That the combination of such streams, prior to treatment, with the Appendix A waste streams would result in substantial reduction of these pollutants.

This determination must be based upon a review of relevant engineering, production, and sampling and analysis information.

Effluent characteristics	BAT effluent limitations and NSPS [1]	
	Maximum for any one day	Maximum for monthly average
Acenaphthene	47	19
Acrylonitrile	232	84
Benzene	134	57
Carbon Tetrachloride	380	142
Chlorobenzene	380	142
1,2,4-Trichlorobenzene	794	196
Hexachlorobenzene	794	196
1,2-Dichloroethane	574	180
1,1,1-Trichloroethane	59	22
Hexachloroethane	794	196
1,1-Dichloroethane	59	22
1,1,2-Trichloroethane	127	32
Chloroethane	295	110
Chloroform	325	111
1,2-Dichlorobenzene	794	196
1,3-Dichlorobenzene	380	142
1,4-Dichlorobenzene	380	142
1,1-Dichloroethylene	60	22
1,2-trans-Dichloroethylene	66	25
1,2-Dichloropropane	794	196
1,3-Dichloropropylene	794	196
2,4-Dimethylphenol	47	19
Ethylbenzene	380	142
Fluoranthene	54	22
Bis(2-chloroisopropyl)ether	794	196
Methylene Chloride	170	36
Methyl Chloride	295	110
Hexachlorobutadiene	380	142
Naphthalene	47	19
Nitrobenzene	6,402	2,237
2-Nitrophenol	231	65
4-Nitrophenol	576	162
2,4-Dinitrophenol	4,291	1,207
4,6-Dinitro-o-cresol	277	78
Phenol	47	19
Bis(2-ethylhexyl)phthalate	258	95
Di-n-butyl phthalate	43	20
Diethyl phthalate	113	46
Dimethyl phthalate	47	19
Benzo(a)anthracene	47	19
Benzo(a)pyrene	48	20
3,4-Benzofluoranthene	48	20
Benzo(k)fluoranthene	47	19
Chrysene	47	19
Acenaphthylene	47	19
Anthracene	47	19
Fluorene	47	19
Phenanthrene	47	19
Pyrene	48	20
Tetrachloroethylene	164	52
Toluene	74	28
Trichloroethylene	69	26
Vinyl Chloride	172	97
Total Chromium	2,770	1,110
Total Copper	3,380	1,450
Total Cyanide	1,200	420
Total Lead	690	320
Total Nickel	3,980	1,690
Total Zinc [2]	2,610	1,050

[1] All units are micrograms per liter.

[2] Total Zinc for Rayon Fiber Manufacture that uses the viscose process and Acrylic Fibers Manufacture that uses the zinc chloride/solvent process is 6,796 μg/l and 3,325 μg/l for maximum for any one day and maximum for monthly average, respectively.

Appendix A to Part 414—Non-Complexed Metal-Bearing Waste Streams and Cyanide-Bearing Waste Streams

Chromium

Methylhydroabietate/Esterification of hydroabietic acid (rosin) with methanol
Acrylic acid/Oxidation of propylene via acrolein
N-butyl alcohol/Hydrogenation of n-Butyraldehyde, Oxo process
Cyclohexanone/From phenol via cyclohexanol by hydrogenation-dehydrogenation
Fatty amines/Hydrogenation of fatty nitriles (batch)
Helioptropin/Oxidation of isosafrole, chromium catalyst
Isobutanol/Hydrogenation of isobutyraldehyde, Oxo process
Cyclohexyl Mercaptan/Cyclohexanol + Hydrogen sulfide
Ethyl Mercaptan/Ethanol + Hydrogen sulfide
Methanol/H.P. Synthesis from natural gas via synthetic gas
Oxo Alcohols, C7–C11/Carbonation & hydrogenation of C6–C10 Olefins
Polyoxypropylene diamine/Polypropylene glycol + Ammonia
n-Propyl alcohol/Hydrogenation of propionaldehyde, Oxo process
SAN resin/Suspension polymerization
Styrene/Dehydrogenation of ethylbenzene
Styrene/Dehydration of methyl benzyl alcohol (coproduct of propylene oxide)
1-Tetralol, 1-Tetralone mix/Oxidation of tetralin (1,2,3,4-Tetrahydronaphthalene)
3,3,3-Trifluoropropene/Catalyzed hydrogen fluoride exchange with chlorinated propane
Vinyl toluene/Dehydrogenation (thermal) of ethyltoluene

Copper

Methylhydroabietate/Esterification of hydroabietic acid (rosin) with methanol
Acetaldehyde/Oxidation of ethylene with cupric chloride catalyst
Acetic acid/Catalytic oxidation of butane
Acetone/Dehydrogenation of isopropanol
Acrylamide/Catalytic hydration of acrylonitrile
Acrylic acid/Oxidation of propylene via acrolein
Acrylonitrile/Propylene ammoxidation
Adipic acid/Oxidation of cyclohexanol-cyclohexanone mixture
Adipic acid/Oxidation of cyclohexane via cyclohexanol-cyclohexanone mixture
Allynitrile/Allychloride + sodium cyanide
Aniline/Hydrogenation of nitrobenzene
Benzofurans, 2,3-Dihydro-2,2-dimethyl-7-benzofuranol/ from o-Nitrophenol + Methallyl chloride
n-Butyl alcohol/Hydrogenation of n-Butyraldehyde, Oxo process
1,4-Butanediol/Hydrogenation of 1,4-butynediol
Butryolactone/Dehydrogenation of 1,4-butanediol
Caprolactam/From cyclohexane via cyclohexanone and its oxime
Lilian (hydroxydihydrocitronellal)/Hydration and oxidation of citronellol
1,2-Dichloroethane/Oxyhydrochlorination of ethylene
Dialkyldithiocarbamates, metal salts/Dialkylamines + carbon disulfide
2-Ethylhexanol/from n-Butyraldehyde by Aldo condensation and hydrogenation
Fatty amines/Hydrogenation of fatty nitriles (batch)
Geraniol/B-Myrcene + Hydrogen chloride, esterification of geranyl chloride, hydrolysis of geranyl acetate
Furfuryl alcohol/Hydrogenation of furfural
Geranial (Citral)/Oxidation of geraniol (copper catalyst)
Glyoxal/Oxidation of ethylene glycol
Isobutanol/Hydrogenation of isobutyraldehyde, Oxo process
Isopropanol/Catalytic hydrogenation of acetone
2-Mercaptobenzothiazoles, copper salt/2-Mercaptobenzothiazole + copper salt
Methanol/High pressure synthesis from natural gas via synthetic gas
Methanol/Low pressure synthesis from natural gas via synthetic gas
Methyl ethyl ketone/Dehydrogenation of sec-Butanol
Oxo alcohols, C7–C11/Carbonation & hydrogenation of C6–C10 olefins
Phenol/Liquid phase oxidation of benzoic acid

Polyoxyalkylene amines/Polyoxyalkylene glycol + ammonia
Polyphenylene oxide/Solution polymerization of 2,6-xylenol by oxidative coupling (cuprous salt catalyst)
Polyoxypropylene diamine/Polypropylene glycol + Ammonia
Quinaldine (dye intermediate)/Skraup reaction of aniline + crotonaldehyde
Silicones, silicone fluids/Hydrolysis and condensation of chlorosilanes
Silicones, silicone rubbers/Hydrolysis and condensation of chlorosilanes
Silicones, silicone specialties (grease, dispersion agents, defoamers & other products)
Silicones: Silicone resins/Hydrolysis & condensation of methyl, phenyl & vinyl chlorosilanes
Silicones: Silicone fluids/Hydrolysis of chlorosilanes to acyclic & cyclic organosiloxanes
Styrene/Dehydration of a-Methylbenzyl alcohol (coproduct of propylene oxide)
Tetrachloroethylene (perchloroethylene)/Oxyhydrochlorination of tetrachloroethane
Tris(anilino)s-triazine/Cyanuric chloride + aniline + cogeners
Trichloroethylene/Oxyhydrochlorination of tetrachloroethane
Unsaturated polyester resin/Reaction of maleic anhydride + phthalic anhydride + propylene glycol polyester with styrene or methyl methacrylate

Lead

Alkyd resin/Condensation polymerization
Alkyd resins/Condensation polymerization of phthalic anhydride + glycerin + vegetable oil esters
Anti-knock fuel additive/Blending purchased tetraethyl lead & tetramethyl lead additives
Dialkydithiocarbamates, metal salts/Dialkylamines + carbon disulfide
Thiuram (dimethyldithiocarbamate) hexasulfide/Dimethyldithiocarbamate + sulfur
Triphenylmethane dyes (methyl violet)/Condensation of Formaldehyde + N-Methylaniline + N,N-dimethylaniline, oxidation of reaction product
4,4'-Bis-(N,N-dimethylaniline) carbinol, Michler's hydrol/Oxidation of 4,4'-Methylene-bis(N,N-dimethylaniline) with lead oxide
Naphthenic acid salts
Stearic acid, metal salts/Neutralization with a metallic base
Tetraethyl lead/Alkyl halide + sodium-lead alloy
Tetramethyl lead/Alkyl halide + sodium-lead alloy

Nickel

Acetates, 7,11-Hexadecadien-1-ol (gossyplure)/Coupling reactions, low pressure hydrogenation, esterification
Acetates, 9-dodecen-1-ol (pheromone)/Coupling reactions, low pressure hydrogenation, esterification
Acrylic acid/oxidation of propylene via acrolein
Acrylonitrile/Propylene ammoxidation
n-Alkanes/Hydrogenation of C6-C22 alpha olefins (ethylene oligomers)
Adiponitrile/Direct cyanation of butadiene
Alkyl amines/Amination of alcohols
4-Aminoacetanilide/Hydrogenation of 4-Nitroacetanilide
BTX/Hydrogenation of olefins (cyclohexenes)
Terphenyls, hydrogenated/Nickel catalyst, hydrogenation of terphenyl
Bisphenol-A, hydrogenated (Biscyclohexanol-A)/Hydrogenation of Bisphenol-A
Butadiene (1,3)/Extractive distillation of C-4 pyrolyzates
n-Butanol/Hydrogenation of n-Butyraldehyde, Oxo process
1,3-Butylene glycol/Hydrogenation of acetaldol
1,4-Butanediol/Hydrogenation of 1,4-butynediol
Butylenes (mixed)/Distillation pf C4 pyrolyzates
4-Chloro-2-aminophenol/Hydrogenation of 4-Chloro-2-nitrophenol
Lilial (hydroxydihydrocitronellal)/Hydration and oxidation of citronellol
Cycloparaffins/Catalytic hydrogenation of aromatics in kerosene solvent
Cyclohexanol/Hydrogenation of phenol, distillation
Cyclohexanone/From phenol via cyclohexanol by hydrogenation-dehydrogenation
Dialkyldithiocarbamates, metal salts/Dialkylamines + carbon disulfide
Ethylamine/Reductive amination of ethanol
Ethylamines (mono, di, tri)/Reductive ammination (ammonia + hydrogen) of ethanol
Isoeugenol, high % trans/Separation of mixed cis & trans isoeugenols
2-Ethylhexanol/from n-Butyraldehyde by Aldol condensation and hydrogenation
Fatty acids, hydrogenated/tallow & coco acids + Hydrogen
Fatty amines/Hydrogenation of fatty nitriles (batch)
Fatty amines/Hydrogenation of tallow & coco nitriles
Glyoxal-urea formaldehyde textile resin/condensation to N-bis(hydroxymethyl) ureas & N,N'-(dihydroxyethyl) ureas
11-hexadecenal/Coupling rxns, low pressure hydrogenation
Hexahydrophthalic anhydride/Condensation of butadiene & maleic anhydride (Diels-Alder reaction) + hydrogenation
Isobutanol/Hydrogenation of isobutyraldehyde, Oxo process
Diisobutyl amine/Ammonolysis of isobutanol
Isopropyl amines (mono, di)/Reductive ammination (Ammonia + Hydrogen) of isopropanol
Linalool/Pyrolysis of 2-Pinanol
Methanol/High pressure synthesis from natural gas via synthetic gas
Methanol/Low pressure sythesis fron natural gas via synthetic gas
Methanol/Butane oxidation
Tris-(hydroxymethyl) methyl amine/Hydrogenation of tris(hydroxymethyl) nitromethane
N-Methyl morpholine/Morpholine + Methanol
N-Ethyl morpholine/Morpholine + Ethanol
2-Methyl-7,8-epoxy octadecane/Coupling reactions, low pressure hydrogenation, epoxidation
Alpha-Olefins/Ethylene oligomer, & Zeigler Cat.
Petroleum hydrocarbon resins, hydrogenated/Hydrogenation of petroleum hydrocarbon resin products
Pinane/Hydrogenation of A-Pinene
2-Pinanol/Reduction of pinane hydroperoxide
Bis-(p-Octylphenol) sulfide, Nickel salt/p-Octylphenol + sulfur chloride (S2C12), neutralize with Nickel base
Piperazine/Reductive amination of ethanol amine (ammonia & hydrogenation, metal catalyst)
N,N-Dimethylpiperazine/Condensation piperazine + formaldehyde, hydrogenation
Polyoxylalkylene amines/Polyoxyalkylene glycol + Ammonia
Polyoxypropylene diamine/Polypropylene glycol + Ammonia
2-Amino-2-methyl-1-propanol/Hydrogenation of 2-Nitro 2-methyl-1-propanol
3-Methoxypropyl amine/Reductive amination of acrylamide with methanol & hydrogen
N-Propylamine/Reductive ammination (ammonia + hydrogen) of n-propanol
Sorbitol/Hydrogenation of sugars
Sulfolane/Condensation butadiene + sulfur dioxide, Hydrogenation
Thionocarbamates, N-Ethyl-o-isopropyl/Isopropyl xanthate + Ethylamine
Toluene diamine (mixture)/Catalytic hydrogenation of dinitrotoluene
Methylated urea-formaldehyde resins (textile)/Methylation of urea-formaldehyde adduct
Methylated urea-formaldehyde glyoxol (textile resin)/Reaction of methylated urea-formaldehyde + glyoxal

Zinc

Methylhydroabietate, diels-alder adducts/Derivatives of abietic esters from rosin
Acrylic resins/Emulsion or solution polymerization to coatings
Acrylic resins (latex)/Emulsion polymerization of acrylonitrile with polybutadiene
Acrylic fibers (85% polyacrylonitrile) by solution polymerization/Wet spinning
Alkyd Resins/Condensation polymerization of phthalic anhydride + glycerin + vegetable oil esters
Benzene/By-product of styrene by ethylbenzene dehydrogenation
Benzene/By-product of vinyl toluene (from ethyltoluene)
n-butyl alcohol/Hydrogenation of n-Butyraldehyde, Oxo process
Coumarin (benz-a-pyrone)/Salicylaldehyde, Oxo process
Cycloparaffins/Catalytic hydrogenation of aromatics in kerosene solvent
Dithiocarbamates, zinc salt/Reaction of zinc oxide + Sodium dithiocarbamates
Dialkyldithiocarbamates, metal salts/Diakylamines + Carbon disulfide
Dithiocarbamates, metal salts/Dithiocarbamic acid + metal oxide
Thiuram (dimethyldithiocarbamate) hexasulfide/Dimethyldithiocarbamate + sulfur
Fluorescent brighteners/Coumarin based
Ethyl acetate/Redox reaction (Tschenko) of acetaldehyde
Ethylbenzene/Benzene alkylation in liquid phase

Ethylbenzyl chloride/Chloromethylation (Hydrogen chloride + formaldehyde, zinc chloride) of ethylbenzene
2-Ethyl hexanol/Aldol condensation-hydrogenation of n-Butyraldehyde
Glyoxal-urea formaldehyde textile resin/Condensation to N-bis (hydroxymethyl) ureas + N,N'-(Dihydroxyethyl) ureas
Isobutanol/Hydrogenation of isobutyraldehyde, Oxo process
Isopropanol/Catalytic hydrogenation of acetone
Methallylidene diacetate/Condensation of 2-Methypropenal + acetic anhydride
Methanol/Low pressure sythesis from natural gas via synthetic gas
Methyl chloride/Hydrochlorination of methanol
Methylethyl ketone/Dehydrogenation of sec-Butanol
Naphthenic acid salts
Nylon
Nylon 6 & 66 copolymers/Polycondensation of Nylon salt + Caprolatam
Nylon 6 fiber/Extrusion (melt spinning)
Oxo alcohols, C12-C15/Hydroformylation & hydrogenation of C11-C14 olefins
Phenolic urethan resins/Phenol + excess formaldehyde + Methylene aniline diisocyanate
Polystyrene (crystal) modified/Polystyrene + sulfonation, chloromethylation and/or amination
Rayon/Viscose process
SAN resin/Emulsion polymerization
Silicones: Silicone rubbers/Hydrolysis and condensation of chlorosilanes
Silicones: Silicone specialties (grease, dispersion agents, defoamers & other products)
Silicones: Silicone resins/Hydrolysis & condensation of methyl, phenyl & vinyl chlorosilanes
Silicones: Silicone fluids/Hydrolysis of chlorosilanes to acyclic & cyclic organosiloxanes
Stearic acid, metal salts/Neutralization with a metallic base
Styrene/Dehydrogenation of ethylbenzene
Styrene-butadiene resin/Emulsion polymerization
Vinyl acetate/Reduction of acetylene + acetic acid
Vinyl toluene/Dehydrogenation (thermal) of ethyltoluene
Xylenes, mixed/By-product vinyl toluene (from ethyltoluene)

Cyanide

Acetone cyanohydrin/Acetone + Hydrogen cyanide
Acetonitrile/By-product of acrylonitrile from propylene by ammoxidation
Acrylic resins/Solution polymerization
Acrylic fiber (85% acrylonitrile)/Suspension polymerization, and wet spinning
Acrylic fiber (85% acrylonitrile)/Solution polymerization, and wet spinning
Acrylonitrile/Ammoxidation of propylene
Adiponitrile/Butadiene + Hydrogen cyanide (direct cyanation)
Allylnitrile/Allyl chloride + Sodium cyanide
Dimethoxybenzaldehyde/Hydroquinone dimethyl ether + Hydrogen cyanide, hydrolysis
Benzyl cyanide/Benzyl chloride + Sodium cyanide
Coal tar products/Distillation of coal tar condensate
Cyanoacetic acid/Chloracetic acid + sodium cyanide
Cyanuric chloride/Catalyzed trimerization of cyanogen chloride
Vat dyes, Indigo paste as Vat Blue 1/Sodamide + potassium N-Phenylglycine, fused with caustic/N-phenylglycine + Aniline + Formaldehyde + Sodium bisulfite, sodium cyanide, hydrolysis with potassium hydroxide
Disperse dyes, Azo and Vat
Ethylenediamine tetraacetic acid/Ethylenediamine + Formaldehyde + Sodium cyanide
Diethylenetriamine pentaacetic acid/Diethylenetriamine + Formaldehyde + Sodium cyanide
N,N'-bis(o-Acetamidophenol)ethylenediamine, ferric complex/ Salicyladehyde + Ethylenediamine + Hydrogen cyanide, hydrolysis to amide
Diethylenetriamine pentaacetic acid, pentasodium salt/Diethylenetriamine pentaacetic acide + caustic
Ethylenediamine tetraacetic acid, metal salts/Ethylenediamine tetraacetic acid + metal bases
Hydroxyethyl ethylenediamine triacetic acid, trisodium salt/ Ethylenediamine + Ethylene oxide + Formaldehyde + Sodium cyanide, hydrolysis
Hexamethylene diisocyanate/Hexamethylene diamine (1,6-Diaminohexane) + phosgene
5,5-Dimethyl hyantoin/Acetone + ammonia + carbon dioxide + hydrogen cyanide
Hydrogen cyanide/By-product of acrylonitrile by ammoxidation of propylene
Iminodiacetic acid/Hexamethylene tetraamine + Hydrogen cyanide, hydrolysis of iminoacetonitrile salt
Methionine/Acrolein + Methyl mercaptan, with hydrogen cyanide and ammonium carbonate
Methylene Diphenylisocyanate (MDI)/Phosgenation of methylene dianiline from Aniline + Formaldehyde
Nitrilotriacetic acid/Hexamethylene tetraamine + Hydrogen cyanide, hydrolysis of nitrilotriacetonitrile salt
Picolines, mixed/Condensation of acetaldehyde + formaldehyde + ammonia
Organic pigments, Azo/Diazotization of aniline cogener, coupling to B-Napthol
Polyurethane resins/Diisocyanate + Polyoxyalkylene glycol
Polyurethane fibers (Spandex)/Polyoxyalkylene glycol + Tolylene diisocyanate + dialkylamine
Pyrimidines, 2-Isopropyl-4-methoxy-/Isobutyronitrile + methanol, ammonia and methylacetoacetate (ring closure)
Pyridine (synthetic)/Condensation of acetaldehyde + ammonia + formaldehyde
Cyanopyridine/Ammoxidation of picoline
Sarcosine (N-Methyl glycine), sodium salt/Hexamethylene tetraamine + Sodium cyanide, hydrolysis
Thiophene acetic acid/Chloromethylation (Hydrogen chloride + Formaldehyde) + Sodium cyanide, hydrolysis
Tolylene diisocyanate (isomeric mixture)/Tolylene diamines + Phosgene
Tris(anilino)S-triazine/Cyanuric chloride + Aniline and its cogeners
Triethylorthoformate/Ethanol + Hydrogen cyanide
Trimethylorthoformate/Methanol + Hydrogen cyanide

Appendix B to Part 414—Complexed Metal-Bearing Waste Streams

Chromium

Azo dye intermediates/Substituted diazonium salts + coupling compounds
Vat dyes/Mixing purchased dyestuffs (Anthraquinones, polycyclic Quinones and Indigoids)
Acid dyes
Azo dyes, metallized/Azo dye + metal acetate
Acid dyes, Azo (including metallized)
Organic pigments, miscellaneous lakes and toners

Copper

Disperse dyes
Vat dyes/Mixing purchased dyestuffs (Anthraquinones, polycyclic Quinones and Indigoids)
Acid dyes
Direct dyes
Vat dyes
Sulfur dyes
Disperse dye coupler/N-substitution of 2-Amino-4-acetamidoanisole
Azo dyes, metallized/Azo dye + metal acetate
Direct dyes, Azo
Disperse dyes, Azo and Vat
Organic pigment Green 7/Copper phthalocyanine
Organic pigments
Organic pigments/Phthalocyanine pigments
Organic pigments/Copper phthalocyanine (Blue Crude)
Organic pigments, miscellaneous lakes and toners

Lead

Organic pigments, Quinacridines
Organic pigments, Thioindigoids

Nickel

Azo dyes, metallized/Azo dye + metal acetate

Zinc

Organic pigments/Azo pigments by diazotization and coupling

PART 416—[REMOVED]

2. 40 CFR is amended by removing Part 416.

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