ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 455

[FRL-4674-3]

RIN 2040-AB32

Pesticide Chemicals Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This final regulation limits the discharge of pollutants into navigable waters of the United States and into publicly owned treatment works by existing and new facilities that manufacture organic pesticide active ingredients. At a later date, EPA intends to propose effluent limitations guidelines and standards for facilities which formulate, package, and/or repackage pesticide active ingredients into final products. This regulation establishes effluent limitations guidelines under the Clean Water Act based on "best practicable control technology (BPT)", "best conventional pollutant control technology (BCT)", "best available technology (BAT)", new source performance standards (NSPS) based on "best available demonstrated technology", and pretreatment standards for new and existing indirect dischargers (PSNS and PSES, respectively). EPA is also promulgating new test procedures for the analysis of pesticide pollutants in the Pesticide Chemicals Category. In developing these regulations, EPA has fully considered pollution prevention practices that are available in the pesticides manufacturing industry, and the Agency has based these regulations on such practices to the extent possible.

DATES: This regulation shall become effective October 28, 1993. The compliance date for PSES is as soon as possible, but no later than September 28, 1996. The compliance dates for NSPS and PSNS are the dates the new sources begin operation. Deadlines for compliance with BPT, BCT and BAT are established in National Pollutant Discharge Elimination System (NPDES) permits.

ADDRESSES: For additional technical information contact Dr. Thomas E. Fielding, Office of Water, Engineering and Analysis Division (WH-552), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460, telephone (202) 260-7156. For additional information on the economic impact analyses, contact Dr. Lynne G. Tudor at the above address or by calling (202) 260-5834.

The complete record (excluding confidential business information (CBI)) for this rulemaking, including EPA's responses to comments received during rulemaking, is available for review at the EPA's Water Docket, 401 M Street, SW., Washington, DC. For access to Docket materials, call (202) 260-3027 between 9 a.m. and 3:30 p.m. for an appointment. The EPA public information regulation (40 CFR part 2) provides that a reasonable fee may be charged for copying.

The Technical Development Document and Economic Impact Analysis supporting today's final rule may be obtained by writing to the EPA Office of Water Resource Center (RC-4100), 401 M Street SW., Washington, DC 20460, or calling (202) 260-7786. The Compendium of Analytical Methods supporting today's final rule may be obtained by writing to EPA Sample Control Center, 300 N. Lee Street, Alexandria, VA 22314.

FOR FURTHER INFORMATION CONTACT: Dr. Thomas E. Fielding at (202) 260-7156.

SUPPLEMENTARY INFORMATION:

Overview

This preamble describes the scope, purpose, legal authority and background of this rule, the technical and economic bases and the methodology used by the Agency to develop these effluent limitations guidelines and standards.

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

I. Legal Authority

This final regulation establishes effluent guidelines and standards of performance for the Pesticide Chemicals Point Source Category under the authorities of sections 301, 304, 306, 307, and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1251 et seq., as amended by the Clean Water Act of 1977, Pub. L. 95–217, and the Water Quality Act of 1987, Pub. L. 100–4), also referred to as "the Act."

In accordance with 40 CFR part 23, this regulation shall be considered promulgated for purposes of judicial review at 1 p.m. Eastern time on October 12, 1993. Under section 509(b)(1) of the 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 promulgated for purposes of judicial review. Under section 509(b)(2) of the Act, the requirements in this regulation may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

II. Background

A. 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 is to issue effluent limitations guidelines, pretreatment standards and new source performance standards for industrial dischargers.

These guidelines and standards 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 pollutants.

In establishing BPT effluent limitations guidelines, EPA considers the total cost of achieving effluent reductions 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, non-water quality environmental impacts (including energy requirements) and other factors as the EPA Administrator deems appropriate (section 304(b)(1)(B)). The Agency considers the category- or subcategory-wide cost of applying the technology in relation to the effluent reduction benefits. Where existing performance is uniformly inadequate, BPT may be transferred from a different subcategory or category.

2. Best Available Technology Economically Achievable (BAT)

In general, BAT effluent limitations represent the best existing economically achievable performance of plants in the industrial subcategory or category. The Act establishes BAT as the principal national means of controlling the direct discharge of toxic pollutants and nonconventional pollutants to navigable waters. The factors considered in assessing BAT include the age of equipment and facilities involved, the process employed, potential process changes, and non-water quality environmental impacts (including energy requirements), (section 304(b)(2)(B)). The Agency retains considerable discretion in assigning the weight to be accorded these factors. As with BPT, where existing performance is uniformly inadequate, BAT may be transferred from a different subcategory or category. BAT may include process changes or internal controls, even when these technologies are not common industry practice.

3. Best Conventional Pollutant Control Technology (BCT)

The 1977 Amendments added section 301(b)(2)(E) to the Act establishing BCT for discharges of conventional pollutants from existing industrial point sources. Section 304(a)(4) designated the following as conventional pollutants: Biochemical oxygen demand (BOD), total suspended solids (TSS), fecal coliform, pH, and any additional pollutants defined by the Administrator as conventional. The Administrator designated oil and grease as an additional conventional pollutant on July 30, 1979 (44 FR 44501).

BCT is not an additional limitation, but replaces BAT for the control of conventional pollutants. In addition to other factors specified in section 304(b)(4)(B), the Act requires that BCT limitations be established in light of a

two-part "cost-reasonableness" test. (*American Paper Institute* v. *EPA*, 660 F.2d 954 (4th Cir. 1981)). EPA's current methodology for the general development of BCT limitations was issued in 1986 (51 FR 24974, July 9, 1986).

4. New Source Performance Standards (NSPS)

NSPS are based on the best available demonstrated control technology (section 306 of the Act). 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 the best available demonstrated control technology for all pollutants (i.e., conventional, nonconventional, and priority pollutants). In establishing NSPS, EPA is directed to take into consideration the cost of achieving the effluent reduction and any non-water quality environmental impacts and energy requirements.

5. Pretreatment Standards for Existing Sources (PSES)

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), (section 307(b) of the Act). The 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 nationwide average percent 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 the implementation of 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 discharges of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs (section 307(b) of the Act). PSNS are to be issued at the same time as NSPS. New indirect dischargers, like the new direct dischargers, have the opportunity to incorporate into their plants the best available demonstrated technologies. The Agency considers the same factors in promulgating PSNS as it considers in promulgating NSPS.

B. Section 304(m) Requirements and Litigation

Section 304(m) of the Act (33 U.S.C. 1314(m)), added by the Water Quality Act of 1987, requires EPA to establish schedules for (i) reviewing and revising existing effluent limitations guidelines and standards ("effluent guidelines"), and (ii) promulgating new effluent guidelines. On January 2, 1990, EPA published an Effluent Guidelines Plan (55 FR 80), in which schedules were established for developing new and revised effluent guidelines for several industry categories. One of the industries for which the Agency established a schedule was the Pesticide Chemicals category.

The Natural Resources Defense Council, Inc. (NRDC) and Public Citizen, Inc., challenged the Effluent Guidelines Plan in a suit filed in U.S. District Court for the District of Columbia (*NRDC et al.* v. *Reilly*, Civ. No. 89–2980). The plaintiffs argued that EPA's plan did not meet the requirements of section 304(m). A Consent Decree in this litigation was entered by the Court on January 31, 1992. The terms of the Consent Decree are reflected in the 304(m) Effluent Guidelines Plan published on September 8, 1992 (57 FR 41000). This plan requires, among other things, that the Administrator sign final effluent guidelines for the manufacturing subcategories of the Pesticide Chemicals category by July 31, 1993. Shortly before July 31, 1993, EPA requested the Court to allow a limited extension to this deadline.

III. Development of Final Pesticide Chemicals Manufacturing Guidelines

A. Efforts Leading to the Proposed Regulation (Earlier Regulatory Efforts and Litigation)

EPA promulgated BPT for the Pesticides Chemicals Manufacturing Category on April 25, 1978 (43 FR 17776; 40 CFR part 455), and September 29, 1978 (43 FR 44846; 40 CFR part 455, subpart A). The BPT effluent limitations guidelines established limitations for chemical oxygen demand (COD), 5-day biochemical oxygen demand (BOD), total suspended solids (TSS), and pH for wastewater discharged by the organic pesticide active ingredient (PAI) manufacturing subcategory (subcategory A), except that discharges of these pollutants resulting from the manufacture of 25 organic PAIs and classes of PAIs were specifically excluded from the limitations. In addition, the BPT guidelines set a limitation for this subcategory on total pesticide discharge which was applicable to the manufacture of 49 specifically listed organic PAIs. BPT limitations requiring zero discharge of process wastewater pollutants were also set for subpart B, Metallo-Organic Pesticide Chemicals Manufacturing Subcategory, applicable to the manufacture of metallo-organic PAIs containing arsenic, mercury, cadmium, or copper.

Several industry members challenged the BPT regulation on April 26, 1978 and the U.S. Court of Appeals remanded them on two minor issues (*BASF Wyandotte Corp.* v. *Costle*, 596 F.2d 637 (1st Cir. 1979), *cert. denied*, *Eli Lilly* v. *Costle*, 444 U.S. 1096 (1980)). The Agency subsequently addressed the two issues on remand and the Court upheld the regulations in their entirety (*BASF Wyandotte Corp.* v. *Costle*, 614 F.2d 21 (1st Cir. 1980)).

On November 30, 1982, EPA proposed additional regulations to control the discharge of wastewater pollutants from pesticide chemical operations to navigable waters and to POTWs (47 FR 53994). The proposed regulations included effluent limitations guidelines based upon BPT, BAT, NSPS, PSES, and PSNS. The proposed effluent limitations guidelines and standards covered the organic pesticide and metallo-organic pesticide chemicals manufacturing subcategories and the formulating/packaging subcategory (subpart C) of the pesticide chemicals industry. In addition, the Agency proposed guidelines for test procedures to analyze the nonconventional pesticide active ingredient (PAI) pollutants covered by these regulations on February 10, 1983 (48 FR 8250).

Based on the new information collected by EPA in response to the comments on the November 30, 1982 proposal, on June 13, 1984, EPA published a Notice of Availability (NOA) of new information (49 FR 24492). In this NOA, the Agency indicated it was considering changing its approach to developing regulations

for this industry. EPA requested comments on the new data and revised approach. EPA published a second NOA of new information on January 24, 1985, which primarily made available for public review technical and economic data which had previously been claimed confidential by industry.

EPA issued a final rule on October 4, 1985 that limited the discharge of pollutants into navigable waters and into POTWs (50 FR 40672). The regulation included effluent limitations guidelines and standards for the BAT, NSPS, PSES, and PSNS levels of control for new and existing facilities that were engaged in the manufacture and/or formulation and packaging of pesticides. The regulation also established analytical methods for 61 PAIs for which the Agency had not previously promulgated approved test procedures.

Several parties filed petitions in the Court of Appeals challenging various aspects of the pesticide regulation (*Chemical Specialties Manufacturers Association, et al.*, v. *EPA* (11th Cir., No. 86–8024)). After a review of the database supporting the regulation the Agency found flaws in the basis for these effluent limitations guidelines and standards. Subsequently, the Agency and the parties filed a joint motion for a voluntary remand of the regulation in the Eleventh Circuit Court of Appeals. The Court dismissed the case on July 25, 1986, in response to the Joint Motion. Upon consideration of the parties' motion to modify the dismissal, on August 29, 1986, the Court modified its order to clarify the terms of the dismissal. The Eleventh Circuit Court of Appeals ordered that: (1) The effluent limitations guidelines and standards for the pesticide chemicals industry be remanded to EPA for reconsideration and further rulemaking; and (2) EPA publish a **Federal Register** notice removing the remanded pesticide regulation from the Code of Federal Regulations.

EPA formally withdrew the regulations from the Code of Federal Regulations on December 15, 1986 (51 FR 44911). Although no errors were found in the analytical methods promulgated October 4, 1985, these methods were also withdrawn to allow for further testing and possible revision. The BPT limitations that were published on April 25, 1978 and September 29, 1978 were not affected by the withdrawal notice and remained in effect. On April 10, 1992 (57 FR 12560), EPA proposed effluent limitations guidelines and standards of performance as part of this rulemaking.

B. *Scope of the 1992 Proposed Rule*

The April 10, 1992 proposed regulations covered the two manufacturing subcategories of the pesticide chemicals industry:

- Subcategory A: Manufacturers of organic pesticide chemicals; and
- Subcategory B: Manufacturers of metallo-organic pesticide chemicals.

EPA will address the Pesticide Chemicals Formulating and Packaging subcategory (Subcategory C) at a later date. Under the Consent Decree in *NRDC et al.* v. *Reilly* referred to above, the Administrator is to sign final effluent guidelines covering this industry by the end of August 1995.

In the 1992 proposal, EPA proposed expanded water pollution control requirements for the organic pesticide chemicals manufacturing subcategory by establishing effluent limitations guidelines and standards for BAT, NSPS, PSES, and PSNS for new and existing facilities that are engaged in the manufacture of organic pesticide chemicals. In addition, BCT for conventional pollutants was proposed equal to BPT for the organic pesticide chemicals manufacturing subcategory.

For the metallo-organic pesticide chemicals manufacturing subcategory, current BPT limitations require no discharge of process wastewater pollutants. EPA proposed reserving the BCT, BAT, NSPS, PSES, and PSNS effluent limitations for this subcategory.

EPA proposed that the effluent limitations guidelines and standards would be applicable to discharges generated during the manufacture of PAIs from chemical reactions. (For one PAI, the effluent guidelines applied only to discharges of wastewater generated during the purification of that PAI to a higher quality PAI product.) The proposed regulations did not apply to the production of pesticide products through the physical mixing, blending, or dilution of PAIs without an intended chemical reaction (except where dilution is a necessary step following chemical reaction to stabilize the product), nor did the proposed regulations apply to packaging or repackaging of pesticide products. These two types of operations are part of the Pesticide Chemicals Formulating and Packaging Subcategory which will be covered under the separate rulemaking referred to previously. The proposed regulations also did not apply to the manufacture of "intermediate" chemicals, which are not pesticides but which subsequently are converted by further chemical reactions to pesticide active ingredients. The "intermediates" are generally covered by other regulations, such as the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) effluent guidelines and standards (40 CFR part 414) when the intermediate is an organic chemical, or the Inorganic Chemicals effluent guidelines and standards (40 CFR part 415) when the intermediate is an inorganic chemical.

The BPT regulations promulgated in 1978, which limit discharges from the manufacture of certain specified PAIs, are not being changed. However, EPA proposed extending the applicability of the existing Subcategory A limitations to discharges from the manufacture of 15 organic PAIs and organo-tin PAIs, which were previously excluded or omitted from coverage by the organic pesticides chemicals manufacturing subcategories. Information collected and developed on direct dischargers indicated that all manufacturers of these 15 organic PAIs and organo-tin PAIs were already subject to permit limitations equal to or more stringent than the BPT Subcategory A limitations; the limitations in these permits were developed on a "best professional judgment" basis, using the existing BPT limitations as guidance.

EPA proposed BCT limits for conventional pollutants (pH, BOD and TSS) equal to BPT limits for subcategory A.

EPA proposed BAT limitations for subcategory A PAIs based on the use of the following treatment technologies: hydrolysis, activated carbon, chemical oxidation, resin adsorption, solvent extraction, biological treatment, distillation, and/or incineration to control the discharge of PAIs in wastewater. EPA also based the proposed BAT limitations on pollution prevention, including in-process recycling (recirculation), and out-of-process recycle/reuse where possible. For some PAIs, compliance with the proposed BAT limitations would likely require implementation of pollution prevention practices and/or improvements to treatment technologies currently in place at facilities by enhancing the operations, such as increasing retention time for hydrolysis or carbon adsorption treatment. BAT effluent limitations for all but one of the priority pollutants were proposed based on the use of model control technologies identified in the OCPSF effluent guidelines. For total cyanide, long-term data from a previous study of the pesticide chemical industry were used.

EPA proposed NSPS limitations for subcategory A PAIs based on BAT limitations for the PAIs, but modified NSPS limitations for certain PAIs to reflect a wastewater flow reduction of

28 percent to account for the ability of new processes or newly constructed facilities to utilize less water or to reuse water generated in the chemical reactions. The NSPS proposed for priority pollutants were set equal to the BAT limitations for subcategory A priority pollutants, with 28 percent less flow to be applied in setting the mass limits for the site.

EPA proposed PSES for subcategory A equal to BAT limitations for PAIs. As with BAT, proposed PSES for the priority pollutants were primarily based on a direct transfer of the OCPSF pretreatment standards.

For PSNS for subcategory A, the following were proposed: (1) The same PAIs were proposed to be subject to regulation under PSNS for this subcategory as were proposed for NSPS; and (2) the same priority pollutants regulated by PSNS under the OCPSF guidelines were proposed for regulation. PSNS limitations were proposed for PAIs in subcategory A as equal to NSPS limitations. For the priority pollutants, PSNS limitations were proposed as equal to the PSES limitations; however, the 28 percent flow reduction would be applied by municipal authorities when calculating the facility-specific mass limits.

C. Post-Proposal Notice of Data Availability

On April 14, 1993, EPA published a Notice of Data Availability (NOA) (58 FR 19392), making available for public comment additional information received since the time of the proposal and placing in the public record information previously, but no longer, claimed as confidential business information (CBI).

The new information consisted largely of additional long-term treatment system performance data for control of discharges of certain PAIs. This new data provided information on treatment system performance over a wider variety of conditions than was previously available. In addition, performance data were also submitted for new treatment systems to be used as a basis for limitations instead of transferring technology information from pilot studies or full-scale treatment of similar PAIs. Data were also submitted on analytical methods where the commenter believed the methods in use differed from the proposed method.

The NOA also solicited comment on certain information excluded from public review at the time of proposal based on claims of CBI by the submitter of this information. Based upon subsequent review of these claims, some submitters withdrew their CBI claims, allowing for public review of the information. The information that was previously, but no longer, claimed as CBI included questionnaire responses from eleven facilities; reports (visits, sampling, health and safety plans, analytical results and correspondence) for six of the eleven facilities visited and/or sampled; long-term treatment system performance data for five of the eleven facilities; and information on EPA's development of limitations based on this data, along with the analysis of the cost impacts on these eleven facilities.

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

The data base used to develop the limitations in this final rule was developed using information from facilities in the pesticide chemicals manufacturing industry, and in the case of the priority pollutant limitations, from the OCPSF industry database. The OCPSF data base contains many of the same priority pollutants that are present in wastewaters from pesticide chemicals manufacturing (many manufacturers of pesticide chemicals are located at facilities that also manufacture OCPSF products). The pesticide chemicals manufacturing industry was described in the preamble to the proposed rule (57 FR 12560). An updated overview describing the industry is contained in Section 5 of the Technical Development Document supporting today's rule. Since proposal, there have been two major changes in the industry that are relevant to this rulemaking. First, EPA's latest information is that there has been a decrease in the number of plants that manufacture pesticides from 90 to 75 due to plant closures. Second, a number of plants have installed additional or improved wastewater treatment facilities since the time of EPA's data collection for this rulemaking. See subsection (e) below, describing the data EPA has received concerning these new treatment facilities. Also as explained below, EPA has incorporated these new data into the development of the limitations in today's final rule where possible.

1. Technical Data

The technical data gathering efforts for this rulemaking involved several activities which are summarized briefly in this section and in the Technical Development Document for today's rule.

In general, EPA's data gathering efforts were conducted by three principal means: (1) Review of existing information pertaining to the pesticide chemicals manufacturing industry and receipt of additional information from plants through a questionnaire of the industry and through the plant's submittal of data during and after the comment period for the proposed rule; (2) implementation of a wastewater sampling and analysis program; and (3) implementation of bench-scale treatability studies. These are described further below.

a. PAIs or Classes of PAIs Considered for Regulation. For the Pesticide Chemicals Manufacturing Category, there are 270 PAIs or classes of PAIs that EPA considered for regulation. The initial basis for this list was the 284 PAIs and classes of PAIs presented in an Appendix to the October 4, 1985 regulation (50 FR 40672) which were originally selected in 1977 on the basis of significant production and/or commercial use.

EPA then expanded this list to 835 PAIs by adding the following groups of PAIs:

- All salts and esters of listed organic acids (such as 2,4-D);
- All metallo-organic PAIs (consisting of an organic portion bonded to arsenic, cadmium, copper, or mercury);
- All organo-tin PAIs;
- All PAIs that appeared to be structurally similar to other listed PAIs (such as organo-phosphorus pesticides); and
- Any other PAIs with an analytical method previously demonstrated to be applicable to wastewater.

The list of 835 PAIs did not include those PAIs already subject to regulation under other effluent guidelines—specifically, those regulated by the OCPSF Category (40 CFR part 414), the Inorganic Chemicals Category (40 CFR part 415), and the Pharmaceutical Manufacturing Category (40 CFR part 439). Information provided to EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)(7 U.S.C. 136 et seq.) indicated that 335 of the 835 PAIs were produced for domestic use in 1984–1985, and the remainder (500 PAIs) were not produced for domestic use in either 1984 or 1985. An additional 15 (of the 835) were added to the 335 PAIs because those 15 PAIs had been manufactured prior to 1984 and might still be manufactured for use or export. The list of 350 PAIs and derivatives, such as salts and esters, was then consolidated by putting salts and esters of a PAI into a PAI class, to arrive at a total of 272 PAIs and classes of PAIs. Because the consolidated classes include all elements of the class, such as all salts and esters of 2,4-D (i.e., not just those manufactured for use in 1986), the 272 PAIs and classes of PAIs actually include 606 of the 835 specific

PAIs. The list of 272 PAIs and classes of PAIs considered for regulation was shown in table 1 of the proposed rulemaking. The list of PAIs considered in this final rule consists of 269 PAIs and classes of PAIs. The reduction in PAIs from 272 to 269 results first, from the deletion of biphenyl from coverage for the reasons discussed in section V below. In addition, two other PAIs (ortho- and para-dichlorobenzene) have been deleted. These two compounds are currently regulated by the OCPSF rule (40 CFR part 414) and were included in table 1 from the proposal with the notation that they were being deleted.

In the final rule, table 1 shows the 260 Subcategory A (organic) PAIs and classes of PAIs and does not list the nine Subcategory B (metallo-organic) PAIs and classes of PAIs, because there are no further regulations for Subcategory B PAIs in this rulemaking.

b. Census Questionnaire. Under the authority of section 308 of the Clean Water Act, EPA sent a questionnaire in 1988 to 247 facilities that the Agency had identified as possible manufacturers of PAIs. These 247 facilities included all 120 facilities included in the database for the remanded regulation. The Agency received responses from all 247 facilities indicating that 90 facilities manufactured pesticides in 1986 and the other 157 facilities did not manufacture PAIs. The questionnaire specifically requested information on: (1) The PAI manufacturing processes used; (2) the quantity, treatment, and disposal of wastewater generated during PAI manufacturing; (3) analytical monitoring data available for PAI manufacturing wastewater; (4) information on treatability studies performed by or for facilities; (5) the degree of co-treatment (treatment of pesticide manufacturing wastewater with wastewater from other industrial manufacturing operations at the facility); and (6) the extent of wastewater recycling and/or reuse at the facility.

Information was also obtained through follow-up telephone calls and written requests for clarification of questionnaire responses. EPA also requested that pesticide manufacturing facilities submit wastewater monitoring data in the form of individual data points rather than monthly aggregates. These wastewater monitoring data included information on raw pollutant loadings from individual process streams as well as pollutant loadings following wastewater treatment. Industry-supplied data from 32 facilities covering 91 PAIs were evaluated for use in determining treatment system performance. Information obtained by the questionnaire, entitled "Pesticide Manufacturing Facility Census for 1986" ("Facility Census") is summarized in the Development Document for today's rule.

c. Sampling and Analytical Programs. Between 1988 and 1991, EPA visited 32 of the 90 manufacturing facilities. During each visit, EPA gathered production process information and waste and wastewater generation, treatment and disposal information. Based on these data and the responses to the facility census, EPA conducted wastewater sampling at 20 of the 32 facilities in order to characterize process discharges and treatment system performance. In addition, EPA collected wastewater for bench-scale treatability studies at seven of the 32 facilities. Four of these seven were among the 20 facilities sampled in order to characterize process discharges and treatment system performance. Therefore, overall, EPA collected wastewater samples at 23 of the 32 facilities visited. The other nine facilities visited were not sampled: two plants do not discharge wastewater (they recycle/reuse their wastewater), two plants had no wastewater treatment, three plants had pesticide manufacturing process wastewater so intimately commingled with wastewater from other manufacturing processes that sampling for characterization was not possible, one plant disposed of wastewater by deep well injection, and the ninth plant was not in production during possible sampling times. (The ninth plant did provide long-term self-monitoring data, however.)

During the sampling activities, raw wastewater from the manufacture of 38 different PAIs were characterized. Samples were also collected to assist in the evaluation of the performance of 62 specific treatment unit operations. Through the treatability studies, EPA analyzed the efficacy of activated carbon adsorption, membrane filtration, hydrolysis and alkaline chlorination for control of 76 PAIs. More detailed studies using actual manufacturing process wastewater to develop additional treatment performance data for activated carbon adsorption, hydrolysis, and alkaline chlorination technologies were subsequently conducted. These more detailed studies involved 13 specific PAIs included in today's final rule.

EPA initially selected facilities for sampling based on data which indicated that: (1) The wastewater treatment system was effective in removing PAIs, and (2) the PAIs manufactured appeared to be representative of one or more PAI structural categories, such as organo-phosphate PAIs. Wastewaters containing PAIs in 21 structural groups were sampled.

Because treatability data were lacking for some PAIs, individual PAIs that were expected to be treatable with a specific technology were targeted for treatability studies. EPA collected samples of actual pesticide manufacturing process wastewater at plants manufacturing those PAIs. Following sample collection, the samples were transferred to an EPA contractor for bench scale testing. The data from these tests were then used to develop treatment costs for these PAIs when it was demonstrated that the technology was effective at PAI removal.

d. Bench-Scale Treatability Studies. EPA conducted a number of bench-scale studies to evaluate the treatability of PAIs by various wastewater treatment technologies, including: hydrolysis, membrane filtration, chemical oxidation, and activated carbon adsorption. Treatability studies were conducted on both clean water to which PAIs were added ("synthetic wastewaters") and on actual pesticide process wastewater.

The hydrolysis, membrane filtration, and carbon isotherm treatability studies used synthetic wastewaters. General factors in EPA's selection of specific PAIs for use in the synthetic wastewaters were the availability of an analytical method for the specific PAI and the ready availability of the PAI in a pure form from either government or commercial sources.

The hydrolysis studies were conducted in some cases to confirm the results of literature hydrolysis data for certain PAIs in order to assess the appropriateness of the bench scale testing. In other cases studies were conducted to obtain hydrolysis data not available in the literature. All of the PAIs selected were expected to hydrolyze under some conditions.

In the hydrolysis treatability study, EPA conducted a series of bench-scale tests to determine the hydrolysis rates of selected PAIs. Thirty-eight (38) PAIs were selected for testing and separated into four synthetic test solutions. The hydrolysis treatability study was conducted under six conditions using a matrix of three pH levels (2, 7, and 12) and two different temperatures (20 °C and 60 °C).

The carbon isotherm studies used PAIs selected from various structural groups to determine which groups would be most amenable to activated carbon technology. Manufacturers of PAIs in a few of those groups were known to use activated carbon technology to treat the wastewater and

treatability data from those manufacturers was available; in this case, the purpose of the carbon isotherm studies was to establish benchmarks for determining the potential efficacy of activated carbon technology to other structural groups. Another factor in selecting the PAIs for these studies was the ability to measure the PAI following the testing. For example, too rapid a hydrolysis rate could destroy the PAI before chemical analyses of the samples are complete following activated carbon testing, thus giving an erroneously high removal value. The results of the isotherm tests were evaluated using the Freundlich isotherm equation.

The membrane filtration studies used PAIs selected to span the molecular weight range of the 269 PAIs and classes of PAIs under consideration for regulation, because the effectiveness of membrane filtration tends to vary with molecular weight. In the membrane filtration treatability studies, EPA conducted a series of bench-scale tests to identify specific PAIs which could be separated from water by various membrane materials. Synthetic test solutions containing 19 PAIs were tested on seven different types of membranes. The membranes were manufactured from three types of materials (cellulose acetate, thin-film composite, and Aramid) and were of various pore sizes, with nominal molecular weight cut-offs ranging from 150 to 500.

The treatability studies using actual pesticide manufacturing process wastewater were conducted to supplement full-scale treatment system performance data, to fill in gaps in performance data where no treatability data were available for the PAI, and to help assess performance of existing full scale treatment systems where the performance of those systems appeared to be inadequate compared to performance of other facilities treating the same or similar PAIs. The PAIs selected for study were the PAIs in production at the plants during the treatability study.

In one series of tests EPA also conducted activated carbon treatability studies to determine adsorption properties of selected PAIs. These studies included carbon adsorption isotherm tests and accelerated column tests which are used in estimating full scale carbon system designs and cost.

One series of chemical oxidation treatability studies was conducted to determine the applicability of alkaline chlorination as a method of treating pesticide manufacturing process wastewaters. In these bench-scale tests, manufacturing wastewaters from six PAI manufacturing processes were tested at chlorine dosages equal to 50, 100, and 125 percent of the chlorine demand for the specific wastewater at pH 12, and ambient temperatures. Contact times of 0.5, 1.5, and 4.0 hours were examined.

Because alkaline chlorination of wastewater containing organic matter may generate volatile organic toxic pollutants, which must subsequently be controlled, EPA also conducted chemical oxidation treatability studies for five of those same six PAIs using ozone rather than chlorine. The preliminary results of those studies indicate that ozone can achieve about the same degree of PAI reduction as chlorine. Chemical oxidation with ozone is usually more expensive than chemical oxidation with chlorine. However, ozone oxidation does not produce volatile toxic pollutants. When the cost of controlling those volatile toxic pollutants is added to the cost of alkaline chlorination, the total cost for chlorination may exceed the cost of ozone oxidation.

e. Data Submitted After Proposal. EPA received comments on the April, 1992 proposed regulations from 34 interested parties. A number of the commenters submitted new information to EPA, including the following:

1. Additional long-term treatment system performance data for control of discharges of PAIs. These new data provide information on treatment system performance over a wider variety of conditions than was previously available.

2. Long-term treatment system performance data for new treatment systems to control discharges of PAIs. These new treatment systems were installed after the period for which EPA collected information for the proposed rulemaking; they replaced inadequate treatment or supplemented existing treatment. The new data allow more of the limitations to be based on demonstrated performance of full-scale treatment systems instead of treatment system performance data transferred from other PAIs or estimates from treatability studies of the performance expected of full-scale treatment.

3. Analytical methods used by dischargers to monitor PAIs in discharges, where the commenter believed the proposed EPA methods were different from those currently in use.

4. Additional information identifying specific pollution prevention practices and "out-of-process" recycle/reuse.

f. Data Transfer from the OCPSF Rulemaking For Priority Pollutants. The Clean Water Act of 1977 stressed the control of toxic pollutants, including 65 toxic pollutants and classes of pollutants. From this list of 65, EPA has derived a subset of 126 individual "priority" pollutants on which the Agency has focused (see, e.g., list of 126 priority pollutants at 40 CFR part 423, appendix A). EPA has determined that 28 of the 126 priority pollutants may be present in pesticides manufacturers wastewaters. EPA is today promulgating direct discharge limitations for these 28 priority pollutants and pretreatment standards for all but four of these 28 pollutants, as described below. For 23 of these 28 priority pollutants, EPA is relying on the OCPSF technical database to promulgate limitations. Limitations for one priority pollutant, cyanide, are based on long-term data collected from the pesticide industry. The other four priority pollutants are volatile organic compounds, but these were not regulated under the OCPSF guidelines and there are no treatment performance data for these four specific pollutants. EPA developed limitations for these four priority pollutants by transferring limitations from other structurally similar priority pollutants based on OCPSF technology (steam stripping). This is the same procedure that was used in developing OCPSF limitations (40 CFR part 414) when performance data were lacking for certain volatile priority pollutants.

Limitations were developed under the OCPSF rulemaking for 23 priority pollutants that were also detected in pesticide manufacturers' wastewaters during the EPA sampling and industry self-monitoring. Forty-six (46) of the 75 pesticide chemicals manufacturing facilities (55 of 90 at proposal) also manufacture compounds regulated under the OCPSF category. Based on these factors, EPA is transferring technical data from the OCPSF category and effluent limitations for priority pollutants based on that data to the pesticide chemicals manufacturing category as supporting data for the limitations for the priority pollutants in this regulation.

The 23 priority pollutants for which EPA is relying on the OCPSF database to set BAT and NSPS limitations for the pesticide chemicals manufacturing category are presented in Appendix B to this preamble. The OCPSF limitations for volatile priority pollutants were based on data from plants that exhibited efficient volatile pollutant reduction using either in-plant steam stripping technologies alone or in-plant steam stripping followed by biological treatment. OCPSF limitations were also based on activated carbon or in-plant biological treatment for some semi-volatile organic priority pollutants. The

OCPSF guideline established limitations for lead based on performance data obtained from EPA's study of the metal finishing industry.

EPA is also transferring PSES and PSNS standards and data supporting those standards from the OCPSF category for the same 23 priority pollutants. EPA is relying on analyses conducted in support of the OCPSF regulations to determine pass-through for these pollutants. The original analysis (for the November 5, 1987 final rule) demonstrated that 21 of the 23 priority pollutants passed through a POTW. Based on this determination of pass-through, the pesticide chemicals manufacturers proposal included PSES and PSNS for these 21 pollutants.

However, on December 1, 1992, based on scientific and engineering judgment in conjunction with biological treatment performance data, EPA proposed to determine that phenol and 2,4-dimethylphenol (two of the 21 priority pollutants originally determined to pass through POTWs) do not pass through POTWs. In that notice, EPA also proposed to apply that same procedure to the pesticide chemicals manufacturing category. After review of comments on that notice, EPA promulgated its determination that phenol and 2,4-dimethylphenol do not pass through POTWs (58 FR 36872, July 9, 1993). Therefore, in today's rule, EPA is promulgating PSES and PSNS for 19 of the 23 priority pollutants, and is not promulgating PSES and PSNS for phenol and 2,4-dimethylphenol.

The priority pollutants for which EPA is relying on the OCPSF database to set limitations for PSES and PSNS for the pesticide chemicals manufacturing category can be found in Appendix B of the preamble to today's rule.

Only technical data used to develop limitations are being transferred from the OCPSF rulemaking for these 23 priority pollutants. The economic analysis evaluating whether attainment of these limitations is economically achievable by pesticides manufacturers has been performed independently as part of today's rule. This analysis used the estimated costs for compliance determined for the pesticides manufacturing facilities as part of this rule. As in the OCPSF rule, the costs related to the use of steam stripping do not include credit for the financial benefits of recovering and reusing the volatile organics separated from the wastestream. Steam stripping technology can function as a pollution prevention technology by allowing for the in-process recycling of the volatile organic compounds stripped from the waste. It can also function as a recycle/reuse technology when out-of-process recycle/reuse occurs. Because the use of the recovered organic compounds can be very site-specific, and the costs associated with treating these stripped compounds (by incineration) are affordable by the industry, the cost basis includes the incineration of these organic compounds and does not contain a credit for any recovery or reuse.

EPA is also promulgating BAT, NSPS, PSES and PSNS limitations for four brominated priority pollutants that appear in pesticides manufacturers' wastewaters but which are not regulated under the OCPSF guidelines. The limitations were developed based on steam stripping, using the same procedure followed in developing the OCPSF regulations for volatile pollutants where treatment performance data were unavailable (as described below).

In the OCPSF regulation, EPA established effluent limitations for 28 volatile priority pollutants based on steam stripping technology, but EPA had performance data for only 15 of those 28 priority pollutants. To develop limitations for the 13 priority pollutants with no performanee data, EPA divided the 15 priority pollutants with data into two subgroups, a high "strippability" subgroup and a medium "strippability" subgroup, based on Henry's Law Constants (a ratio of aqueous solubility, or tendency to stay in solution, to vapor pressure, or tendency to volatize). Based on each pollutant's Henry's Law Constant, the 13 priority pollutants lacking performance data were assigned to either the high or medium strippability subgroup, and the average data for each subgroup were then transferred for limitations development. (For more details, see 52 FR 42540–42541, November 5, 1987.)

This same procedure was followed for each of the four brominated volatile priority pollutants for which limitations are promulgated today.

2. Pollution Prevention and Recycling Practices

As part of the data gathering activities for this rule, information concerning pollution prevention (source reduction and in-process recycling) and out-of-process recycling practices was obtained. EPA considered this information in setting limitations for PAIs in this rulemaking. For some PAIs, the limitations reflect the current use of these practices in the manufacturing process for those PAIs; and for other PAIs the limitations reflect the transfer of the practices from facilities manufacturing the same PAI or structurally similar PAIs. For priority pollutants, waste loading reductions will result from these same pollution prevention practices as they are applied to comply with the PAI limitations. Since priority pollutants are also contained in the recycled (or recirculated) wastewaters that are controlled by the PAI limitations, the quantity of these pollutants are also reduced in the allowable discharge flow whether or not the concentration limitations are applied directly or converted to mass limits based on this flow.

The pollution prevention and recycling practices used in the pesticide chemicals manufacturing industry, and where and how often they are used, are described in more detail in section 7 of the technical Development Document for this rule and are summarized in Section XI of this preamble. The major process wastewaters being recirculated or recycled are product and equipment wash water and water formed during the chemical reactiens (water of reaction). Other streams involved in recirculation/recycle at seme facilities are process stream washes, air pollution control devices scrubber water, and separated chemical process carrier water. The more detailed description contained in section 7 of the Development Document addresses how these practices are used by:

- Discussing pollution prevention and recycling practices used in the pesticide chemicals manufacturing industry and describing how these practices were identified;
- Identifying which facilities incorporate these practices;
- Discussing how these practices are incorporated into the rule;
- Discussing how the production-based limitations for the PAIs promote the implementation of pollution prevention and recycling practices; and
- Discussing why it may not be feasible for all pesticide manufacturing plants to incorporate these practices.

Recirculation and recycle practices have been incorporated into the BAT/PSES/NSPS/PSNS limitations for 96 PAIs. A detailed description of the incorporation of pollution prevention practices is contained in Section XI of this preamble.

3. Economic Data

The principal source of data used to predict economic impacts was the questionnaire census of pesticide manufacturing facilities. The census included facilities that, in 1986, manufactured one or more of the 270 pesticide active ingredients that were considered within the scope of the

proposed regulation. The questionnaire consisted of two parts: Part A requested data (for 1986) necessary to perform the technical and treatment cost estimation analysis, including active ingredient-specific production. Part B of the questionnaire requested detailed economic and financial data, including balance sheet and income information for 1985, 1986, and 1987. Part B was also designed to obtain information on plant liquidation values and cost of capital. The technical data section of the questionnaire (part A) and the economic data section (part B) were administered at different times. This timing difference, and new information obtained by EPA, resulted in 90 pesticide manufacturing facilities completing part A of the questionnaire while 88 pesticide manufacturing facilities completed part B. In part B of the questionnaire, respondents had the option of providing or not providing active ingredient-specific unit variable cost, unit sales, production quantity, and export percentages. The questionnaire informed facilities that chose not to provide these active ingredient-specific data that EPA would assess the economic impacts for that facility based on financial averages calculated from the facility-level data that they submitted.

The database developed from the questionnaire was used to evaluate various measures of economic impacts including facility closures, product line closures, facility profitability impacts, ability of a facility to incur debt, firm-level impacts, community impacts, international trade effects, effects on new pesticide manufacturing facilities, and impacts on small businesses. In addition to using data from the section 308 questionnaire, EPA's analysis of economic impacts employed data from several secondary sources. The facility-level impact analysis used secondary price data from "Doane Marketing Research's Annual Marketing Survey" and from DPRA's "Agchemprice." The facility-level impact analysis also employed data collected by EPA pursuant to FIFRA. The FIFRA data were used to estimate prices as well as to figure the percentage of pesticides production that is outside of the scope of the regulation. In addition, the facility-level analysis used estimates of the price elasticity of demand for pesticides developed by EPA (1991) and presented in appendix C of the Economic Impact Analysis titled "Estimates of the Price Elasticity of Demand for Pesticide Clusters." The community impact analysis required population data from the "Statistical Abstract of the United States" (U.S. Department of Commerce) and employment rates obtained from the Bureau of Labor Statistics. The foreign trade analysis used import data collected under FIFRA as well as data on the U.S. trade balance from the "International Trade Statistics Yearbook" (United Nations) and the "Statistical Abstract of the United States." The firm-level analysis was developed using financial statistics from Standard and Poor's Compustat service and Robert Morris Associates' "Annual Statement" studies. Finally, the analysis of impacts on small businesses used data on firm-level employment obtained from Dun and Bradstreet's "Million Dollar Directory."

E. Costing Methodology

The costing methodology used to develop treatment costs for the treatment technology options upon which the final effluent limitations guidelines are based consisted of several steps designed to identify estimates of costs that each individual facility is expected to incur to comply with the final limitations. These steps and the costing approach are the same as those used to determine the costs for the 1992 proposal, as described in the Development Document for the proposed rule.

First, the processes of each plant were evaluated to determine the level of pollutant discharges based on current treatment (if any). These levels were then compared with the effluent concentration levels that would result in the case of each of the two regulatory options considered: Option 1 (numeric effluent concentration levels identified based on use of the best available treatment technologies plus zero discharge limitations for selected PAIs), and option 2 (no discharge of process wastewater pollutants). Then, the specific treatment technology additions or treatment technology sequence upon which the effluent concentration levels are based was selected and sized for each individual process. The cost—both purchase price (capital cost) and annual operation and maintenance cost (annual O&M cost)—was then calculated for the additional treatment based on the concentration reductions required and the volumes of wastewater to be treated. These procedures are discussed in more detail in section 8 of the Development Document, with a separate discussion of the cost of PAI treatment versus priority pollutant treatment. For PAI treatment costs, the methodology considers the design of a treatment system for each plant that requires additional treatment. For plants that have multiple PAIs requiring additional treatment, the methodology assumes the design of one or more treatment trains as required. PAI-contaminated wastewaters requiring the same type of treatment (such as activated carbon) are assumed to be commingled and put through the same system. This train is then sized based on the wastewater flow rate through the system and PAI removal efficiencies required to meet the limitations, and costs are calculated for the resulting design. The cost estimates are based on a computer-based cost model containing independent modules which represent the individual treatment processes. The model links the individual treatment units (modules) together to represent an entire wastewater treatment system. The modules represent treatment technologies in use in the pesticide chemical manufacturing industry, and are useful and credible for providing accurate costs.

This design and cost process is repeated for any other PAIs that require treatment at the facility. The total treatment costs are then summed for the facility, and individual PAI treatment costs are allocated by dividing the applicable set of treatment costs by the PAI wastewater contribution, which is based on daily average wastewater flow rates and annual production days. Finally, BAT/PSES compliance monitoring costs are calculated for each pesticide manufacturing facility that does not currently monitor for a PAI or priority pollutant. These monitoring costs will be incurred regardless of whether a plant will require additional treatment. EPA included monitoring costs for those plants not currently monitoring for which today's regulations impose additional PAI and priority pollutant limitations.

For priority pollutants, additional treatment system design specifications and costs for the removal of priority pollutants for individual pesticide manufacturing facilities were calculated using the same procedure as was used with respect to the removal of PAIs. Because the priority pollutant limitations were transferred from the regulations established for OCPSF manufacturers, the methodology assumes that plants will apply the BAT technologies identified in the OCPSF rulemaking as the bases for these limitations. In some cases, the current priority pollutant loadings for an individual facility might not exceed OCPSF limits; however, the treatment technology installed to bring the PAI levels within BAT/PSES compliance may actually increase one or more of the priority pollutant loadings to levels

exceeding OCPSF limits. One example of this is the application of alkaline chlorination (chemical oxidation to remove dithiocarbamate PAIs; this treatment may result in elevated levels of chlorinated hydrocarbon priority pollutants). In these instances, additional treatment was designed and costed to bring these priority pollutant levels into compliance with OCPSF limits. In the example above, plants costed for alkaline chlorination were also costed for steam stripping, which was designed to remove the resulting chlorinated hydrocarbons.

F. Pollutant Loadings Methodology

The pesticide chemicals manufacturing industry generates process wastewater containing a variety of pollutants. Characterization of the raw wastewater was based on EPA sampling since most pesticide chemicals manufacturing facilities did not have raw waste load data. Characterization of effluent from treatment technologies was a result of data obtained from both industry-supplied self-monitoring data and EPA sampling at pesticide chemical manufacturing facilities. Priority pollutants identified in the Facility Census as "known or likely to be present" were given estimated loadings, either based on plant monitoring data or in a few cases where monitoring data were not available, based on the solubility level of the compounds. In a few cases the presence of priority pollutants was confirmed using TRI data where questionnaire responses identified the pollutant as known to be present in the wastewater used in the process. For some facilities, the self-monitoring data were from sample points following the commingling of pesticide chemicals manufacturing wastewaters with wastewater from other operations. Requests were made for data from sampling locations prior to the commingling of these waste streams. Many of these facilities were able to provide these types of monitoring data for both raw (before treatment) and treated wastewaters.

EPA based the effluent limitations on data from plants with BAT-level treatment in place (including, where available, pollution prevention and recycle/reuse practices). It may be to the facilities' advantage to reduce or eliminate pollution at the source rather than to treat wastewater because this may reduce costs for treatment and disposal of wastes while allowing recovery and reuse of process materials. EPA could not identify additional source reduction or recycle/reuse opportunities that were not already in use at the plants visited. See section III.2 for the previous discussion of EPA's incorporation of pollution prevention practices in today's rule. The limitations require the facility to meet technology-based performance standards. Under today's rule, facilities would be encouraged to adopt pollution prevention measures as a way to comply with these performance standards if they find these measures to be effective in reducing costs of compliance.

A wide variety of pollutants are discharged in the wastewaters from the pesticide manufacturing industry. Approximately 2.7 million pounds per year of conventional pollutants (BOD and TSS) and 7.2 million pounds per year of the nonconventional pollutant COD are directly discharged by facilities manufacturing organic pesticide chemicals. Because the BOD and TSS discharged by this industry are compatible with (and treated by) POTWs, these parameters are not currently monitored by any of the indirect dischargers, including the two indirect dischargers that currently manufacture metallo-organic pesticides. Therefore, EPA could not estimate how much BOD or TSS is discharged to POTWs by these indirect dischargers. In addition, the indirect discharging facilities do not monitor for COD. Also, there are no facilities that discharge process wastewater resulting from the manufacture of Subcategory B PAIs (organo-arsenic, organo-copper, or organo-mercury PAIs) directly to receiving streams.

Approximately 204,000 pounds per year of PAIs are discharged by the organic pesticide chemicals manufacturing subcategory. The metallo-organic pesticide chemicals subcategory currently discharges about 0.3 pounds per year of priority pollutants and PAIs to POTWs. Because EPA does not have an analytical method that measures the amount of organo-copper or organo-mercury PAI present in wastewater, the wastewater is monitored by measuring the amount of total copper or total mercury in the wastewater. Because the copper or mercury is an integral and the most significant part of the PAI, EPA believes monitoring of the parent metal (copper in the case of organo-copper PAIs and mercury in the case of organo-mercury PAIs) gives a very good measure of the amount of PAI in the wastewater.

EPA sampled pesticide manufacturing process wastewater at various locations throughout the wastewater generation, treatment, and discharge path at 20 facilities to screen the wastewater for the presence of PAIs and priority pollutants and to evaluate control technology performance. In order to determine the presence of priority pollutants, EPA collected samples over each of three sampling days. A report that there was detection of a priority pollutant in at least two samples at the same location was viewed as indicating a high probability that the priority pollutant was in fact present, whereas reported detection of a priority pollutant in only one sample out of three was viewed as casting doubt on the presence of that priority pollutant.

Specifically, where priority pollutants were reported detected in only one sample at any sample site, EPA used the following procedure to evaluate the report. First, EPA examined samples collected at other sites at the same facility for reported detections of that same pollutant in pesticide manufacturing process wastewater at any of those other sites. Second, EPA examined the details of the production process to determine if the pollutant was a raw material or by-product, or a likely contaminant of the raw materials or solvents. Finally, EPA contacted knowledgeable plant personnel to determine if the pollutant was a known or likely contaminant, and to determine if the plant had also detected the pollutant during sampling, particularly during sampling conducted the same day EPA sampled and analyzed by the same or a similar analytical method. In those cases in which EPA could not confirm the presence of the priority pollutant by any of these methods, EPA concluded that the result represented a bad sample and disregarded the result. No comments were received as a result of the use of this methodology at proposal.

EPA sampling at the 20 facilities reported detection of 70 priority pollutants in wastewaters. However, in many cases, the priority pollutants were detected in only one sample at one sample site and the presence of that pollutant could not be confirmed after checking all the sources described above. EPA's conclusion in the cases where reported detections at one sample site could not be confirmed by any means is that the reported results are incorrect and the pollutant is not in fact present.

In addition to EPA sampling, 47 industry facilities in their responses to the Facility Census reported that there were 60 priority pollutants that the plants themselves detected or believed to be present in wastewaters at these plants, including 14 priority pollutants not detected by EPA during sampling. Twenty-two facilities reported that no priority pollutants would be expected in their pesticide manufacturing process

wastewater. The other 21 plants did not know whether priority pollutants were present or not.

Both EPA sampling and industry data show that many of the priority pollutants are detected in only trace amounts. At trace levels, the pollutants are not treatable by current technologies, and also are below levels likely to cause any adverse effects. Three priority pollutants (4-nitrophenol, hexachlorobutadiene, and hexachlorocyclopentadiene) were not detected in process wastewater during EPA sampling. These three priority pollutants would be expected at only a few sites (4-nitrophenol as a result of manufacturing parathion or methyl parathion; the other two pollutants from manufacturing heptachlor). EPA was unable to sample the process wastewaters from manufacturing parathion, methyl parathion or heptachlor because the plants manufacturing these products were not operating during the time available for sampling. The parathion and methyl parathion manufacturer has informed EPA that it does not intend to manufacture either of these two products in the future. The heptachlor manufacturer has also indicated that continued production of heptachlor is uncertain.

Section 5 of the Development Document for today's rule provides additional data on concentrations of priority pollutants found during EPA sampling of pesticide manufacturing process wastewaters and also provides industry-supplied data on priority pollutants found in wastewaters.

G. Subcategorization

For the proposal, EPA retained the manufacturing subcategories currently existing in the 40 CFR part 455 regulations: Subcategory (or subpart) A, Organic Pesticide Chemicals Manufacturing and Subcategory B, Metallo-organic Pesticide Chemicals Manufacturing. As described in the proposal, the definition of the subcategories was based on product type, raw materials used, and the nature of the waste generated. For this rule, organo-tin pesticides manufacturing, which technically fits the definition of a metallo-organic pesticide, was proposed to be covered under Subcategory A (organic pesticides manufacturing) and not Subcategory B (metallo-organic pesticides manufacturing). As stated in the proposal, wastewaters from organo-tin pesticides manufacturing have significantly different characteristics from those of wastewaters from the manufacture of metallo-organic pesticides containing arsenic, cadmium, copper and mercury (those covered under Subcategory B). The amounts and types of pollutants from organo-tin pesticide manufacturing are closer to the amounts and types of pollutants from the manufacture of organic pesticide chemicals.

Data and comments received since the proposal did not change the conclusions on the proposed subcategorization. Therefore, the final rule retains the subcategories as proposed.

IV. Summary of the Most Significant Changes From the Proposal

A. Coverage of BPT Regulation

EPA proposed to make the BPT limitations for pH, BOD, TSS and COD in 40 CFR part 455, subpart A applicable to 15 additional PAIs and the organo-tin PAIs that had been excluded or omitted from coverage in the original BPT rulemaking. The final rule drops BPT coverage that was proposed for one of these PAIs (biphenyl) because it is no longer manufactured as a pesticide chemical. Also, the final rule does not promulgate COD limitations for facilities that manufacture 11 of the 14 remaining PAIs because EPA concluded that the data do not support setting such limitations, as pointed out by commenters. Apart from these exceptions, the final rule extends BPT applicability in the manner that was proposed. A further description of the changes from the proposal and their bases is contained in section V below.

B. Revisions to BAT Limitations

The Agency proposed that 122 individual PAIs be regulated under BAT in the organic pesticide manufacturing subcategory. The Agency also proposed that 28 priority pollutants be regulated under BAT for the organic pesticide manufacturing subcategory. EPA proposed to reserve BAT for Subcategory B.

BAT limitations for the Subcategory A pollutants were proposed based on EPA's identification of pollution prevention and recycle/reuse practices and the following as BAT technologies: Hydrolysis, activated carbon, chemical oxidation, resin adsorption, biological treatment, solvent extraction, and/or incineration. Also, a zero discharge requirement was proposed under Option 1 for certain PAIs where zero discharge has been demonstrated to be achievable through water reuse or the lack of water use, where off-site incineration was expected to be the lowest cost treatment, where the facility did not currently discharge, and in some cases, where all the treatment effluent data was at a non-detected level for the specific PAI. In addition, the proposed regulations based effluent limitations for priority pollutants on the use of the model control technologies identified in the OCPSF rulemaking. In some cases where in-plant data demonstrated that very low concentrations of PAIs were achieved prior to combining treated pesticide process wastewaters with other process wastewaters, the proposal assumed that dilution of the pesticide process wastewater with other wastewaters would make it impossible for the discharger to demonstrate compliance at end-of-pipe. In these cases, EPA proposed to require in-plant monitoring and limitations based on PAI treatment in-plant, prior to combining PAI wastewater with other wastewaters.

The technology bases for the final BAT limitations is the same as those proposed. However, the limitations for a number of the PAIs and several of the priority pollutants have been revised. These revisions were based on the submittal of comments and new data during the comment period. The changes made to the limitations were based on supplemental data for new or improved treatment systems, new treatment data for several PAIs which had proposed limitations based on technology transfer, longer term treatment data for better assessment of variability, modifying the zero discharge requirement for PAI manufacturing processes which were not complete recycle/reuse or dry processes; and correcting the technology transfer bases for several brominated priority pollutant limitations. In addition, the lead and cyanide limitations coverage is clarified, in-plant monitoring requirements in the proposed rule have been deleted (these requirements may be imposed at the permitting stage), and as noted in the BPT discussion above, one PAI (biphenyl) has been dropped from coverage altogether in this final rule.

A description of these changes and their bases is contained in section V of today's notice.

C. Revisions to Pretreatment Standards for Existing Sources

The final PSES for PAIs are based on the final BAT limitations. Therefore, the changes to the PSES limitations for PAIs are the same as those described above for BAT. For priority pollutants, the same changes in the brominated priority pollutants described above also apply to the final PSES limitations.

To evaluate the need for PSES for the priority pollutants, EPA relied on an analysis originally done to support the OCPSF regulations. As noted in section

III of today's notice, 23 of the priority pollutants present in OCPSF wastewaters are also present in pesticides manufacturers wastewaters. At proposal, the OCPSF pass through analysis showed that 21 of those 23 priority pollutants pass through. EPA determined that the only priority pollutants of those 23 that did not pass through are 2-chlorophenol and 2,4-dichlorophenol. As described in detail in the preamble to the recent OCPSF rule (58 FR 36872), EPA has also determined that two more priority pollutants, phenol and 2,4-dimethylphenol, also do not pass through a POTW. Therefore, the final regulations establish PSES limitations for 19 of the 23 priority pollutants present in OCPSF wastewaters that are also present in pesticide manufacturers wastewaters, and do not establish PSES limitations for phenol, 2,4-dimethyl phenol, chlorophenol, or 2,4-dichlorophenol.

D. Revisions to New Source Performance Standards

In the proposal, limitations for NSPS were based on the concentration basis for BAT limitations with a flow reduction of 28 percent applied to the production-flow relationship for most of the PAIs in order to develop the production-based mass limitations. NSPS limitations for some PAIs were proposed at zero discharge (see BAT discussion), while those for three other PAIs, for which the BAT data were received from newer existing facilities, were proposed equal to BAT. The NSPS limitations promulgated today have the same flow reduction basis as proposed, and are revised from the proposal for specific PAIs only based on: (1) Those changes in BAT limitations discussed previously which are carried over to NSPS, (2) eliminating the 28 percent process flow reduction from being applied to incineration scrubber water, and (3) identification of one additional PAI for which data were received from a newer facility. A more detailed discussion of the basis for the NSPS limitations is contained in section V of today's notice.

For most PAIs, the basis for the final NSPS is not changed from the proposal. However, PAIs benfluralin, ethalfuralin, trifluralin, pendimethalin, phorate, terbufos, acephate, and captafol, have final BAT limitations based on incineration. The only discharge is the incinerator scrubber water used to clean the incinerator gases prior to emission to the atmosphere. Comments received from manufacturers correctly pointed out that a reduction in the process wastewater volume will not reduce the need for or the amount of scrubber water used to clean the incinerator gases. Therefore, in the final rule, EPA has revised NSPS to be equal to the BAT limitations for these eight PAIs.

The proposed NSPS limitations for pyrethrin I and pyrethrin II, like the proposed BAT limitations, were set at zero discharge. The final BAT limitations for those two PAIs are based on hydrolysis technology transfer, and therefore, the final NSPS limitations for those two PAIs are based on hydrolysis and a 28 percent reduction of process wastewater flow. The proposed BAT limitations for norflurazon were set at zero discharge; however, the final limitations are numeric limitations based on technology transfer from activated carbon treatment systems. The norflurazon plant did not begin operations until 1986 and is therefore a new plant, and EPA has information that this plant has already incorporated source reduction. Therefore, the final NSPS for norflurazon are set equal to the final BAT limitations.

E. Revisions to Pretreatment Standards for New Sources

In setting PSNS limitations for PAIs, EPA made the same changes from the proposal previously described for PAI limitations under BAT and NSPS, (including flow reduction). In setting PSNS limitations for priority pollutants, EPA made the same changes from the proposal previously described for priority pollutant limitations under BAT and PSES (including changes to the pass through determination).

F. Revisions to Analytical Methods

EPA listed the method numbers of the analytical methods required for monitoring the pesticide active ingredients (PAIs) in table 7 of the proposed rule (57 FR 12601). The methods referenced by number in table 7 had either been promulgated at 40 CFR part 136 or copies were obtainable from the EPA Sample Control Center or the National Technical Information Service (NTIS) at the addresses given in the proposal (57 FR 12590), and a copy of the obtainable methods was included in the docket for the proposed rule.

EPA has revised and promulgated table 7 of the proposed rule as table 7 in this final rule. The revisions are the result of changes in method numbers, comments received, and revision and development of additional methods by EPA.

At the time of proposal, EPA was in the process of separating Method 1618 into Methods 1656, 1657, and 1658 for the organo-chlorine pesticides and PCBs, organo-phosphate pesticides, and phenoxy-acid herbicides, respectively. Table 7 of the proposed rule did not contain these individual method numbers. However, the correct method numbers were listed in the Development document for the proposed rule and the index of the methods compendium titled "Methods for the Determination of Nonconventional Pesticides in Municipal and Industrial Wastewater" (EPA 821/R-92-002, April 1992) ("Compendium"), was available from the EPA Sample Control Center and included in the docket. The active ingredients affected by the change from Method 1618 to Method 1656 are propachlor, captafol, chloroneb, endrin, heptachlor, methoxychlor, pentachloronitrobenzene, toxaphene, and trifluralin. The active ingredients affected by the change from Method 1618 to Method 1657 are dichlorvos, mevinphos, stirofos, chlorpyrifos, diazinon, parathion methyl, dioxathion, ethion, ethoprop, fenthion, malathion, methamidophos, naled, fensulfothion, disulfoton, phosmet, azinphos methyl, bolstar, parathion, phorate, DEF, terbufos, and merphos. The active ingredients affected by the change from Method 1618 to Method 1658 are 2,4-D and its salts and esters, dichlorprop and its salts and esters, MCPP and its salts and esters, and dinoseb.

Some of the method numbers listed in the Compendium for certain PAIs were inadvertently omitted from table 7 of the proposal. The correct method numbers are listed in table 7 of today's final rule. The active ingredients for which Method 1656 was added are triadimefon, propanil, metribuzin, alachlor, atrazine, bromacil and its salts and esters, butachlor, chlorothalonil, DCPA, ethalfluralin, fenarimol, isopropalin, norflurazon, benfluralin, propazine, simazine, terbacil, and terbuthylazine. The active ingredients for which the respective methods were added are: Method 515.1 for DCPA and pentachlorophenol; Method 633.1 for pronamide; Method 1657 for acephate; Method 515.2 for pentachlorophenol; and Methods 507 and 622 for merphos. EPA has dropped outdated industry methods that were not to be included in table 7 of the proposed rule and were not included in the methods Compendium. Industry Method 140A for gyphosate was dropped in favor of EPA Method 547 and industry Method 131 for dazomet was dropped in favor of EPA Method 1659. Also EPA has dropped inapplicable methods for AI's for which they were inadvertently listed in table 7 of the proposed rule. EPA dropped Method 1656 for DEF and merphos, for which Method 1657

should have been listed and for which it is now listed in this final rule. EPA also dropped Method 1656 for bromoxynil in favor of Method 1661, and for fenvalerate in favor of Method 1660.

EPA has expanded the list of methods required for monitoring many of the PAIs, and has included the identification numbers of these methods in table 7. In the proposal, EPA stated that the objective in allowing multiple methods was to permit as much flexibility as possible while controlling the quality of the methods approved (57 FR 12590). The additional methods included in this final rule are EPA Methods 515.2 and 555 for determination of the phenoxy-acid herbicides, Method 548.1 for determination of endothall, and Method 553 for the determination of carbaryl, diuron, and linuron. Method 515.2 was developed with pollution prevention objectives (to reduce solvent use) in mind, and uses solid phase extraction (SPE) disks for extraction of the herbicides from water. Method 548.1 is an extensive revision of Method 548 and EPA recommends that users of Method 548 change to Method 548.1 because of the simplicity and greater reliability of Method 548.1. Method 555 is a new method for phenoxy-acid herbicides that uses high performance liquid chromatography with a diode array detector. Method 553 is a new method employing SPE and liquid chromatography followed by particle-beam/mass spectrometry. These improved and new methods are being included in this final rule as additional methods that may be used and as allowable variants of the methods proposed. The active ingredients affected by the addition of Method 515.2 are 2,4-D and its salts and esters, 2,4-DB and its salts and esters, dichlorprop and its salts and esters, acifluorfen, DCPA, dinoseb, and pentachlorophenol. The active ingredients affected by the addition of Method 555 are 2,4-D and its salts and esters, 2,4-DB and its salts and esters, MCPA and its salts and esters, MCPP and its salts and esters, dichlorprop and its salts and esters, acifluorfen, dinoseb, and pentachlorophenol.

EPA listed Method 525.1 as an allowable method for many PAIs in table 7 of the proposed rule, and as the only method for Pronamide. Method 525.1 was included in the set of methods obtainable from NTIS and included in the docket. However, many of the PAIs for which Method 525.1 was listed in table 7 of the proposal are not listed within Method 525.1 itself. The reason that these PAIs were not listed within Method 525.1 was that EPA's Environmental Monitoring Systems Laboratory in Cincinnati, Ohio (EMSL-Ci) had not revised Method 525.1 to include the PAIs, although EMSL-Ci had produced performance data demonstrating analysis of these PAIs using Method 525.1. EPA has included Method 525.1 in the revised Compendium and has printed the performance data supplied by EMSL-Ci at the end of the Method because Method 525.1 is the only gas chromatography/mass spectrometry (GC/MS) method available for many of the PAIs, because EPA wants to allow continued use of Method 525.1 for the PAIs for which it was proposed, and because Method 525.1 was the only method proposed for measurement of pronamide. Method 525.1 was also added for the determination of ethoprop, pentachlorophenol and toxaphene.

EPA has also approved Method 507 for pronamide, as indicated in table 7, because the only major difference between Methods 525.1, which was proposed and is approved for pronamide, and Method 507, which was not proposed, is that Method 525.1 uses a mass spectrometer detector whereas Method 507 uses a nitrogen-phosphorus detector (NPD). EPA has also approved Method 507 for cyanazine, based on data submitted by industry. These data show that cyanazine, a triazine herbicide closely related to the other triazine herbicides listed in Method 507, can be analyzed using GC/NPD. Method 515 was changed to Method 615 for MCPA and its salts and esters as a result of a typographical error. Fenvalerate, pyrethrin I, and pyrethrin II were added to Method 1660 based on new test data.

EPA has revised the Compendium that was included in the docket and discussed in the proposed rule. Typographical errors were corrected and a technical correction was made to EPA Method 1660 reducing by a factor of 10 the Method Detection Limits (MDLs), estimated MDLs, minimum levels, and concentrations for certain quality control acceptance criteria, for the pyrethrin/pyrethroid active ingredients covered by Method 1660. The factor of 10 technical correction was the result of improper calculations in the original version of Method 1660. This final rule is not affected by the corrections because the effluent limits for the pyrethrin/pyrethroid active ingredients covered by this rule are above the higher minimum levels and MDLs published in the original version of the Compendium.

To provide a single set of documents for the methods required for monitoring the regulated PAIs that are not promulgated at 40 CFR part 136, EPA has expanded the Compendium to include the proposed Method 525.1, newly developed Methods 515.2, 553 and 555, the revised Method and 548.1, and the other methods that EPA listed as obtainable from NTIS in the proposed rule (57 FR 12590) that are applicable to the regulated PAIs. The revised (two volume) Compendium is also available from the U.S. EPA Office of Water. EPA has retained Method 642 in the Compendium because the decision not to regulate biphenyl came too late to remove Method 642 from the Compendium. Compliance monitoring of the priority pollutants, as in the proposal, is required to be conducted using methods contained in 40 CFR part 136.

V. Basis for the Final Regulation

A. Revisions to the Applicability of the BPT Limitations in Subcategory A

EPA proposed to amend the BPT applicability provision for Subcategory A to include 15 previously excluded organic PAIs and the organo-tin pesticides. The COD, BOD, TSS, and pH limitations under BPT for the organic pesticide chemicals manufacturing subcategory were proposed to apply to the manufacture of these 15 PAIs and organo-tin pesticides. EPA did not propose to make the BPT total pesticides limitation for the organic pesticide chemicals manufacturing subcategory (which applies to the combined discharge of 49 specified PAIs) applicable to these PAIs, because new BAT limitations were proposed that would apply to each of them individually.

When the BPT effluent limitations guidelines were promulgated in 1978 for subcategory A, discharges of conventional pollutants, total pesticides, and COD resulting from the manufacture of 25 PAIs and classes of PAIs were excluded from coverage. These PAIs were excluded because of lack of data showing the levels that could be achieved after treatment. Since then, the Agency has collected effluent data on 15 organic PAIs within the group of 25 PAIs and classes of PAIs. These data were originally collected by the manufacturing facilities themselves in order to monitor their discharges. The 15 organic PAIs for which EPA now has treatment data are: Ametryn, prometon, prometryn, terbutryn, cyanazine, atrazine, propazine, simazine, terbuthylazine, glyphosate, phenylphenol, hexazinone, sodium phenylphenate, biphenyl, and methoprene. As noted in the proposal, EPA has also developed analytical

methods and collected effluent data for organo-tin pesticides, which were not covered in BPT guidelines. EPA stated in the proposal that the available treatment data demonstrated that dischargers manufacturing these PAIs are meeting NPDES permit limitations equivalent to the current BPT guidelines. Therefore, EPA proposed to extend the applicability of the BPT effluent guidelines to cover all of these PAIs.

The effect of this revision, as proposed, would be to set the BPT limitations at the performance level currently being achieved at facilities under their NPDES permits and to establish a baseline on which to evaluate incremental costs of candidate BCT technologies. At proposal, EPA believed that the manufacturing facilities were in compliance with their NPDES BPT permit limitations for pH, BOD, TSS and COD. Thus, EPA projected in the proposal that there would be no costs incurred by any of these facilities in connection with the proposed extension of BPT applicability in the national effluent guidelines.

In today's final rule, EPA is amending the BPT applicability provision as proposed, with certain changes. First, for three of these 15 PAIs (phenylphenol, sodium phenylphenate, and methoprene), the BPT limitations for BOD, TSS, pH, and COD are being promulgated in today's final rule as proposed.

Second, for 11 of the remaining 12 PAIs (i.e., all except biphenyl), EPA is promulgating BPT limitations as proposed for BOD, TSS, and pH, but is not promulgating COD limitations. The 11 PAIs at issue are ametryn, prometon, prometryn, terbutryn, cyanazine, atrazine, propazine, simazine, terbuthylazine, glyphosate and hexazinone. Manufacturers of these PAIs submitted comments and explanatory data demonstrating that, although their discharges do meet the existing BPT limitations for pH, BOD, and TSS, they do not and cannot meet the BPT guidelines for COD because of high COD loadings and high salt contents of their wastewaters.

EPA agrees with these comments. The wastewater treatment technologies installed at the facilities manufacturing these 11 PAIs are equivalent to the BPT technology, i.e., the technologies include both in-plant treatment to control PAIs and end-of-pipe biological treatment to control BOD and TSS. Because these manufacturers are meeting the BPT-level limitations on BOD, TSS and pH, it appears that these technologies are being well-operated. The data show, however, that the production of these 11 PAIs generates wastestreams with significantly higher COD loadings (and higher salt content) than are contained in the wastestreams of the facilities on which the BPT regulations were based. The higher salt content reduces the ability of the BPT treatment technologies to remove COD. Therefore, there is no basis on which to make the existing BPT regulations on COD applicable to the manufacture of these 11 compounds.

In addition, EPA does not have data on which COD limitations could be derived for facilities that manufacture these 11 compounds. To derive COD limitations, EPA would require treatment technology performance data and/or process source reduction information related to reductions in COD in the discharges from the production of these compounds. This information was not available to support this rulemaking. These 11 PAIs represent a small number of PAIs manufactured at a small number of facilities. In the absence of a national regulation, COD loading from the manufacturing of these 11 PAIs may be regulated by permit writers on a technology basis using best professional judgment (BPJ) or as necessary to meet water quality standards. Moreover, compliance by manufacturers with the individual PAI and priority pollutant limitations established in today's rule may result in additional COD reductions over what these manufacturers are currently achieving. Accordingly, the final regulations require the manufacturers of these 11 PAIs to comply with the existing BPT limitations on BOD, TSS and pH but not the COD limitations.

The remaining pollutant from the group of 15 is biphenyl. Since the time of the proposal of this rule, EPA has revoked the registration of biphenyl as a pesticide. (Letter from Linda J. Fisher, Assistant Administrator, Office of Pesticides and Toxic Substances for EPA, "Notice of Cancellation", November 12, 1992, Product Registration #005412–00005). Therefore, because biphenyl can no longer be used as a pesticide, it is not covered by the pesticide chemical effluent limitations guidelines and standards, and EPA is not promulgating any regulations today covering biphenyl. See 40 CFR 455.10, 455.21 (regulations cover "pesticides," defined as substances intended to prevent, destroy, repel or mitigate pests). Instead, biphenyl is subject to the OCPSF effluent limitations guidelines and standards at 40 CFR part 414, subpart H (Specialty Organic Chemicals). (Note that biphenyl manufacturing is classified under SIC Code 2869.) EPA also notes that all existing manufacturers of biphenyl already have NPDES permits covering biphenyl (among other organic chemical manufacturing operations) based on the OCPSF effluent guidelines.

A manufacturer of the PAI methoprene commented that the proposed extension of BPT applicability to cover methoprene would require the manufacturing facility to continue to dispose of methoprene manufacturing wastewater by underground injection. EPA disagrees; the applicability of the BPT limitations in this rule allows the facility, if it chooses, to change its disposal method from underground injection to treatment and discharge.

No comments were received from manufacturers of organo-tin PAIs, phenylphenol and sodium phenylphenate.

Consistent with the proposal, today's final rule does not make the BPT total pesticides limitation for the organic pesticide chemicals manufacturing subcategory (which applies to the combined discharge of 49 specified PAIs) applicable to the 14 PAIs for which BPT limitations are promulgated today, because new BAT limitations are being promulgated today that will apply to each of these PAIs individually.

B. BCT

1. BCT Cost Test

The BCT cost test methodology, published on July 9, 1986 (51 FR 24974), discusses the Agency's consideration of costs in establishing BCT effluent limitations guidelines. EPA evaluates the reasonableness of BCT candidate technologies (those that are technologically feasible) by applying a two-part cost test: (1) The POTW test; and (2) the industry cost-effectiveness test.

In the POTW test, EPA calculates the cost per pound of conventional pollutant removed by industrial dischargers in upgrading from BPT to a BCT candidate technology and then compares this cost to the cost per pound of conventional pollutant removed in upgrading POTWs from secondary treatment to advanced secondary treatment. The upgrade cost to industry must be less than the POTW benchmark of $0.27 per pound (in 1976 dollars, or $0.47 per pound in 1986 dollars).

In the industry cost-effectiveness test, the ratio of the incremental BPT to BCT cost divided by the BPT cost for the industry must be less than 1.29, i.e., the cost increase must be less than 29 percent.

2. BCT Options Identified

For the proposed rule, EPA considered whether or not to establish BCT effluent limitation guidelines for Subcategory A plants that would attain incremental levels of effluent reduction beyond BPT for TSS and BOD. A number of technology options were identified and evaluated with respect to further TSS and BOD reductions. The most promising of the options involved the addition of multi-media filtration to the existing BPT systems since it is estimated to be a lower cost technology than the others that were identified. However, multi-media filtration has not been demonstrated to consistently achieve additional removals of BOD and TSS in this industry. EPA would reject this technology as a basis for BCT (and NSPS) limitations for this reason alone. Further, even apart from the issue of whether multi-media filtration is an available technology, EPA also finds that this technology would not pass the BCT cost test. EPA applied the BCT cost test to use of multi-media filtration technology as a means to reduce BOD and TSS loadings. The plants in Subcategory A were split into two flow categories: High flow (greater than 0.5 million gallons/day [MGD] discharge) and low flow (less than 0.5 MGD). Two flow categories were created because EPA believed that the cost of treatment per pound of pollutant removed at high-flow plants would have lower costs due to economies of scale. For each of these two flow categories, the Agency evaluated the costs of 48 percent BOD and 53 percent TSS removal levels that were estimated based on limited (3 days) data from one plant in the industry that uses a large detention pond followed by multi-media filtration and assuming all of the removals were assigned to the filtration only. The cost per pound of the high flow scenario was $0.44/lb (1976 Dollars) of BOD and TSS combined, while the cost per pound removed of the low flow scenario was $1.96/lb (1976 Dollars) of BOD and TSS combined. Both of these options exceed the $0.27/lb POTW cost test value. Because these costs exceed the POTW benchmark, the first part of the cost test fails; therefore, the second part of the test was unnecessary. It was therefore determined that multi-media filtration did not pass the BCT cost test.

EPA considered but rejected the following other candidate BCT technologies: carbon adsorption, incineration, evaporation, membrane filtration, additional biological oxidation (above the level required to meet BPT), and the use of settling ponds. Multi-media filtration of the wastewater is required prior to carbon adsorption and membrane filtration and therefore the cost of multi-media filtration plus carbon adsorption or membrane filtration would be more than the cost of multi-media filtration alone. In addition, while carbon adsorption and membrane filtration can be effective in removing specific compounds from wastewater, they have not been demonstrated to be effective in removing those materials exerting biological oxygen demand. Incineration and evaporation were projected to have much higher costs than multi-media filtration due to the need to purchase fuel, and therefore, were both excluded from further consideration. Biological oxidation and clarification were used as the basis for BPT, and there are no data to demonstrate that higher effluent quality could be achieved for PAI manufacturing wastewaters by increasing biological residence time, increasing mixed liquor suspended solids, or through the addition of settling ponds, and so these options were rejected. Finally, the Agency looked at the use of polymers and coagulants to enhance clarification. While some facilities use these chemical agents on specific pesticide-containing wastewaters to enhance the treatment system performance, there are no data available to demonstrate additional removals of the conventional pollutants. Therefore, this option was rejected for lack of data.

The estimated costs and removals for the BCT option using multi-media filtration remained the same as used in the proposal since the BPT basis for the conventional pollutants (BOD and TSS) and the BCT technology option costs are the same on a model plant basis. Thus, POTW comparison cost test results for both of the flow levels still fail the POTW costs benchmark, and the final rule sets BCT for Subcategory A equal to BPT as proposed.

For Subcategory B, the Agency is reserving BCT because BPT limitations already require zero discharge of process wastewater pollutants. This is the most stringent limitation possible; there is no need for BCT regulations reflecting more stringent control technologies.

EPA received only favorable comments on its BCT proposal.

C. Best Available Technology Economically Achievable

1. Pollutants Being Regulated

EPA is today promulgating BAT for Subcategory A establishing pesticide pollutant limitations for 120 PAIs and limitations for 28 priority pollutants applicable to the manufacture of any of 260 PAIs or classes of PAIs. EPA is reserving BAT for Subcategory B because the BPT regulations already require no discharge of process wastewater pollutants.

The discharge limits specified under today's final BAT effluent limitations guidelines differ from BPT limits promulgated in 1978 for the organic pesticide chemicals manufacturing subcategory. As mentioned earlier, the existing BPT regulation limits total pesticides, that is, the total mass of all 49 PAIs in wastewaters resulting from the manufacture of the 49 organic PAIs. (See 40 CFR 455.20.) The final BAT effluent limitations will regulate 120 individual PAIs, including 105 PAIs that were left unregulated by the 1978 BPT effluent limitations. Fifteen PAIs of the 120 PAIs are part of the 49 PAIs already regulated as total pesticides. These are: Endrin, heptachlor, methoxychlor, PCNB, toxaphene, trifluralin, azinphos methyl, diazinon, disulfoton, malathion, parathion methyl, carbaryl, diuron, linuron, and 2,4-D.

2. BAT Technology Options and Selection

At proposal, EPA identified two regulatory options for consideration to reduce the discharge of priority pollutants and PAIs by Subcategory A organic pesticide manufacturers. The two BAT technology options considered at proposal were:

a. Option 1: Treated Discharge. Under Option 1, BAT limitations for Subcategory A were proposed based on the use of hydrolysis, activated carbon, chemical oxidation, resin adsorption, biological treatment, solvent extraction, and/or incineration, to control the discharge of PAIs in wastewater. Also, a zero discharge requirement was proposed under Option 1 for certain PAIs where zero discharge has been demonstrated to be achievable through water reuse or the lack of water use. In addition, Option 1 as proposed based BAT effluent limitations for priority pollutants on the use of the model control technologies identified in the OCPSF effluent guidelines rulemaking. For most of the priority pollutants, the limitations were proposed to be directly transferred from the OCPSF regulations (57 FR 12560).

b. Option 2: Zero Discharge. Option 2 would require the organic pesticide chemicals manufacturing subcategory to achieve zero discharge for all pesticide manufacturing wastewater pollutants, based on the use of on-site or off-site incineration and/or recycle and reuse.

EPA proposed BAT based on Option 1, because Option 1 provides a high level of control of PAI and priority pollutant discharges, minimizes cross-media impacts, and was estimated to be economically achievable. EPA rejected Option 2 because it was deemed to be not economically achievable and because of the cross-media implications of transporting large quantities of wastewater off-site for disposal.

For this final rule, EPA considered the same two technology options considered for proposal. Commenters were generally supportive of the Agency's selection of Option 1 for proposal. One commenter suggested that EPA include more extensive recycle/reuse and pollution prevention in the technology basis for the regulation. For the final rule, EPA reexamined its database, including production process information, and included in this reexamination the new process information and full-scale control technology performance data provided by commenters on the proposed rule (as described below). In deriving the BAT limitations for PAIs, EPA sought to incorporate recirculation and recycle practices and source reduction to the fullest extent possible. In several cases, source reduction, recycle and recirculation practices employed at one plant were identified as BAT technologies and therefore formed the basis of limitations that apply to all manufacturers of the same product. However, because most PAIs are manufactured at only one facility, this transfer of practices was somewhat limited. The pollution prevention practices identified in this industry and used as the basis for these regulations are discussed in section XI below. Based on the available data, EPA concludes that this final rule does incorporate both recirculation and recycle/reuse practices to the extent possible and also includes identifiable source reduction.

Accordingly, the Agency is promulgating BAT based on Option 1, with changes as described below to some of the proposed limitations in light of new data.

The final BAT limitations and costs for organic PAIs are based on the same BAT technologies as were identified in the proposal—i.e., hydrolysis, activated carbon, chemical oxidation, resin adsorption, biological treatment, solvent extraction and/or incineration treatment systems.

Option 1 will greatly reduce pollutants discharged into the environment while avoiding cross-media transfer of pollutants that might occur under Option 2 and incorporating recycle/reuse technologies where possible. The pollutants that are removed under this option (and that are not recycled or reused) will be destroyed by the BAT treatment technologies. This option will have minimal economic impacts and is deemed to be economically achievable (see section VII of today's notice). The Agency rejected Option 2 because it was determined not to be economically achievable (see section VII of today's notice) and because of the cross-media implications of the transfer of pollutants for off-site disposal that might occur through industry's efforts to meet a zero discharge limitation for all PAIs.

3. Basis for Final Limitations in The Rule

a. PAI Limitations. The final PAI numeric limitations are based, wherever possible, on actual industry monitoring data on the concentrations of PAIs in wastewaters treated by full-scale BAT treatment systems. Where actual full-scale data are not available, the final BAT limitations are based on a transfer of treatment system performance data between structurally similar PAIs, supported by data from EPA or industry bench-scale treatability studies. In some cases, the final BAT limitations might require that existing PAI treatment technologies currently in place at facilities be improved by enhanced operations, such as hydrolysis with increased retention time, carbon adsorption with increased retention time, and additional PAI monitoring.

The BAT limitations for PAIs are mass-based, i.e., they are expressed in terms of pounds of pollutant allowed per pound of product produced. They are calculated by the following procedures: (1) Fitting daily PAI concentration data to a modified delta-lognormal distribution,[1] the same statistical procedure that was used in the OCPSF rulemaking; (2) estimating the 99th percentile of the distribution of daily PAI concentrations from the fitted distribution of daily concentration measurements; (3) multiplying the estimated 99th percentile of the distribution of concentrations by average daily flow to derive the daily pollutant loading (e.g., pounds of pollutant discharged per day); and (4) dividing the result by daily average production (e.g., pounds of product produced per day) to give the daily production-based mass limitation (e.g., pounds of pollutant discharge per pound of product produced). The monthly average production-based mass limitation was calculated similarly except the 95th percentile of the distribution of monthly averages was used instead of the 99th percentile of daily concentration measurements. The variability factors were calculated by fitting the concentration data to the delta-lognormal distribution. The daily variability factor is a statistical entity defined as the ratio of the estimated 99th percentile of the distribution of daily values divided by the expected value, or mean, of the distribution of daily values. Similarly, the monthly variability factor is defined as the estimated 95th percentile of the distribution of four-day averages divided by the expected value of the distribution of monthly averages.

At each stage of BAT limitations development, the Agency attempted to obtain data from pesticide chemicals manufacturing plants with treatment systems representing BAT performance to provide coverage as complete as possible for the PAIs and priority pollutants discharged by the pesticide chemicals manufacturing industry. Data sources used by the Agency as bases for BAT limitations are discussed in detail in section III.D above and in section 3 of the Technical Development Document for today's final rule.

A number of PAI limitations were revised for the final rule, based on new data received by the Agency. Specifically, a number of pesticide facilities indicated to EPA in their comments that they are using treatment systems that are new and improved compared to the systems on which EPA's proposed regulations were based. These commenters provided additional and supplemental full scale treatment system data giving updated results for the pollutant levels that could be achieved using their new or improved treatment systems. These new data have led to final limitations that are different from those proposed for 30 PAIs.

For 55 PAIs the mass limitations are based on full scale BAT data (including 5 PAIs for which incinerator scrubber water data were used), submitted by the manufacturers; for 30 PAIs the limitations are set at zero discharge based on recirculation, recycle/reuse and/or no water use or excess from the process; for one PAI the limitations take into consideration the discharge from the production of another PAI which is measured by the same analytical method; and for 34 PAIs limitations are based on technology transfer. The 55 PAIs with limitations based on full-scale data reflecting their BAT treatment (and in some cases planned improvements to that treatment) are: 2,4-D, cyanazine, acifluorfen, alachlor, atrazine,

[1] A description of the delta-lognormal distribution is available in the Technical Development Document.

chlorpyrifos, ethion, pendemethalin, phorate, terbufos, triadimefon, dichlorvos, mevinphos, propanil, metribuzin, aldicarb, bromoxynil, carbofuran, chloroneb, chlorothalonil, stirofos, fenvalerate, diazinon, DCPA, dinoseb, dioxathion, diuron, endrin, fenarimol, fenthion, heptachlor, isopropalin, linuron, methamidophos, methomyl, methoxychlor, fensulfothion, disulfoton, azinphos-methyl, the 8 organo-tins, bolstar, parathion-ethyl, PCNB, permethrin, DEF, tebuthiuron, toxaphene, and trifluralin.

For another 30 PAIs, zero discharge BAT limitations have been set. For 28 of these 30, zero discharge is based on either closed loop recycle/reuse or recirculation of all process wastewater or on the fact that all water added to the process remains with the salt product. These 28 (of the 30) PAIs are: the 10 salts and esters of 2,4-D, 3 salts and esters of 2,4-DB, 3 salts and esters of dichlorprop, 4 salts and esters of MCPA, 4 salts and esters of MCPP, 3 salts and esters of endothall, and the lithium salt of bromocil. For one PAI, naled, zero discharge limitations are set based on no water use in the manufacturing process. Also, the purification of the PAI phosmet, by either single or double recrystalization, involves no water use, and that part of the manufacturing process only is regulated at zero discharge.

For one PAI, benomyl, the BAT limitations are based on full scale data that include carbendazim's production (i.e., pounds of PAIs per 1000 pounds of benomyl and carbendazim produced) since the analytical method does not differentiate between the two; data that eliminate the loadings from the formulating and packaging operations at the facility; and data that account for additional removals by the end-of-pipe biological treatment system following hydrolysis. The remaining 34 PAIs with limitations in the final rule have their limitations based on technology transfer. Fourteen of these 34 PAIs received mass limitations by "direct transfer" of mass limitations (i.e., the numeric production-based mass limitations for one PAI, such as "1×10^{-3} pound of pollutants per 1000 pounds of product produced," are also established for a second PAI based on a direct transfer based on similar chemical structure and treatability). These PAIs are: Ametryn, prometon, prometryn, propazine, simazine, terbuthylazine, and terbutryn from the average of the mass limitations for atrazine and cyanazine; bromoxymil octanoate from bromoxynil; propachlor and butachor from alachlor; merphos from DEF; parathion methyl from parathion ethyl; and ethalflurin and benfluralin from trifluralin.

The remaining 20 (of the 34) PAIs have limitations based on technology transfer using data from other PAI's with full-scale BAT treatment system information but not "directly" transferring the mass limitations. For these 20 PAIs, direct transfers of mass limits were not made because in general there were no other PAIs that were sufficiently similar structurally and for which data were available. EPA did, however, have information on which technologies were effective in removing these PAIs. Therefore, EPA in effect transferred data on the level of treatment system performance that these technologies achieve with respect to other PAIs. These other PAIs are not necessarily structurally similar to these 20 PAIs but are susceptible to treatment by the same types of technologies. Specifically, the limitations for these PAIs were generated by: (1) Setting achievable long-term average (LTA) concentrations for each PAI based on the demonstrated performance for other PAIs using the same BAT technology; (2) applying average variability factors for each group by the associated BAT treatment technology; and (3) determining the production-based mass limitations for each plant and PAI combination by multiplying the long-term average (annual) flow by the concentration-based limitation value determined under parts (1) and (2) and dividing this quantity by the average production for the specific PAI.

In evaluating data for PAIs with treatment system performance data, the Agency noted that those PAIs subjected to similar treatment systems achieved similar ratios of long-term average (LTA) effluent concentrations to their respective analytical method detection limit (MDL). EPA also noted that the technology in use at plants with long term data typically reduced the PAI concentration to average levels close to the detection limit. Accordingly, EPA limitations based on transfer of the LTA/MDL ratio require the same degree of treatment for PAIs with similar treatment systems. By knowing the hydrolysis rate, chemical oxidation rate or carbon adsorption ratio (carbon usage per pound of PAI removed), the cost for full-scale treatment can be determined.

The following describes in more detail the procedure used by the Agency to determine limitations for PAIs without sufficient full scale treatment data.

The Agency calculated the ratio of the LTA to the MDL for each PAI with long-term full-scale treatment system performance data. These data were also used to determine daily and monthly variability factors for each PAI. The Agency then calculated the average LTA/MDL ratio and average variability factors for each set of PAIs that use the same treatment technology. For PAIs with no full-scale or bench (treatability) scale data the long term mean effluent concentration level achievable was estimated by the product of the average LTA/MDL ratio for the set of PAIs and the MDL for the PAI. The daily and monthly limitation concentration values for the PAI were then calculated by the product of the estimated LTM for the PAI and the average variability factors for each structural group related to the appropriate BAT treatment technology.

For a few PAIs subjected to hydrolysis treatment where data were used to transfer limitations to PAIs without similar chemical structures the PAI with the highest LTA/MDL ratio and variability of that PAI were used. Finally, the production-based mass limitations were determined by multiplying the long-term average flow from the PAI manufacturing process by the transferred concentration-based limitation value and dividing this quantity by the average daily production of the PAI.

For 2 of the 20 PAIs that have limitations based on this technology transfer methodology, acephate and captafol, the limitations were based on using the concentration at the minimum detection level (i.e., LTA/MDL ratio=1), and transferring the average variability factors based on full scale incinerator scrubber water data for the incineration of pendimethalin, phorate, terbufos, tebuthiuron, and fenarimol because all available data from incineration treatment of acephate and captafol were reported as not detected. For 4 PAIs, norflurazon, pronamide, bromacil, and terbacil, the BAT limitations are based on using their MDL and multiplying the average LTA/MDL data and average variability factors from activated carbon treatment of ethion, permetrin, alachlor, diazinon, dinoseb, toxaphene, bromoxymil, trifluran, and PCNB. For 3 PAIs, TCMTB, pyrethrin I, and pyrethrin II, BAT limitations are based on their MDL in conjunction with the LTA/MDL ratio and variability factors from hydrolysis treatment of benomyl which has a slower hydrolysis rate than any of these other three PAIs. (Other PAIs subjected to hydrolysis treatment hydrolyze either faster than or at about the same rate as TCMTB, pyrethrin I and pyrethrin II. Therefore, transfer of the average LTA/MDL ratio and average variability factors could overestimate the effectiveness of hydrolysis technology for TCMTB, pyrethrin I and

pyrethrin II.) For one PAI, carbaryl, limitations were transferred from aldicarb and methomyl using full scale hydrolysis treatment average LTA/MDL data and average variability factors. For 9 PAIs (nabonate, nabam, busan 85, busan 40, KN methyl, carbam-S, vapam, dazomet, and ziram), BAT limitations are based on transfer of variability factors using full-scale performance data from one facility and bench-scale treatability test results to demonstrate the BAT level LTA for all of these 9 (dithiocarbamates) PAIs. For the last of the 20 PAIs using this technology transfer methodology, malathion, the limitations were based on its MDL and transferring the average LTA/MDL ratio and average variability factors from a similar structural group of PAIs, stirofos, parathion-ethyl, dioxathion, triadimefom, and DEF treated using hydrolysis.

As noted in section IV, the limitations in the final rule were revised for 29 PAIs overall since proposal. The 29 PAIs with revised limitations in the final rule are: 2,4-D, cyanazine, acifluorfen, alachlor, atrazine, chlorpyrifos, ethion, pendemethalin, phorate, terbufos, acephate, captofol, ametryn, prometon, promotryn, propazine, simazine, terbuthylazine, terbutryn, benomyl, pronamide, bromacil, terbacil, TCMTB, pyrethrin I, pyrethrin II, propachlor, butachor, and norflurazon.

The bases for the revised limitations for the 29 PAIs are as follows: For 7 PAIs (the first 7 of the 29 listed above—2,4-D through ethion) limitations were revised as a result of new full-scale data submitted by manufacturers. More specifically the limitations for acifluorfen have been revised to take into account changes in the production rate and to base limitations more on additional source reduction rather than solely on additional treatment. Limitations for atrazine and cyanazine are revised based on new full-scale data supplied by a manufacturer of atrazine and cyanazine for a much longer period of time than was previously available (six years versus one year). Those new data show that the treatment systems experience more variability than was apparent from the earlier data. Thus, the final limitations have been increased from the proposed limitations to account for this higher variability.

Limitations for 2,4-D are revised based on full-scale data reflecting the use of a solvent recovery system. Limitations are revised for alachlor based on long-term full scale data submitted after the proposal by a manufacturer. These full-scale data replace the treatability study data used at proposal. Limitations for ethion were also revised based on the submittal of full-scale BAT treatment data following the proposal. At proposal, EPA lacked full-scale long-term data and therefore had proposed limitations for ethion based on a transfer of the limitations set for other pollutants. The final limitations for ethion are based on these new data and not on BAT technology transfer as was proposed. The final limitations are greater than the limitations that were proposed for ethion.

The average LTA/MDL ratio and average variability factors used to calculate the proposed transferred limitations for ethion were based on both full-scale and bench scale data for PAIs that are treated by activated carbon. EPA notes that when these values are recalculated to consider only cases in which full-scale treatment data are available, the recalculated limitations are approximately equal to the final limitations for ethion, which are based on full-scale data. The agreement of these values serves to validate this methodology for deriving transferred limitations in the other cases in which it was used (i.e., in the cases of bromacil and terbacil, for which data from structurally similar PAIs were not available). Limitations for pendimethalin have been revised to reflect the higher flows based on treatment by two incinerators because both can and do operate at the same time. Limitations for phorate and terbufos are revised to account for higher flows per production unit than originally considered. The limitations for chlorpyrifos are revised based on submittal of longer term full-scale treatment data.

For 7 PAIs, ametryn, prometon, prometryn, terbutryn, propazine, simazine, and terbuthylazine, EPA transferred data on BAT level removals from PAIs atrazine and cyanazine. These technology transfers, at the time of proposal, were supported by EPA and industry treatability tests. Limitations in the final rule are revised based on using the new full-scale data for atrazine and cyanazine discussed above.

The limitations for benomyl are revised to account for the fact that much of the benomyl-containing wastewater not currently treated in the in-plant hydrolysis treatment system is formulating/packaging process wastewater rather than manufacturing process wastewater; to account for more of the production of the intermediate, carbendazim, which is treated by the in-plant hydrolysis treatment and cannot be distinguished from benomyl by the current analytical methods; and to include additional removals by the end-of-pipe biological treatment system that were not considered in the proposed regulations. Limitations for TCMTB, pyrethrin I, and pyrethrin II were also revised based on transfer of the BAT treatment data on hydrolysis from benomyl and using the LTA/MDL ratio and variability factors data. Two PAIs, butachlor and propachlor, have limitations revised based on new full-scale data submitted on alachlor.

At proposal, EPA derived achievable concentration levels by using performance data, including bench-scale treatability study data for activated carbon treatment for three PAIs (alachor, butachlor, and propachlor). The full-scale data submitted on the BAT treatment of alachlor (discussed above) have also been used to set limits for these two other, structurally similar PAIs manufactured at the same plant and treated in the same treatment system (those two PAIs, butachlor and propachlor were not at full production during the time the new data were collected, so performance data for those PAIs could not be obtained). In addition, the Agency deferred establishing final limitations for one PAI, glyphosate salt.

The proposed limitation for glyphosate salt, which is a product manufactured from another PAI, glyphosate, was zero discharge. At proposal, there were insufficient data to establish limitations for glyphosate, however, the portion of the manufacturing process which gave glyphosate salt had no discharge. Thus zero discharge limitations were proposed for that portion of the process. Since proposal, the manufacturer has significantly changed the manufacturing process in order to reduce overall pollutant releases to all media. However, unlike the previous process, the new process that produces glyphosate salt has a water discharge. New information was submitted following the proposal, reflecting effluent levels following biological treatment of the total process wastewaters. After reviewing the effluent data, EPA cannot determine whether the data represent BAT level treatment or whether other control technologies should be identified as BAT. Because there was insufficient time to conduct additional treatment studies, and because this PAI (and its salt) has low toxicity, regulation is being deferred at this time.

Based on the reevaluation of the data set for use in transferring variability factors for ethion, discussed above, EPA revised the limitations transfer procedure to eliminate using variability data from treatability studies for

activated carbon. This revised procedure resulted in final limitations for four PAIs (bromacil, terbacil, norflurazon, and pronamide) that are higher than the proposed limitations for those four PAIs.

In addition, the Agency proposed effluent limitations requiring zero discharge of process wastewater pollutants for 37 pesticide active ingredients (PAIs) based on total recycle and reuse of all process wastewater for 29 PAIs, no water use for one PAI, all data reported as "not detected" for 2 PAIs, no current discharge for two PAIs (one of which was biphenyl), and EPA's estimated lowest cost treatment of off-site disposal by incineration for 2 PAIs. Also, the Agency proposed requiring zero discharge of process wastewater pollutants for the purification of phosmet by re-crystallization based on recycle/reuse of all water, which was the only part of the phosmet manufacturing process for which the Agency proposed any limitations.

Commenters stated that the data reported as "not detected" were measured by current analytical methods, and show only that the pollutant levels were below the detection limit; the data do not necessarily show "zero discharge." Further, today's methods may eventually be replaced by methods with lower detection limits, and so a "non-detect" value today may show up as a detectable (measured) value in the future. The Agency agrees with these comments. Commenters also stated that achieving zero discharge to surface waters involves an increase in total plant discharges to other media, such as air emissions or solid waste disposal if the process wastewater cannot be reused effectively. The Agency generally agrees that this could be the case in some circumstances.

Therefore, EPA has revised its determination of the PAIs that should be subject to a zero discharge limitation. As proposed, the final rule promulgates zero discharge limitations for the 28 PAIs as to which zero discharge was based on total recycle and reuse of all process wastewater and for the one PAI that is manufactured without water and a no water use portion of the process for one other PAI. For five PAIs (of the 29 PAIs with revised limitations), acephate, captafol, norflurazon, pyrethrin I, pyrethrin II for which EPA proposed a "zero discharge" requirement based either on data that were below the current detection limit, no current discharge, or off-site disposal, EPA is promulgating numeric limitations in response to comments. To derive these limitations, EPA used the technology transfer procedures described above (utilizing LTA/MDL ratios and average variability factors) since performance data were unavailable (all data were below the current detection limit or there was no treatment or there was no treated effluent because the wastewaters were transported off-site for disposal).

Norflurazon was discussed previously as having revised limitations based on transfer of data from other PAIs treated with activated carbon; pyrethrin I and pyrethrin II, discussed earlier, have limitations based on hydrolysis treatment of benomyl; and acephate and captafol have revised limitations based on the transfer of full-scale incinerator scrubber wastewater discharge data. As discussed previously, regulation of glyphosate salt has been deferred and the last of the proposed zero discharge PAIs, biphenyl, as discussed previously, has been dropped from coverage of this rule.

The BAT database for organic PAIs and calculation of effluent limitations from this database are presented in section 7 of the Technical Development Document for today's final rule.

For certain PAIs, the Agency proposed to establish monitoring and compliance requirements "in-plant" as opposed to at the "end-of-pipe" location. See 57 FR 12573, 12591. As explained in the proposal, EPA's data sources include both in-plant and end-of-pipe sampling locations. Many plants manufacture other products besides pesticides. In most cases, these plants treat to remove PAIs and then combine the wastewaters for treatment to remove other pollutants. Where in-plant data demonstrated that very low concentrations of PAIs were achieved prior to combining treated pesticide process wastewaters with other process wastewaters, dilution of the pesticide process wastewaters with other wastewaters would make it impossible for the discharger to demonstrate compliance at end-of-pipe. In these cases, EPA proposed to require in-plant monitoring and limitations (i.e., at a point after treatment to remove PAIs but prior to combining with other wastewaters) as part of the national effluent guidelines.

Industry commenters objected to this proposed requirement for a number of reasons. First, they noted that many facilities commingle PAI process wastewater with wastewater from other PAIs and other process wastewaters prior to any treatment, or provide partial treatment prior to commingling and the remainder of treatment in combined end-of-pipe systems. In their view, monitoring upstream prior to commingling unfairly penalizes the discharger by not accounting for the treatment occurring following commingling. Also, they state, it constrains a facility's ability to collect and centrally treat wastes in the most cost-effective manner. In addition, the commenters believe that a national requirement for in-plant monitoring is inappropriate because the mixture of wastewater flows at each facility that may produce a particular PAI may not be the same, or may change over time at a given facility. Thus, monitoring for a particular PAI at the end-of-pipe may be feasible at one plant but infeasible at another.

EPA finds that additional removals by end-of-pipe biological treatment for PAIs following in-plant treatment using physical/chemical BAT technologies are not evident from the data, except for those few PAIs for which biological treatment has been identified as the BAT technology. Another exception is benomyl, for which limitations are based on end-of-pipe biological treatment following hydrolysis. On the other hand, EPA generally agrees with the commenters that a national requirement for in-plant monitoring may not be appropriate because the mixture of wastewater flows at each facility that may produce a particular PAI may not be the same, or may change over time at a given facility. In any event, EPA concluded that the existing regulations already adequately treat the issue of required monitoring locations. See 40 CFR 122.45(h), which authorizes permit writers to impose internal monitoring and compliance locations in NPDES permits when limitations imposed at the point of discharge are impractical or infeasible. For pretreaters, a similar requirement applies (see 40 CFR 403.6). Accordingly, in light of the public comments and because EPA's concerns are adequately addressed in the existing regulations, EPA has eliminated all of the proposed requirements for in-plant monitoring and compliance for PAIs. EPA notes that the clarification in these final regulations of which streams are considered to be "process wastewater flow" should be helpful to permit writers in their determinations of appropriate monitoring locations.

b. Priority Pollutant Limitations. EPA proposed BAT effluent limitations for 28 priority pollutants. For 23 of these 28 priority pollutants, EPA proposed to rely on the OCPSF database to set limits that are identical to the limits set for these pollutants in the OCPSF guidelines. For four other priority pollutants (consisting of the four brominated pollutants bromodichloromethane, bromomethane,

dibromochloromethane, and tribromomethane) which were not regulated under OCPSF and for which there are no treatment performance data, EPA proposed to use limitations set in the OCPSF guidelines for other priority pollutants that were deemed to have similar "strippabilities." This is the same procedure used in the OCPSF rulemaking for developing limitations when performance data were lacking for certain volatile organic priority pollutants. Limitations for one priority pollutant, cyanide, were proposed based on actual long-term full-scale data from the pesticide industry.

For 24 of the 28 priority pollutants proposed to be regulated under BAT, the bases for the proposed limitations have not changed, and the BAT limitations remain the same in the final rule as were proposed. For the remaining four priority pollutants, consisting of the four brominated priority pollutants the limitations in the final rule have been revised from the proposal.

The proposed limitations for the four brominated priority pollutants were based not on effluent data for these pollutants but on a transfer of the limitations set for other priority pollutants. To transfer these limitations, EPA stated in the proposal that it divided the group of priority pollutants for which effluent data were available into two subgroups, a high "strippability" subgroup and a medium "strippability" subgroup, based on each pollutant's Henry's Law constant (a ratio of aqueous solubility, or tendency to stay in solution, to vapor pressure, or tendency to volatize). The Agency stated that it assigned each of the four brominated priority pollutants, based on its Henry's Law constant, to either the high or the medium strippability subgroup. EPA stated that the average data for each subgroup were then transferred to set limitations for these four pollutants. See 57 FR 12566, 12577. Commenters correctly pointed out, however, that the proposed limitations for the four brominated pollutants were not based on the average data for each subgroup. Instead, they were based on the limitations for a single pollutant within the strippability subgroup (specifically, they were based on the limitations for the pollutant that had a Henry's Law constant closest to the constant for the brominated pollutant). This was an error; EPA intended to base the limitations for these four pollutants on the average data for each subgroup, as the preamble to the proposal stated. Accordingly, EPA has corrected this error and the final limitations for the four brominated priority pollutants reflect the average data rather than the data for any single pollutant within the subgroup.

In addition, in response to comments, the wording for the lead and cyanide limitations has been revised to more clearly define the wastewater streams being regulated. For lead and cyanide, the wastewater streams intended to be covered are the non-complexed lead-bearing and cyanide-bearing organic pesticide chemical manufacturing process wastewaters. The revised wording is consistent with the changes made for the lead and cyanide limitations in the OCPSF rule (58 FR 36872).

As discussed in Section II of today's final rule, 55 of the 90 pesticide chemicals manufacturing facilities believed to exist at the time of the proposal (now 46 of the 75 facilities) also manufactured compounds regulated under the OCPSF category. Typically, wastewaters from pesticide manufacture are ultimately commingled with OCPSF wastewaters generated at the site and treated in the same end-of-pipe (EOP) wastewater treatment systems. Even though pesticide wastewaters may be pre-treated to remove PAIs, their priority pollutants are removed in the same EOP treatment system that removes priority pollutants from OCPSF wastewaters.

In the final rule, as proposed, EPA has set limitations for the priority pollutants by directly transferring the priority pollutant limitations from the OCPSF rule. As part of this transfer, the final rule adopts the approach in the OCPSF rule of setting different limitations for direct discharger facilities that do and do not have end-of-pipe ("EOP") biological treatment systems. Some plants use EOP biological treatment to meet their limitations on conventional pollutants. These plants rely on other technologies to reduce their priority (toxic) pollutants; however, the biological treatment has the incidental effect of removing some further amount of the priority pollutants. The rule accounts for this further removal of toxics by the EOP biotreatment systems by establishing one set of priority pollutant limitations for those facilities that do not use EOP biotreatment and a different, generally more stringent set of limitations for those plants that do. There were no unfavorable comments on this proposed approach that were submitted in connection with this rulemaking, except that the Natural Resources Defense Council (NRDC) incorporated by reference its comments opposing this approach in connection with the OCPSF rulemaking.

EPA's recent response to the OCPSF remand explains in detail the Agency's reasons for adopting this approach (58 FR 36881–36885 and supporting record). The Agency explained there that it is not feasible, necessary or desirable to eliminate or limit the applicability of the non-EOP biological treatment limitations for priority pollutants. EPA stated its belief that the Clean Water Act does not require the Agency to develop a scheme that is not technically defensible and which would create undesirable treatment incentives within the regulated community.

EPA also discussed three alternatives to EPA's scheme that were suggested by NRDC. The first suggested alternative was to develop a BOD "floor" (i.e., a minimum BOD level) to limit the applicability of the non-EOP biotreatment limitations. EPA found, however, that the development of a floor would be technically infeasible due to the lack of a theoretical minimum BOD level for sustaining biological treatment and the great variability of OCPSF production and wastewater characteristics. These reasons generally hold true with respect to the pesticides manufacturing industry as well. Although a given pesticides manufacturing plant may be able to operate a biological system at a certain long-term average BOD level, that does not assure that another plant with the same long-term average BOD level, but with a different waste stream composition or varying BOD levels, will also be able to operate a biological system. In addition, plants that need to achieve significant BOD reductions will generally be motivated by economic considerations to install biotreatment systems over the more costly alternatives. Moreover, as explained in the OCPSF preamble, EPA believes that a BOD floor would be undesirable in that it would likely result in irrational and undesirable wastewater treatment and waste management decisions (i.e., it would create incentives to maximize BOD loads at the end-of-pipe).

NRDC also suggested that EPA limit the applicability of the non-EOP biotreatment limitations to those processes for which there has been an adequate showing of low-BOD wastewater. In fact, low-BOD wastewater seldom occurs in the pesticides manufacturing industry. In any event, as noted, there are only two direct discharger plants that do not have EOP biological treatment and therefore will be subject to the non-EOP biological treatment limitations on priority pollutants, and EPA expects few new sources to be built that will manufacture the regulated PAIs.

As a third alternative, NRDC argued that EPA could eliminate the non-EOP biotreatment limitations and address low-BOD situations through fundamentally different factors ("FDF") variances (or maintain the limitations but apply them only where a site-specific showing of necessity is made). (FDF variances are not available to new sources.) As discussed in the OCPSF preamble, however, maintaining the option of non-EOP biotreatment limitations is desirable in that it encourages source control and other in-plant waste management techniques. EPA's decision to provide two sets of limitations instead of accounting for low BOD through the FDF process is a rational exercise of its discretion under the Act.

EPA notes that setting less stringent limitations in these regulations for plants without EOP biological treatment will result in virtually no actual increase in priority pollutant discharges to surface waters. There are only two direct discharger plants that will be subject to the non-EOP biological treatment limitations. One of these plants incinerates all of its wastewaters; since only scrubber wastewater remains, there would be nothing left to treat in a biological treatment system. The second plant has very low loadings of priority pollutants after applying BAT physical/chemical treatment technologies. Both of these facilities also perform some recycling/reuse of either non-wastewater streams or wastewater streams. Together, EPA estimates that these two plants will discharge less than one pound per year of priority pollutants to surface waters after meeting the non-EOP biological treatment limitations on priority pollutants. Imposing limitations on the second plant based on EOP biological treatment would remove only a trivial additional amount of priority pollutants.

In the OCPSF rulemaking, EPA identified treatment technologies that have been shown to be effective and the best available for removing priority pollutants from OCPSF wastewaters, or commingled OCPSF and pesticide manufacturing wastewaters. EPA has determined that 23 (22 volatile and semi-volatile organic priority pollutants and lead) priority pollutants regulated in the OCPSF guidelines also may be found in wastewaters from pesticides manufacturing. EPA therefore proposed that the limitations for these 23 pollutants (1,1-Dichloroethylene, 1,1,1-Trichloroethane, 1,2-Dichloroethane, 1,2-Dichloropropane, 1,2-Dichlorobenzene, 1,2-trans-Dichloroethylene, 1,3-Dichloropropene, 1,4-Dichlorobenzene, 2-chlorophenol, 2,4-Dichlorophenol, 2,4-Dimethylphenol, Benzene, Chlorobenzene, Chloromethane, Dichloromethane, Ethylbenzene, Lead (Total), Naphthalene, Phenol, Tetrachloroethylene, Tetrachloromethane, Toluene, Trichloromethane) be directly transferred to the pesticide chemicals manufacturing category as BAT effluent limitations guidelines. The bases for the OCPSF BAT limitations for priority pollutants was discussed in the preamble to the proposed pesticide manufacturing regulation (57 FR 12574–12577). Additional more detailed discussion is included in the OCPSF Development Document, which is part of the public record for this rule.

The proposed limitations for total cyanide were not transferred from OCPSF, but instead were based on the median values of the effluent data from treatment systems incorporating chemical oxidation and biological treatment at two pesticide manufacturing facilities and five organic chemicals manufacturing facilities, along with effluent data from one pesticides manufacturing facility with biological treatment only.

The proposed regulations made the cyanide limitations applicable to all cyanide-bearing waste streams. Several commenters argued that the proposed cyanide limitations should be applied to amenable cyanide (i.e., non-complexed cyanide) only. They stated that the limitations for cyanide are based on its amenability to alkaline chlorination, but that complexing of cyanide with other compounds may interfere with treatment of cyanide by alkaline chlorination. In recognition of this problem, the commenters note, the OCPSF regulations allow the permit writer or control authority to establish alternative total or amenable cyanide limitations for waste streams that cannot achieve the total cyanide limits due to complexing at the end-of-process source (i.e., prior to commingling with other waste streams or corroded piping downstream from the process). See 40 CFR 414.11(g). The commenters argue that this same regulatory flexibility for cyanide limitations should be included in the pesticides manufacturers effluent guidelines.

EPA agrees and has therefore added the appropriate flexibility to the cyanide limitations by incorporating the OCPSF regulatory language (414.11(g)) into today's final regulations (455.20(e)). The reasons for adding this flexibility are further explained in a preamble to the OCPSF rulemaking (55 FR 42333–42334, Oct. 18, 1990). EPA considered addressing the issue of complexed cyanide-bearing waste streams by listing those product/process waste streams determined by EPA to contain significant levels of complexed cyanide, but EPA believes that leaving that determination to the permit writer or control authority can better take into account the differences among complexed cyanide-bearing waste streams. The additional regulatory language requires the permit writer or control authority to assess the relevant information concerning the degree of complexing and the extent to which it impacts the ability to achieve the limitations and to set forth such findings in writing; for direct dischargers, the analysis will be contained in the fact sheet. This will assure that the specific cases where significant cyanide complexing precludes compliance with the limitations can be appropriately addressed by the permit writer or control authority, while the limitations will continue to apply in all other cases.

Several commenters also stated that the limits for lead should be applicable only to "lead-bearing" waste streams and not to all "metal-bearing" waste streams. EPA agrees and has made this change in the final regulations. The final regulation also limits the applicability of the regulations to lead-bearing waste streams that are non-complexed. This is consistent with the treatment of lead in the OCPSF regulations and is appropriate for the pesticides manufacturers regulations as well. The reasons for making the regulations applicable only to the non-complexed lead-bearing streams are explained in the OCPSF rulemaking (see 52 FR 42543, November 5, 1987). As noted there, each plant that has complexed metals (including lead) may need to use a different set of unique technologies to remove these metals. Thus, limits for complexed lead are not set by this regulation but must be established by permit writers or control authorities on a case-by-case basis.

In the OCPSF rule and in the proposed pesticide chemical manufacturers guidelines, EPA based the effluent limitations for volatile organic pollutants on the use of steam stripping with product recovery or overhead (recoverable volatile organic) destruction by incineration rather than on air stripping, which would allow the volatile organic pollutants emissions to the atmosphere.

In the absence of any wastewater treatment, pesticides manufacturing plants 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 many direct discharging pesticides manufacturers 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. The volatilization from existing wastewater treatment systems would be reduced, however, by the combined effect of the BPT and BAT regulations. Compliance with the BAT regulations is expected to enhance the performance of the existing wastewater treatment facilities. In many cases the final regulations are expected to result in the increased use of steam stripping technologies, which will lessen air emissions.

In the OCPSF rule, the Agency discussed at length whether it could require the use of steam stripping over air stripping in order to prevent air emissions. After considering the broad variety of technical, policy, and legal issues involved, the Agency concluded that the issue of volatile air emissions from OCPSF facilities is best addressed under laws that specifically direct EPA to control air emissions (56 FR 42558–42562). The primary statutes providing such directions are the Clean Air Act (42 U.S.C. 7401 et seq., as amended by the Clean Air Act Amendments of 1990, Pub. L. 101–549, Nov. 15, 1990) and, in the case of facilities managing hazardous waste, the Resource Conservation and Recovery Act (RCRA) (42 U.S.C. 6901 et seq.).

Title I of the Clean Air Act Amendments of 1990 (CAAA) requires that State implementation plans for certain ozone non-attainment areas be revised to require the implementation of reasonably available control technology (RACT) for control of volatile organic compound (VOC) emissions from sources for which a Control Techniques Guidelines (CTG) document will be published. Title III of the CAAA requires that the Administrator set standards for hazardous air pollutants (HAPs) from all source categories based on maximum achievable control technologies (MACT) for emission sources. EPA plans to develop MACT standards for each HAP emission source category. Wastewater and waste handling and treatment operations can be significant sources of HAP and VOC emissions within multiple source categories. To address emissions of VOC from wastewater the Agency plans to issue a CTG for industrial wastewater. The pesticide industry will be one of several industries covered by this CTG. The Agency also plans to issue National Emission Standards for Hazardous Air Pollutants (NESHAP) for the pesticide industry which will define MACT. The Agency has proposed the first MACT standard (57 FR 62608, December 31, 1992) which regulates emissions of HAPs from the Synthetic Organic Chemical Manufacturing Industry. This proposed standard does not affect the pesticides industry but is an example of recent rules controlling air emissions from wastewater. (See further discussion of CAA activities and RCRA requirements related to the pesticides manufacturing industry in Section VIII of this notice).

Under Subcategory B, the Agency is reserving the establishment of BAT effluent limitations as proposed. The BPT effluent limitations for Subcategory B already require no discharge of process wastewater pollutants. This is the most stringent limitation possible; there is no need for BAT regulations reflecting more stringent control technologies.

4. Applicability of BAT Limitations

Each discharger in Subcategory A will be subject to the effluent limitations for the pollutants regulated in that subcategory. The regulations will serve as the basis for limitations in the National Pollutant Discharge Elimination System (NPDES) permits issued to direct dischargers (see 40 CFR 122.44(a)). The monitoring requirements for plants in Subcategory A will include an analysis for all priority pollutants regulated and only for those PAIs used or manufactured at each plant.

5. BAT Pollutant Removals, Costs, and Economic Impacts

EPA estimates that the BAT regulation will result in the incremental removal (beyond that achieved by BPT) of 147,000 pounds per year of PAIs and 14,000 pounds per year of priority pollutants. In addition, steam strippers to remove volatile pollutants would reduce air emissions by nearly six million pounds per year. Much of the volatile pollutants are currently being emitted to the air from sewers and biological treatment systems. Achievement of BAT is estimated to require capital costs of $24.9 million and annualized costs of $18.2 million (1986 dollars). There are no plant closures anticipated as a result of the BAT regulation. Two facilities are projected to close product lines as a result of the regulation, with job losses equivalent to 31 full-time employees. A discussion of the economic impact analysis of BAT is contained in Section VII of today's notice.

D. New Source Performance Standards

1. Need for NSPS Regulation

New Source Performance Standards (NSPS) represent the limitations attainable through the application of the best available demonstrated treatment technologies for nonconventional, conventional, and priority pollutants.

For Subcategory A, the Agency has determined that limitations that are more stringent than BAT limitations required for existing plants can be achieved and are justified in some cases; in the remaining cases, NSPS is promulgated equal to BAT.

The Agency is reserving NSPS for Subcategory B, because BPT already requires no discharge of process wastewater pollutants. This is the most stringent limitation possible; thus, there is no need for NSPS regulations reflecting more stringent control technologies. EPA believes it is unlikely that there will be any new manufacturers (Subcategory B facilities) of the metallo-organic pesticides currently being manufactured. New manufacturing plants, to the extent there are any, would very likely produce only new pesticides not registered in 1986. Unlike organic pesticide chemicals, where new producers of currently manufactured pesticides are possible, EPA believes new producers of metallo-organic pesticides are unlikely, because there have been no new plants in the metallo-organic pesticide industry for more than 20 years and because the current PAIs produced are the same as those produced over the past 20 years (i.e., there have been no new metallo-organic PAIs in 20 years). Three plants of eight operating in 1986 have closed, and no new plants have begun operations. Therefore, the Agency does not believe there will be any new sources, and there is no need for NSPS.

2. NSPS Technology Options and Selection

The Agency considered the following two options to develop NSPS for conventional, nonconventional and priority pollutants from Subcategory A manufacturing facilities.

a. Option 1: Treated Discharge. Option 1 would base NSPS limits on the BAT limitations for organic PAIs in Subcategory A, except that the limits would be modified to reflect the capability for wastewater flow reduction by source reduction and recycle/reuse at new facilities. The Agency compared

wastewater generation and discharge practices at more recently built pesticide manufacturing plants with those at older plants. Specifically, EPA looked at the practices for manufacturing PAIs for which BAT regulations are being promulgated today, most of which are produced at the older plants. The Agency compared the practices to those used for similar production processes at the more modern plants. That is, the comparison involved a similar production process at the newer plant but not necessarily production of the same PAI. In many cases, the comparison was to the production of a PAI that is not covered by today's final regulations due to lack of analytical method for the new PAI and lack of BAT treatment level performance data. The Agency found that an average wastewater volume flow reduction of 28 percent has been demonstrated at the newer facilities for similar production processes. This flow reduction has been achieved by increased recycle/reuse of wastewater and in many cases, specific identifiable source reduction steps, such as increased source segregation of process streams to allow for more direct recycle within the process, and increased use of closed loop recovery systems with or without treatment.

The flow reduction evaluation consisted of reviewing the questionnaire responses to determine contaminated wastewater discharge flow rates and process age; comparing process wastewater discharge rates for each facility with their pesticide process starting and last modification dates for the PAI production process; and normalizing the discharge volume by dividing it by the annual PAI production volume. Although this analysis revealed a flow reduction trend, the dates reflected plant level startup or modification rather than startup of individual processes; these data were therefore too general to be used. A second evaluation looked at overall industry data comparing the 1977 and 1986 Manufacturers Census. However, this method of evaluation also proved to be too general to be satisfactory since there was not sufficient process identification with respect to changes reflected in the different flow levels. The final evaluation method consisted of identifying which PAI manufacturing processes were in operation in 1986 that were not in operation during 1977, using the Manufacturers Census for both years. Metallo-organic pesticides processes were excluded since they were required to meet zero discharge by the 1978 BPT rules and their process water needs are significantly different from those of organic pesticides processes.

Certain PAI processes (for organic pesticides) were also excluded from the analysis because they are associated with unique wastewater generation characteristics. Excluded were those processes which manufacture PAIs from other registered PAIs, either through the amination or esterification of 2,4-D compounds, bromacil, bromoxomyl, pentachlorophenol, endothall, or glyphosate, or through the purification of hexazone, phosmet or malathion. Also excluded were instances where process wastewater was disposed of primarily by deepwell injection or incineration since deepwell disposal does not provide much of an incentive to reduce flows and the incinerator flows represent scrubber water flows which cannot be further reduced on a daily discharge basis.

Out of a total of 36 processes (at 29 facilities) that were started-up since 1977, 25 processes (at 23 facilities) were identified in the flow per unit production analysis as "new plants". Two analyses of flow per unit production were made: First, all wastewater discharge volumes to treatment for each process were totaled to determine flow rates per process; and second, those wastewater discharges which resulted from specifically identified and quantified contact process streams (excluding scrubber blowdowns, stripper or distillation overheads, and contaminated stormwater) were totaled to estimate total discharge volumes from segregated, PAI-contaminated streams. While contaminated stormwater may also contain PAIs, it was excluded from the second analysis because control of stormwater reflects housekeeping and facility design more than process design.

Between the "Old" and "New" plants, there is a difference of 0.44 (from 1.55 to 1.11) gallons per pound in total wastewater discharges, representing a 28 percent reduction in flow. The difference between discharges of contact wastewater are even greater—this analysis suggests that in newer processes only 52 percent of all wastewater discharged results from unsegregated process streams, as opposed to 70 percent in older facilities. This reduction reflects both the higher degree of source segregation practiced in newer processes, as well as a trend toward processes generating only scrubber or stripper overheads through the use of closed loop, solvent recovery systems. However, not included in this analysis was a determination of the degree of segregation between contact streams resulting from pre-PAI formation steps and post-PAI formation steps in the processes, a practice which is also more common in the newer facilities. Selective treatment, using PAI destruction/removal technologies of only contaminated wastewater streams could also reduce the flow to and therefore the cost of PAI treatment processes.

Several industry commenters take issue with EPA's fundamental conclusion that flow reduction of 28 percent can be achieved by new sources. According to the commenters, the data base for existing pesticides manufacturers reflects their efforts to do everything possible to reduce the amount of waste generated or to implement pollution prevention waste reduction measures.

EPA does not agree, because, as explained, the data show that the newer generation of pesticides manufacturing facilities have achieved a 28 percent reduction in their effluent flow volume compared to existing facilities that produce pesticide chemicals with similar manufacturing processes. Based on these flow reduction data, it is evident that newer facilities have redesigned their processes and minimized their flows in significant ways compared to older facilities (for example, several specific source reduction measures that newer facilities have implemented, leading to flow reductions, are explained further below). Moreover, a number of manufacturers have provided evidence that even since the time of EPA's information collection for this rulemaking, plants have been doing more to achieve a reduction in effluent flow volume. Specifically, in their comments on the proposed regulations, two companies provided information on flow reduction measures (resulting from source reduction practices) that have been implemented at three existing plants since 1990. Four other commenters gave details of their intentions to implement further source reduction measures to achieve flow reduction in the near future at four facilities. In sum, EPA cannot agree with the industry commenters' unsupported claim that it is unlikely that further reductions in flow volumes will be possible at new facilities.

The industry commenters also claim that in deriving NSPS standards, EPA has confused flow reduction with a reduction in the mass of pollutants discharged. The commenters' understanding is that flow reduction refers to reducing the volume of effluent

discharged, not necessarily reducing the mass of pollutants. A reduction in the volume of wastewaters, the commenters assert, usually means an increase in pollutant concentrations, with no change in the mass of pollutants. Flow reduction, they state, is often a matter of segregating non-contact flows, which results in lower wastewater volumes, higher PAI concentrations and no change in the actual PAI mass discharge. The commenters conclude that NSPS limits based on a 28 percent decrease in the mass of pollutants discharged therefore could not be achieved even if there were a 28 percent reduction in effluent volume.

The commenters' conclusion is invalid because they misunderstand what EPA means by flow reduction. EPA's finding that a 28 percent average flow reduction has been achieved at newer plants is based not just on reducing the volume of water used in the production process, but also on source reduction techniques that reduce the mass of pollutants in the effluent. These source reduction techniques reduce both the volume of effluent and the mass of pollutants discharged. There are a number of different ways in which the newer generation of plants are already achieving source reduction. Some examples are the following (these examples reflect techniques that have actually been employed at one or more of the newer generation of existing plants, as reflected in the record for this rulemaking):

—Redesign (reordering) of the steps undertaken to manufacture PAIs can reduce the overall amount of solvents and water needed in the production process as reaction and carrier media. This leads to a lower amount of spent solvents and wastewaters that need to be disposed of.

—New facilities can be designed to reduce the amount of piping between chemical process reactors and other equipment, such as storage tanks. Newer plants have the opportunity to locate pesticide chemical reactor vessels and other equipment closer together to reduce the amount of piping. Because there is a smaller amount of piping to wash periodically, there is a smaller volume of effluent generated due to equipment washing and a smaller mass of pollutants in the effluent.

—Solvents rather than water can be used to perform equipment washing. Generally, solvents are much more effective than water at washing because they absorb much greater levels of impurities (the solubility levels of pollutants in solvents are usually much higher than they are in water). Therefore, lower volumes of solvents can be used for equipment washes compared to water, and the solvents can be reused to a much greater degree than wash water can. Further, solvent washes that are no longer usable may be burned (i.e., used as a fuel). Contaminated water from equipment washes, however, has very little fuel value and can be incinerated only at a high cost. Equipment wash water therefore is more likely to have been discharged by older plants. (Because older plants may not have been designed and equipped to cope with flammability and explosion concerns that may be present when using solvent washes, they may have no choice but to use water rather than solvent washes.)

—The manufacturing equipment can be designed and configured at newer plants to lead to greater recovery of equipment wash water and spills of reaction materials before they are contaminated, either through contact with the ground or through commingling with other wastestreams. Therefore, a greater portion of these flows can be reused rather than discharged (impurities introduced into these flows from ground contact or from commingling can render them unfit for reuse).

Moreover, even without employing source reduction practices, reducing the volume of water itself will lead to a related reduction in the mass of pollutants discharged because of more efficient wastewater treatment. The commenters' assumption is that water reduction practices do not reduce the amount of the pollutant and therefore will lead to an increased concentration of the pollutants in the effluent. It may well be that some water (or even source) reduction will, in some cases, lead to an increase in the pollutant concentration in wastewaters (for example, where process wastewater streams are segregated from non-contact streams, reducing dilution of the process wastewater streams). However, in such cases, because the volume of wastewater has been reduced, the treatment systems can be operated more efficiently and will ultimately remove a larger overall portion (mass) of the pollutants in the wastewaters than was removed prior to flow reduction. The data in fact show that the BAT control technologies, properly operated, will generally reduce the level of pollutants to similar concentrations both before and after flow reduction. This phenomenon holds true for all of the control technologies identified in this rule as BAT technologies (i.e., hydrolysis, activated carbon, chemical oxidation, and biological treatment).

For example, assume that a unit of PAI production generates 1000 gallons of wastewater with 100 ppb of pollutant, and that the control technology will reduce this level of pollutant to 1 ppb in the effluent. If the flow were reduced to 750 gallons of wastewater and the mass of pollutants were not reduced, the concentration of pollutants in the influent would increase to 133 ppb. The data show, though, that after treatment, a level of approximately 1 ppb can still be achieved in the effluent due to more efficient operation of the treatment system. As a result, a greater mass of pollutants has been removed by treatment in the latter case.

In sum, to meet NSPS, flow reduction can be achieved through source reduction, not just water reduction, and BAT treatment systems can be operated more efficiently to remove greater amounts of a pollutant at lower flow volumes. Therefore, the data showing a 28 percent average reduction in the flow volume at manufacturing facilities support a corresponding 28 percent reduction in the allowable mass of the pollutants in a facility's effluent.

The industry commenters also point out that even if the figure of 28 percent flow reduction were supported by the data, this represents only an average flow reduction value. Therefore, they claim, 50 percent of new plants will not be able to meet this value, and so it should not be used as a basis for NSPS standards.

EPA disagrees with the commenters on this issue as well. Section 306 of the Clean Water Act defines new source performance standards as reflecting the "greatest degree of effluent reduction which the Administrator determines to be achievable through application of the best available demonstrated control technology * * * including, where practicable, a standard permitting no discharge of pollutants." New source performance standards are based not on what most or all plants in a category can achieve, but on the best performance that can be achieved in that category. The present availability of a particular technology may be "demonstrated," for example, if even one plant uses the technology in question. *Chemical Manufacturers Association* v. *EPA*, 870 F.2d 177, 263 (5th Cir. 1989).

EPA recognizes that for each of the existing PAI manufacturing processes, new plants would be capable of achieving somewhat different rates of flow reduction because of differences in plant designs and configurations and in the degree of source reduction practiced

by existing plants. In other words, available source reduction measures, comprising part of the best available demonstrated technologies for NSPS purposes, would be somewhat different at the different manufacturing facilities and would achieve somewhat different levels of flow reduction at the various facilities. Because of this, EPA concluded that NSPS standards could not be based in this instance on the single greatest level of flow reduction being achieved at any one facility. Instead, EPA applied its engineering and technical judgment to determine that NSPS standards should be set on the basis of an average flow reduction using the current data.

EPA believes that this average flow reduction value is a reasonable estimate of what new plants could achieve. If anything, it may somewhat underestimate the flow reduction capabilities of some new plants because the available data do not reflect further flow reduction measures that are being implemented at existing facilities, as described above, or other source reduction measures (i.e., additional stormwater control) that can be implemented by new sources. These factors lend significant support to the Agency's judgment that new sources will be able to achieve flow reduction of at least 28 percent. Because there is a lack of sufficient quantitative data on further source reduction capabilities, however, EPA was unable to rely on such capabilities to set even more stringent NSPS standards.

The Agency believes that, in particular, new sources can do more than existing facilities to reduce the levels of pollutants in contaminated stormwater. This will result in further source reduction that is not accounted for in the data on which EPA set a 28 percent reduction in allowable pollutant levels for new sources. EPA promulgated general stormwater permits for the pesticide chemicals manufacturing industry and others in September, 1992 (57 FR 41236, September 9, 1992, and 57 FR 44438, September 25, 1992). These permits (and similar State permits in some cases) require that by October, 1993, all existing and new facilities must have developed and implemented a stormwater pollution prevention plan designed to minimize the level of pollutants that have the potential to get into stormwater runoff. From the information in the questionnaires and the site visits, EPA believes that once these pollution prevention plans are implemented, new sources (as well as existing ones) will be able to do more than pesticide chemicals manufacturing facilities are currently doing to reduce the amount of contamination in storm water. For example, facilities can enclose production areas, build dikes for storage areas, shipping areas and loading docks, and place production equipment closer together to reduce the surface area exposed to precipitation runoff. These further source reduction measures could not be quantified because there are no specific data on what pollutant reductions can be achieved through improved stormwater control. However, the fact that further source reduction capability through improvements to stormwater control could not be accounted for in setting NSPS standards does lend qualitative support to EPA's determination that a 28 percent reduction in flow volume and pollutant levels based on available data is a reasonable estimate of what new plants will be able to achieve.

Because of differences in flow reductions that might be achieved at different types of new plants, the industry commenters advocated not taking flow reduction into account at all and therefore setting NSPS standards equal to BAT limitations. EPA does not believe it would be justified in ignoring flow reduction measures completely in establishing NSPS for new pesticides manufacturers. The Act directs the Agency to set new source performance standards at the level achievable with the best available demonstrated control technologies in an effort to move toward the Act's overall goal of zero discharge. It would be inappropriate to fully overlook pollution prevention opportunities presented in this case by known flow reduction capabilities of new plants. Instead, EPA has arrived at a reasonable estimate of the flow reduction level that all new plants will be able to achieve.

Therefore, to set NSPS limitations for PAIs, EPA used the BAT limitations and applied a 28 percent wastewater flow reduction to arrive at the mass-based proposed NSPS limits (except as described below for three PAIs). This flow reduction was applied where BAT limits are based on the flows at older facilities (of course, where the BAT is a zero discharge limit, NSPS is also set at zero discharge). At proposal there were two PAIs (carbofuran and DEF) with non-zero BAT limitations that were being produced at the more modern plants (also, limits for a third PAI, merphos, were based on technology transfer from DEF, one of the other two). Because these are newer plants EPA assumes that they have both achieved flow reductions of at least 28 percent compared to older plants. Because there were insufficient data to quantify further flow reductions that might be possible, EPA proposed to set the NSPS limits for these three PAIs equal to the BAT limits. EPA received no further information from commenters on this approach for these three PAIs, and therefore the final NSPS limits for these PAIs are being promulgated as proposed.

Another commenter asserted that, because some proposed PAI limitations would require zero discharge, NSPS/PSNS should require zero discharge for all PAIs. A limit of zero discharge of process wastewater pollutants was proposed, and is included in the final rule, for those particular PAIs where closed-loop production or no water use production has been demonstrated as available. The production processes in those cases are different from production processes for other PAIs, and the technology cannot be transferred due to the differences in the production processes. For certain other PAIs, the proposed NSPS/PSNS incorporated waste reduction (recycle/reuse, recirculation, and process changes as discussed in Section XI). However, this waste reduction practices cannot be demonstrated to achieve zero discharge. For example, extensive process changes might be considered, such as those involving a different raw material or different manufacturing conditions, (temperatures, pressures), but basing NSPS on such changes would not be feasible because such changes may result in a different chemical compound (unregulated PAI or non-PAI) being manufactured. As discussed above, the zero discharge option for all process wastewaters was determined to be economically unachievable for both BAT and NSPS.

To summarize, in the proposal, where the BAT limitations for PAIs were set at zero discharge, NSPS limitations were also set at zero. For all other PAIs except three, EPA used the BAT limitations and applied a 28 percent wastewater flow reduction to arrive at the mass-based proposed NSPS limits. For the remaining three PAIs, NSPS was proposed as equal to the BAT numeric limits because BAT was proposed to be based on data from new plants which had already achieved the 28 percent reduction in the flow.

NSPS Option 1 limitations for BOD, COD, and TSS for Subcategory A were also proposed to be set equal to BPT limitations but reflecting a reduction in wastewater flow of 28 percent. NSPS limitations under Option 1 for priority pollutants discharged by Subcategory A plants were proposed to be set equal to BAT because these limits are concentration-based. The capability of

reduced wastewater flow at new plants would be taken into account by the permit writer to arrive at mass-based permit limits.

b. Option 2: Zero Discharge. Proposed Option 2 would require zero discharge of process wastewater pollutants, based on off-site or on-site incineration, source reduction, recirculation and recycle/reuse. NSPS Option 2 corresponds to BAT Option 2. The facility-level economic impacts of NSPS Option 2 are considered to be essentially the same as those for BAT Option 2 since the costs of on-site or off-site incineration (and associated transportation costs) would only be reduced to reflect the flow reduction between new and existing plants. NSPS Option 2, like BAT Option 2, therefore would still be extremely expensive (see Section VII). The BAT costs for Option 2 are almost totally due to annual operating costs of contract hauling and incineration of the entire wastewater volume. Thus, this cost is almost entirely dependent upon the volume of wastewater. Given this situation, the reduction in costs for new sources would be directly proportionate to the reduction in wastewater volume (i.e., 28 percent for most PAIs). Since approximately 28 percent reduction of costs is still close to the level of revenues expected as a result of the manufacture of these PAIs, the Agency believes that the zero discharge limitations for all wastestreams would present a barrier to market entry. Therefore, the Agency is rejecting Option 2 as a basis for the final rule NSPS, because this option would not be economically achievable.

As a third option, the Agency also considered membrane filtration technology added to Option 1 for further pollutant reduction. However, the removal levels that this technology can achieve have not been demonstrated at any pesticide chemicals manufacturing plant. Therefore, the Agency did not base NSPS on this technology.

As stated in the proposal the Agency also considered but rejected the option of basing NSPS on the BAT technology with no additional flow reduction in any case. The Agency believes that flow reduction has been demonstrated in many cases as described, and, because flow reduction may mitigate the costs for treatment by resulting in the need for smaller treatment units, and in some cases also decrease production costs, new plants have an incentive to include flow reduction as an integral part of the plant design. Therefore, the NSPS limitations include flow reduction as described.

EPA is promulgating Option 1 for NSPS effluent limitations guidelines, as was proposed (although the final rule includes changes to some of the individual PAI limitations, as discussed below). Option 1 provides for reduction of pollutants discharged into the environment beyond that which is achieved by BAT. In addition, Option 1 represents further progress toward pollution prevention goals due to the reduction in the volume of wastewater generated prior to treatment.

For most PAIs, the basis for the final NSPS is not changed from the proposal. However, for the PAIs benfluralin, ethalfluralin, trifluralin, fenarimol, isopropalin, pendimethalin, phorate, terbufos, acephate and captafol, the final BAT limitations are based on incineration. The only discharge of wastewaters is the incinerator scrubber water used to clean the incinerator gases prior to emission to the atmosphere. Comments received from manufacturers correctly pointed out that a reduction in the process wastewater volume will not reduce the need for or the amount of scrubber water used to clean the incinerator gases. The reduced wastewater volumes being incinerated would require less days for the operation of the incinerator, but the same pollutant pounds per day during the days of incinerator operation. Therefore, in the final rule EPA has revised the NSPS limitations to be equal to the BAT limitations for these ten PAIs.

The proposed NSPS limitations for pyrethrin I and pyrethrin II, like the proposed BAT limitations for these PAIs, were set at zero discharge. The final BAT limitations for those two PAIs, however, have been changed to numeric limitations based on hydrolysis technology transfer. Therefore, the final NSPS limitations for these two PAIs have been set by using the final BAT limitations and imposing a 28 percent reduction of process wastewater flow.

The proposed BAT limitations for norflurazon were also set at zero discharge. However, the final regulations set numeric limitations based on a transfer of the limits set for structurally similar PAIs (where activated carbon treatment was identified as the BAT technology). The norflurazon plant did not begin operations until 1986 and is therefore considered to be a newer plant that has already incorporated flow reduction. Therefore, the final NSPS limits for norflurazon are set equal to the final BAT limitations (i.e., no flow reduction beyond BAT has been incorporated).

In setting NSPS standards, EPA has also considered whether pesticide manufacturers will begin to produce new PAIs in the future. The pesticide chemicals manufacturing industry is unique in that expansion or changes in the industry are not likely to occur through the manufacture of currently produced PAIs at new facilities. Instead, it is much more likely that only new PAIs would be manufactured at new facilities. Since the nature of the treatability of new PAIs cannot be readily predicted, the Agency does not believe it is possible to develop NSPS standards for treatment of new PAIs.

3. Applicability of NSPS

The Agency is promulgating NSPS under Subcategory A for the conventional pollutants regulated under BPT/BCT (BOD, TSS, and pH), COD, and the toxic and nonconventional pollutants regulated under BAT (120 organic PAIs and 28 priority pollutants). NSPS being promulgated today for the PAIs are presented in Table 3 of today's final rule.

Each new source discharger in Subcategory A will be subject to the standards for the pollutants regulated in this subcategory. Once a pollutant is regulated, the regulation will serve as the basis for the limitations in the NPDES permits issued to new source direct dischargers. The monitoring requirements established by the permitting authority for new source pesticide chemicals manufacturing plants would include an analysis for all regulated conventional and priority pollutants at each plant; the non-conventional pollutant, COD, at each applicable plant; and only those PAIs used or manufactured at each plant.

E. Pretreatment Standards for Existing Sources

1. Need for Pretreatment Standards

Indirect dischargers in the pesticide manufacturing industry, like the direct dischargers, use as raw materials, and produce as products or byproducts many nonconventional pollutants (including PAIs) and priority pollutants. As in the case of direct dischargers, they may be expected to discharge many of these pollutants to POTWs at significant mass or concentration levels, or both. EPA estimates that indirect dischargers of organic pesticides annually discharge approximately 27,000 pounds of PAIs and 22,000 pounds of priority pollutants to POTWs.

EPA determines which pollutants to regulate in PSES on the basis of whether or not they pass through, interfere with, or are incompatible with the operation of POTWs (including interference with sludge disposal practices). The Agency evaluates pollutant pass through by comparing the pollutant percentage

removed by POTWs (with well-operated secondary treatment systems) with the percentage removed by BAT technology applied by direct dischargers. A pollutant is deemed to pass through POTWs when the average percentage removed nationwide by well-operated POTWs (those meeting secondary treatment requirements) is less than the percentage removed by directly discharging pesticide manufacturing facilities applying BAT for that pollutant.

There is very little empirical data on the PAI removals actually achieved by POTW's. Therefore, the Agency proposed to rely on laboratory data to estimate the PAI removal performance that would be achieved by biological treatment ("biotreatment") at well-operated POTWs achieving secondary treatment levels. The results of this laboratory study are reported in the Domestic Sewage Study ("DSS") (Report to Congress on the Discharge of Hazardous Waste to Publicly Owned Treatment Works, February 1986, EPA/530–SW–86–004). The DSS provides laboratory data under ideal conditions to estimate biotreatment removal efficiencies at POTWs for different organic PAI structural groups.

For each of these PAI structural groups, the DSS shows that average BAT removal efficiencies are considerably greater than the average PAI removals achieved by biotreatment under laboratory conditions for each of the PAIs (99 percent removal by BAT versus an optimistic estimate of 50 percent or less removal by the POTW as reported in the DSS). Accordingly, organic PAIs were deemed to pass through the treatment systems at POTWs.

In addition to pass-through, many of the PAIs in pesticide manufacturing wastewaters are present at concentrations which may interfere with biological treatment operations at POTWs. In some cases, discharges into POTWs have interfered with the operations at POTWs, resulting in documented discharges of PAIs and operational problems at the POTWs. Details of the pass-through analysis are discussed in Section 7 of the Technical Development Document for today's rule.

For the proposal, in order to evaluate the need for PSES for the priority pollutants, EPA relied on an analysis originally done to support the OCPSF regulations. See section 6 of the OCPSF Technical Development Document. Prior to promulgation of the OCPSF effluent guidelines in 1987, EPA conducted a study of well-operated POTWs that use biological treatment (the "50-Plant Study"). The 50-Plant study determined the extent to which priority pollutants are removed by POTWs. The principal means by which the Agency evaluated pollutant pass-through was to compare the pollutant percentage removed by POTWs (with well-operated secondary treatment) with the percentage removed by direct dischargers with BAT Technology.

Because some of the data collected for evaluating POTW removals included influent levels of priority pollutants that were close to the detection limit, the POTW data were edited to eliminate influent levels less than 100 parts per billion (ppb) and the corresponding effluent values, except in cases where none of the influent concentrations exceeded 100 ppb. In the latter case, where there were no influent data exceeding 100 ppb, the data were edited to eliminate influent values less than 20 ppb and the corresponding effluent values. These editing rules were used to allow for the possibility that low POTW removals simply reflected the low influent levels.

EPA then averaged the remaining influent data and also averaged the remaining effluent data for each pollutant and each POTW whose data passed the editing rules for that pollutant, and calculated an average percent removal for each POTW. The percent removal achieved for each priority pollutant was determined based on the median of the average percent removals calculated for each of these POTWs. This percent removal was then compared to the percent removal achieved by BAT treatment technology. Based on this analysis, EPA determined that 47 priority pollutants of the 63 priority pollutants regulated under OCPSF passed through POTWs. Not all of these priority pollutants are present in pesticides manufacturers' wastewaters. As noted, 23 of the priority pollutants present in OCPSF wastewaters are also present in pesticides manufacturers wastewaters. The OCPSF pass through analysis originally showed that 21 of those 23 priority pollutants pass through; the only priority pollutants of those 23 that were determined not to pass through were 2-chlorophenol and 2,4-dichlorophenol. As described previously, and in more detail in a later OCPSF rulemaking (58 FR 36872), EPA has now determined that two more priority pollutants, phenol and 2,4-dimethylphenol, also do not pass through a POTW.

Consistent with the OCPSF rulemaking, EPA is setting the pretreatment standards for existing sources for the priority pollutants equal to the set of BAT limitations that applies to plants that do not have end-of-pipe biological treatment. In the OCPSF pass-through analysis for setting pretreatment standards, POTW removals were compared to BAT-level removal at plants that did not have end-of-pipe biological treatment.

The number of priority pollutants that are covered by the final PSES regulations is based on EPA's pass through methodology as described in two OCPSF rulemaking notices published on December 1, 1992 (57 FR 56883) and July 9, 1993 (58 FR 36872) (the "OCPSF notices"). A detailed description of this methodology is contained in the OCPSF notices (at 57 FR 56886–56887 and 58 FR 36885–36888).

Those notices explain the following: In general, EPA is continuing to apply its traditional pass through methodology, which considers the median percent removals of a pollutant by direct dischargers and by POTWs to determine pass through. This approach has been upheld in litigation as an appropriate, conservative means of determining pass through (*CMA* v. *EPA*, 870 F.2d 177, 243–48 (5th Cir. 1989)) and EPA continues to believe it is the correct approach as a general matter. However, the traditional approach is overly conservative for two priority pollutants, phenol and 2,4-dimethylphenol. EPA's analysis focused first on the data relating to phenol removals. A comparison of median removals by BAT technologies and at POTWs indicated that phenol and 2,4-dimethylphenol do pass through POTWs. It became apparent, however, that the pass through conclusion was strictly an artifact of the higher influent concentrations for direct dischargers in EPA's database. (Specifically, the calculated removals from lower influent concentrations at POTWs down to the analytical minimum level are less than the calculated removals from the higher influent concentrations for direct dischargers down to the analytical minimum level, even though the POTWs and direct dischargers might actually be achieving about the same removals.) The OCPSF notices state that viewing the data as a whole, EPA found that POTWs appear to achieve removals of the phenols that are essentially equivalent to those achieved by direct dischargers.

As also explained in the OCPSF notices, a chemical and engineering analysis indicates that the two phenols are highly biodegradable due to their simple chemical structures, and EPA finds that a pollutant's estimated biodegradation rate is the best theoretical indicator of whether it will pass through POTW biological treatment

systems. Under all the above considerations, EPA concluded that phenol and 2,4-dimethylphenol do not pass through POTWs. EPA's decision to modify its traditional pass through methodology for phenol and 2,4-dimethylphenol was based on the Agency's conclusion that both the data available for these two pollutants and the chemical and engineering analysis performed by EPA indicate that the traditional pass through methodology is overly conservative for these pollutants.

For the pesticides manufacturers rulemaking, EPA had proposed to set categorical pretreatment standards for 26 priority pollutants, including phenol and 2,4-dimethylphenol, based on a determination that they pass through POTWs. However, in the notice published on December 1, 1992, EPA indicated that for both the OCPSF and pesticides manufacturers rulemakings, the Agency was considering not setting pretreatment standards for phenol and 2,4-dimethylphenol for the above reasons. In the notice published on July 9, 1993, EPA finalized its decision not to set pretreatment standards for phenol and 2,4-dimethylphenol in the OCPSF rulemaking. In today's final pesticides manufacturers rule, consistent with the OCPSF rule, EPA has similarly deleted these two pollutants from the list of pollutants that are covered by pretreatment standards. For the reasons articulated more fully in the December 1, 1992 and July 9, 1993 notices, EPA has determined for today's final rule that phenol and 2,4-dimethylphenol do not pass through POTWs.

Therefore, today's final rule sets pretreatment standards for 24 priority pollutants instead of 26 pollutants as proposed. As the proposal indicated, EPA has determined under its traditional pass through methodology that these 24 pollutants do pass through POTWs. Further, even under the additional pass through considerations described above, EPA still finds that these 24 pollutants do pass through. Of these 24 priority pollutants, 17 are volatile organics as to which EPA would have applied the "volatile override" to determine that they pass through if the percent removal analysis had not shown pass through. (The 17 pollutants in question are all of the 24 pollutants listed in Table 6 of the regulations except for naphthalene, cyanide, lead, and the four brominated compounds: bromomethane, tribromomethane, dibromochloromethane, and bromodichloromethane.) These pollutants have overall volatilization rates comparable to the rates for which EPA has applied the volatile override in the past (see, e.g., OCPSF rule, 58 FR 36886–36888, July 9, 1993). Based on their Henry's Law constants, these are all highly volatile compounds. Because much of the "removal" of these pollutants prior to and during POTW biological treatment is likely the result of volatilization, EPA continues to conclude, based on its traditional methodology, that these 17 pollutants pass through POTWs.

One of the remaining pollutants, naphthalene, is also a volatile organic pollutant as to which EPA would have applied the "volatile override" to determine that it passes through if the percent removal analysis had not shown pass through. EPA is mentioning naphthalene separately because, unlike the case of the 17 pollutants discussed above, biological treatment has been identified in this rulemaking as part of the BAT basis for naphthalene limitations. This indicated that naphthalene's biodegradability might be important for pass through purposes. However, EPA continues to conclude, as stated in the OCPSF rulemaking, that naphthalene is chemically more complex than the phenols and therefore less readily biodegradable in POTWs. The volatile override would control EPA's finding of pass through in any event for naphthalene. See 58 FR 36887 (determination in the OCPSF remand notice that naphthalene does pass through POTWs).

As stated in the proposal, there is very little data to determine POTW removals for the four brominated priority pollutants: Bromomethane, bromoform (tribromomethane) dibromochloromethane, and bromodichloromethane. However, these pollutants are structurally very similar to chloromethane and chloroform (trichloromethane), which were shown to pass through by the OCPSF analysis. In addition, EPA sampling at pesticide plants where the brominated priority pollutants are found shows that extensive volatilization of these pollutants occurs in sewers rather than removal via treatment, and the Agency expects that similar volitilization would occur when the pollutants are discharged to a POTW. This volatilization would not occur with BAT treatment, which removes (and destroys or recycles) the pollutants from the wastewater before volatilization can occur. Therefore, EPA has determined that pass-through does occur for these four brominated priority pollutants.

The two remaining priority pollutants out of 24 are cyanide and lead. The determination of pass through for cyanide is based on actual full-scale data showing very high removals for cyanide at BAT-level plants (over 99 percent), compared to an average removal level for cyanide of 54 percent at well-operated POTWs, as determined in the 50-plant study. For lead, as the proposal explained, the BAT concentration limits were based on the use of hydroxide precipitation technology. EPA transferred data for this technology from the Metal Finishing industry for purposes of both the OCPSF and pesticides manufacturers rulemakings. It is clear that the data, which show much greater removals of cyanide and lead by BAT technologies than by POTWs, are not merely an artifact of different influent levels. Cyanide and lead also are not readily biodegradable compounds. EPA therefore continues to conclude that cyanide and lead do pass through POTWs.

Moreover, even under the revised pass through considerations, EPA continues to conclude that all of the 120 PAIs regulated in today's final rulemaking do pass through POTWs. As described above, to compare removals at well-operated POTWs versus BAT-level plants, EPA relied on laboratory data to estimate the removals at POTWs. These were controlled experiments that were not subject to the low influent concentrations that may be present in the case of actual full-scale data at POTWs. In fact, as discussed, EPA believes that these laboratory data were optimistic in that they tended to overestimate the removals of PAIs at well-operated POTWs. Therefore, there is no basis for altering EPA's findings under the traditional pass through methodology that these PAIs do pass through POTWs.

Based upon the above considerations, EPA has concluded that PSES regulations are warranted for all of the pollutants regulated under BAT for direct dischargers except 2-chlorophenol, 2,4-dichlorophenol, phenol and 2,4-dimethylphenol.

General pretreatment regulations applicable to all existing and new source indirect dischargers appear in 40 CFR part 403. These regulations describe the Agency's overall policy for establishing and enforcing pretreatment standards for new and existing users of a POTW and delineate the responsibilities and deadlines applicable to each party in this effort. In addition, § 403.5(b) outlines prohibited discharges that apply to all users of a POTW.

2. PSES Technology Options and Selections

Indirect discharging organic pesticide manufacturing facilities generate wastewaters with similar pollutant

characteristics as direct discharging facilities. Hence, the same treatment technologies discussed previously for BAT are considered applicable to PSES.

The Agency considered the following two options in developing PSES for Subcategory A:

a. Option 1: Treated Discharge. Under this option, PSES for organic PAIs would be set equal to the BAT Option 1 guidelines based on the use of hydrolysis, activated carbon, chemical oxidation, resin adsorption, biological treatment, solvent extraction, and/or incineration, and on water reuse or lack of water use in certain cases. The PSES for priority pollutants would be transferred from the PSES established for OCPSF.

b. Option 2: Zero Discharge. Option 2 for Subcategory A indirect dischargers would require zero discharge of pesticide manufacturing wastewater through recycle, reuse, or off-site or on-site incineration of wastewater.

EPA is promulgating Option 1 technologies as the basis for the proposed PSES for the organic pesticide chemicals manufacturing subcategory. Option 1 is economically achievable (see section VII of today's notice), and EPA expects that Option 1 would greatly reduce pollutants discharged into the environment, compared to the zero discharge option (Option 2), thus furthering cross-media and pollution prevention concerns. That is, pollutants not recycled or reused are destroyed by treatment under Option 1 with a minimal amount of transfer to other media. At the same time, the potential cross-media impacts would be largely avoided (e.g., transportation effects such as energy use and air emissions from off-site hauling of large volumes of wastewater, off-site treatment by technologies other than the BAT technologies identified as capable of destroying the PAIs, underground injection without destruction of the PAIs, or less efficient incinerator use due to the large volumes of water being vaporized). Option 2 has been rejected because it was determined not to be economically achievable and because of the cross-media implications of the transfer of pollutants for off-site disposal that might occur through industry efforts to meet a zero discharge limitation for all PAIs.

3. Calculation of PSES

The pretreatment standards for existing sources in the organic pesticides chemicals manufacturing subcategory are presented in tables 2 (for PAIs) and 6 (for priority pollutants) of today's rule. The PSES standards are shown for both PAIs and priority pollutants. As with BAT, PSES standards for organic PAIs are production-based mass limitations. The final PSES limitations for PAIs have been revised as described for BAT in Section V.C above. As with BAT, the priority pollutant PSES standards are concentration-based. The PSES limitations for PAIs and priority pollutants require dischargers to meet "maximum for any one day" and a "maximum monthly average" standards. As proposed, EPA has selected Option 1 for setting the final PSES limitations. For PAIs, the final limitations are identical to the final BAT limits established for these pollutants. The final PSES limitations for the 19 priority pollutants common to both pesticides manufacturers and OCPSF wastewaters which pass through a POTW are identical to those established for these pollutants under PSES for OCPSF.

4. Applicability of PSES Limitations

The Agency is promulgating PSES limitations under the organic pesticide chemicals manufacturing subcategory for the same 120 organic PAIs promulgated under BAT for this subcategory. EPA is promulgating PSES for 24 of the 28 priority pollutants that are promulgated for BAT. As discussed above, the Agency has determined that 2-chlorophenol, phenol, 2,4-dimethylphenol and 2,4-dichlorophenol do not pass through POTWs and do not cause interferences at POTWs.

5. Removal Credits

Congress has recognized that even when a pollutant is deemed to pass through a POTW, the POTW nevertheless in certain cases may in fact be removing a non-trivial amount of the pollutant. As a result, Congress established a discretionary program for POTWs to grant "removal credits" to industrial users (sec. 307(b) of the Act, 33 U.S.C. 1317(b)). The removal credit, in the form of a less stringent pretreatment standard, allows an increased amount of pollutants to flow from an industrial user's plant to the POTW.

Section 307(b) establishes a three-part test for obtaining removal credit authority. Removal credits may only be awarded if: (1) The POTW "removes all or any part of (the) toxic pollutant" for which credits are being granted; (2) the POTWs ultimate discharge does "not violate that effluent limitation or standard which would be applicable to such toxic pollutant if it were discharged by (the industrial user) other than through a POTW"; and (3) the treatment of the industrial user's waste stream "does not prevent sludge use or disposal by such (POTW) in accordance with Clean Water Act section 405 * * *"

EPA removal credit regulations are set forth at 40 CFR 403.7. The United States Court of Appeals for the Third Circuit invalidated parts of the removal credit regulations on April 30, 1986. (*Natural Resources Defense Council* v. *EPA*, 790 F.2d 289, 292, 3rd Cir. 1986.) The court ruled that, *inter alia*, EPA may not authorize any POTW to grant removal credits until comprehensive sludge regulations are promulgated under section 405 of the Act.

On February 19, 1993, EPA published "Round One" of its final regulation under the CWA for the use or disposal of sewage sludge (58 FR 9248). This final regulation sets forth requirements contained in 40 CFR part 503 for sewage sludge applied to the land, placed on a surface disposal site, or fired in a sewage sludge incinerator. The standards for each end use or disposal practice consist of general requirements, numerical limits on the pollutant concentrations on sewage sludge, management practices, operational standard and frequency of monitoring, recordkeeping and reporting requirements. The sewage sludge rulemaking also amended 40 CFR part 403 (EPA's General Pretreatment Regulations) and promulgated an "Appendix G" to part 403 with two lists of pollutants that are henceforth eligible for a removal credit with respect to the use or disposal of sewage sludge. The first list, G–I, contains the pollutants controlled for the various use or disposal practices regulated by the part 503 regulation. Of the pollutants on the G–I list, only lead is also covered by pretreatment standards in today's pesticides manufacturers rulemaking. If a POTW complies with the part 503 limit for lead (in connection with land application or incineration) and complies with the other requirements in part 503 for that practice, lead will be eligible for a removal credit so long as other EPA procedural and substantive requirements found at 40 CFR 403.7 are met.

The second list in the appendix, G–II, lists certain pollutants by use or disposal practice and a concentration for each pollutant. The Agency determined that the pollutants on the second list do not pose an unreasonable risk to public health and the environment if the concentrations for those pollutants in the sewage sludge are below the concentrations for the pollutant G–II list. The G–II list contains the following 6 pollutants that are covered by pretreatment standards in today's pesticides manufacturers

rulemaking: Benzene, 2,4–D, heptachlor, lead (surface disposal), malathion, and toxaphene. Authority to issue removal credits with respect to these pollutants will also be available as described in the preamble to the sewage sludge rule. Removal credits will not be available for any pollutants covered by the pretreatment standards in today's rule that are not on either the G–I or G–II list.

As the sewage sludge rule preamble explains, proof that the pollutant concentrations in a POTW's sewage sludge do not exceed the pollutant concentrations on the G–II list must be provided in the Sludge Management Certification portion of a POTW's removal credit application (see 40 CFR 403.7(e)(4)(v)). No further monitoring of these pollutants is required unless required by a sewage sludge permit. If subsequent monitoring reveals that the concentration of the pollutant in the POTW's sewage sludge exceeds the levels in the G–II list or any more stringent limit in the POTW's sewage sludge permit, the POTW is no longer eligible for removal credit authority for that pollutant. See 40 CFR 403.7(f)(4).

To receive removal credit authority for a pollutant, a POTW also must comply with the limits in a sewage sludge permit. The POTW also must comply with any applicable provisions of the Clean Air Act and any more stringent State or local regulations to receive removal credit authority. Implementation of the sewage sludge rule is discussed further in the preamble to that rule.

In addition, on October 9, 1991, EPA published its final rule regulating municipal solid waste landfills (MSWLF) (56 FR 50977). The Solid Waste Disposal Facility Criteria final rule revises 40 CFR part 257 and adds part 258. The rule applies to MSWLFs which co-dispose household wastes and sewage sludge. This rule satisfies a portion of EPA's obligations under CWA section 405(d) to promulgate standards for sludge use and disposal. As a result, POTWs that dispose of all of their sludge in a co-disposal MSWLF will be eligible to seek removal credit authority. In order to obtain removal credit authority, a POTW must dispose of all of its sludge in a MSWLF and the landfill must be in compliance with part 258. In addition, the POTW must meet the other requirements for removal credits set forth at 40 CFR part 403. See 58 FR 9382 (July 9, 1993).

6. Compliance Date

EPA is establishing a deadline for compliance with PSES to be as soon as possible, but no later than three years. See CWA section 307(a)(6). Design and construction of systems adequate for compliance with PSES will be a substantial undertaking for many pesticide chemicals manufacturing indirect 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. Although some facilities will be able to comply with PSES in less time, there may well be facilities that will require the three-year compliance time.

This compliance period is consistent with the 1987 rulemaking for OCPSF plants, which gave plants up to three years to come into compliance with OCPSF pretreatment standards. There are many plants that manufacture both organic chemicals and pesticides. These plants will be subject to both the OCPSF pretreatment standards (40 CFR part 414) and the pesticide manufacturers pretreatment standards. In some cases the plant will be subject to two sets of limitations on the same pollutant; in others, the PSES technology identified for an OCPSF pollutant will be the same as the PSES technology identified for the control of different pollutants under the pesticide manufacturers rule. In either case, the plant may already have installed the technologies necessary to meet the PSES limitations being promulgated today. EPA therefore considered whether to require a PSES compliance period for pesticide manufacturers that is shorter than three years where appropriate, to account for the fact that some combined pesticides/OCPSF plants have already installed the necessary PSES technologies by this time. The Agency believes, however, that it needs to allow a full three years for those plants to come into compliance, since the technologies they have installed to meet the OCPSF standards may have been sized only to meet those standards and may not currently be capable of meeting the combined OCPSF and pesticides standards.

7. PSES Pollutant Removals, Costs, and Economic Impacts

EPA estimates that the PSES regulation will result in the removal of 25,000 pounds per year of pesticide active ingredients, and 21,000 pounds per year of priority pollutants. As a result, use of steam strippers to remove volatile pollutants would reduce air emissions by nearly 20,000 pounds per year. Most of these volatile pollutants are currently emitted to the air in sewers and biological treatment systems. PSES is estimated to result in capital costs of approximately $8.7 million, and annualized costs of just over $5.1 million (1986 dollars). There are no plant closures anticipated as a result of the PSES regulation. At proposal, one facility was projected to close a product line as a result of the regulation, with job losses equivalent to 97 full time employees projected to occur as a result of the product line closure and the decrease in demand resulting from higher prices. That plant had, in fact, closed prior to the proposal of the PSES. No additional firms are expected to experience significant financial impacts as a result of compliance with PSES. (See Section VII, "Economic Considerations.")

8. Pretreatment Standards for Subcategory B

The Agency is reserving PSES for Subcategory B. For Subcategory B plants, EPA considered imposing PSES equal to the existing BPT (i.e., requiring no discharge of process wastewater pollutants), but determined that the only way the facilities could achieve this standard is by off-site disposal (incineration). Off-site disposal was determined not to be economically achievable because one of the two facilities in this subcategory is projected to close if forced to meet that standard. Other options, such as imposing treated discharge requirements, were considered unnecessary since the existing indirect dischargers are subject to locally imposed pretreatment limits which EPA believes provide adequate protection for the POTW and the environment. The two existing facilities are treating their discharges in accordance with these limits and together are discharging only 0.3 pounds of priority pollutants and PAIs annually. Further, imposing the control technologies that are the bases for the BAT limitations being proposed today (i.e., Option 1, physical/chemical treatment) would result in the additional removal of only less than 0.3 pounds annually of priority pollutants and PAIs from these two facilities. In light of the small amount of pollutants being discharged, as well as the economic unachievability of off-site disposal, EPA is not establishing regulations for existing indirect dischargers in the metallo-organic pesticides manufacturing subcategory.

One commenter asserts that EPA should have set PSES limitations for Subcategory B, because local limits are not within EPA's control and might be relaxed by local authorities. EPA does not agree that PSES limitations should be set. Current discharges subject to

current local limits are insignificant (only about 0.3 pounds per year), and imposing PSES limits is projected to remove only de minimis additional amounts of pollutants (less than 0.27 pound per year). Information concerning the two POTWs involved indicates that they had previous problems with pesticide discharges, and because of that are unlikely to relax their local requirements. Moreover, three of the five Subcategory B facilities that EPA identified at proposal as indirect dischargers have closed. Finally, even if the two POTWs removed their local limits on these pollutants entirely, the total annual discharge from the two plants would only be about 14 pounds per year, which is an insignificant amount. Accordingly, EPA is not setting PSES limitations for Subcategory B.

F. Pretreatment Standards for New Sources

Section 307(c) of the Act calls for EPA to promulgate pretreatment standards for new sources (PSNS) at the same time that it promulgates new source performance standards (NSPS). New indirect discharging facilities, like new direct discharging facilities, have the opportunity to incorporate the best available demonstrated technologies, including process changes, in-plant controls, and end-of-pipe treatment technologies.

The same technologies discussed previously for BAT, NSPS, and PSES were proposed as the basis for PSNS. PSNS for Subcategory A are based on the technologies used as the basis for PSES, as identified in the previous section, modified to reflect the flow reduction capable at certain new facilities (as described above for NSPS). EPA also considered a zero discharge option, as for PSES, but it was rejected for the same reasons of economic impact and cross media implications (see the NSPS discussion above).

The final pretreatment standards for new sources for Subcategory A are presented in Tables 3 and 6 of today's rule. The PSNS standards are shown for both PAIs and priority pollutants. As with PSES, the PAI standards are production-based mass limits while the priority pollutant standards are concentration-based.

The Agency is establishing PSNS regulations under Subcategory A for the same 120 organic PAIs promulgated under NSPS including the same flow reduction basis (versus BAT levels) that were used to establish NSPS numerical limitations. The Agency is also promulgating PSNS for 24 of the 28 priority pollutants addressed under NSPS. Four priority pollutants, 2-chlorophenol, 2,4-dichlorophenol, 2,4-dimethylphenol and phenol are determined not to pass through a POTW and therefore are not regulated by PSNS. As discussed above for the final PSES, EPA determined which priority pollutants to regulate under PSNS on the basis of whether or not they pass through, cause upsets, or otherwise interfere with the operation of POTWs (including interference with sludge disposal practices). A detailed discussion of the pollutants considered and selected for regulation in the pesticide chemicals manufacturing industry is provided in Section 6 of the Technical Development Document for today's final rule.

Under Subcategory B, the Agency is reserving PSNS. The Agency believes it is unlikely that there will be any new manufacturers of the metallo-organic pesticides currently being manufactured. New manufacturing plants, to the extent there are any, would very likely produce only new pesticides not registered in 1986. Unlike organic pesticide chemicals, where new producers of currently manufactured pesticides are possible, EPA believes that new producers are unlikely, because there have been no new plants in the metallo-organic pesticide industry for more than 20 years and because the current PAIs produced are the same as those produced over the past 20 years (i.e., there have been no new metallo-organic PAIs in 20 years). In addition, three of the eight organo-metallic pesticide manufacturing plants that were operating in 1986 have closed and no new plants have begun operating. Therefore, the Agency does not believe there will be any new sources, and there is no need for PSNS for Subcategory B.

VI. Pollutants Not Regulated

This section contains a discussion of the priority and pesticide active ingredient (nonconventional) pollutants not regulated by this final rule. A more detailed description of the reason for not regulating each of these pollutants is contained in section 6 of the Development Document.

A. Priority Pollutants Not Regulated

Of the 126 priority pollutants listed in 40 CFR part 423, appendix A, 28 are being regulated as priority pollutants, three are being regulated as PAIs under this rulemaking, and 95 are not being regulated. A list of the 95 PAIs not being regulated and the reasons is contained in Appendix C of this notice.

EPA's sampling of pesticide chemicals manufacturing process wastewater detected 70 priority pollutants (58 organic pollutants, 11 metals, and cyanide). The industry identified a total of 60 priority pollutants, including an additional 14 priority pollutants (12 organic priority pollutants and 2 priority pollutant metals) not detected during EPA sampling. Thus, a total of 84 priority pollutants were reported or detected in plant wastewaters. However, 26 of the 70 priority pollutants detected by EPA sampling were detected at only one or two of the 21 plants sampled.

As stated in Section III.F of this notice, EPA followed a series of steps to confirm the presence of a priority pollutant in cases where priority pollutants were reported as detected in only one or two samples at any sample site. First, EPA examined analytical results for samples collected from other sites at the same facility for reported detections of that same pollutant in pesticide manufacturing process wastewater. Second, EPA examined the details of the production process to determine if the pollutant was a raw material or by-product, or a likely contaminant of raw materials or solvents used by the plant. Finally, EPA contacted knowledgeable plant personnel to determine if the pollutant was a known or likely contaminant, and to determine if the plant had also detected the pollutant during sampling, particularly during sampling conducted the same day EPA sampled and analyzed by the same or a similar analytical method. If EPA could not confirm the presence of the priority pollutant by any of these methods, EPA concluded that the detection represented an erroneous sampling or analysis result, and that the priority pollutant was not, in fact, present.

For 26 of the priority pollutants, EPA could not confirm their presence by these methods and believes these reported detections to be in error; therefore, EPA is not regulating these 26 priority pollutants. (See appendix C.1.c. of this document.)

For 69 other priority pollutants (of the total of 126 priority pollutants), both EPA sampling and industry data show that many of these pollutants are detected in only trace amounts. At trace levels, the pollutants are not treatable by current technologies, and also are below levels likely to cause any adverse effects. Thus, EPA is not setting regulations for these 69 priority pollutants for one or more of the following reasons:

(a) 39 pollutants are deemed not present in pesticides manufacturing wastewaters, because they have not been detected in the effluent with the

use of analytical methods promulgated pursuant to section 304(h) of the Act or with other state-of-the-art methods. (See appendix C.1.a. of today's document.)

(b) 20 pollutants are present only in trace amounts and are neither causing nor likely to cause toxic effects. (See appendix C.1.b. of today's document.)

(c) Six pollutants will be effectively controlled by the technologies upon which are based other effluent limitations guidelines and standards, particularly those required to comply with the PAI limitations in this final rule. (See appendix C.1.d. of today's document.)

(d) Insufficient data are available to establish limitations for three pollutants. These three pollutants would be expected to be present in wastewaters from the manufacture of only three PAIs. These three PAIs were not being manufactured during the time available for sampling and may not be manufactured in the future. (See appendix C.2.a. of today's document.)

(e) No promulgated analytical method is available for one pollutant (asbestos).

Therefore, EPA is promulgating BAT effluent limitations and NSPS for the remaining 28 priority pollutants (26 organic priority pollutants, one metal priority pollutant (lead) and total cyanide).

For PSES and PSNS, the priority pollutants were selected using the analysis originally conducted in 1987 to support the OCPSF regulations. In that analysis, EPA determined that 47 priority pollutants of the 63 priority pollutants regulated for the BAT effluent limitations passed through POTWs. Not all of these priority pollutants are present in pesticide manufacturers wastewaters. As noted, 23 of the priority pollutants present in OCPSF wastewaters are also present in pesticide manufacturers wastewaters. As described in section III.D of today's document, over half of the pesticide chemical manufacturers were regulated by the OCPSF regulations; the 23 priority pollutants detected in pesticide manufacturing wastewaters were also part of the wastewaters covered by the OCPSF evaluations; and most commenters supported the proposal to incorporate data from the OCPSF data base into the pesticide chemicals data base.

Using the OCPSF pass-through analysis updated to reflect results of more recent analysis of pass-through from OCPSF facilities, 19 of those 23 priority pollutants pass through. The four priority pollutants that do not pass through are phenol, 2,4-dimethylphenol, 2-chlorophenol and 2,4,-dichlorophenol. EPA is not setting pretreatment standards for these pollutants. Five other priority pollutants (the brominated volatile organics and cyanide) have been determined to pass-through POTWs based on the volatization rates of the brominated compounds and the percent removal comparison of cyanide treatment data from pesticide manufacturers and the POTW removals for cyanide. Overall, then, EPA is regulating 24 of the 28 priority pollutants under PSES/PSNS.

B. Pesticide Active Ingredient Pollutants Not Regulated

Under Subcategory A, 170 individual PAIs were manufactured in 1986; and 8 PAIs were manufactured from 1985–1989, but were not manufactured in 1986. Therefore, a total of 177 PAIs (178 PAIs minus biphenyl, which is no longer a registered pesticide active ingredient) were considered for potential regulation. Of these, 120 PAIs individual PAIs are regulated in this final rule. EPA is not establishing regulations to limit the discharge of the other 57 individual PAIs. (Note, however, that the limitations on conventional and priority pollutant discharges apply to the manufacturing of all 177 PAIs.) Of the 57 PAIs, all production ceased for 12 PAIs before the Agency could gather data. Data could not be obtained for 14 other PAIs, which are currently in production, because analytical methods are not available to measure those PAIs in wastewater. All wastewaters for 14 other PAIs are currently disposed of in deep wells subject to regulation under EPA's Underground Injection Control program and were not evaluated for BAT level treatment. EPA decided to develop data and regulations for products with actual discharges to surface waters. For the remaining 17 PAIs, insufficient data exists on their treatability. Either the plants do not monitor for the PAI or the available data are inadequate to demonstrate that the technology in use is the best available technology. In addition, the available bench scale treatability data is inadequate and there are no structurally similar PAIs with data which could be transferred. Available toxicity data indicates that these 17 PAIs are less toxic than most of the 120 PAIs for which there are effluent limitations and standards in this final rule.

VII. Economic Considerations

A. Review of Proposed Rule

The April 10, 1992 notice of proposed rulemaking included a description of the anticipated economic impacts of the effluent limitations guidelines and standards for the pesticide manufacturing industry. Economic impacts of the proposal are briefly reviewed below.[2] Changes to the economic impact assessment ("EIA") since the proposed rule are presented in Section B, while the full assessment for the final rule is presented in Section C.

At proposal, 90 pesticide manufacturing facilities were counted as potentially subject to regulation. EPA projected that 61 of these facilities would incur costs as a result of this regulation. The economic impacts on these 61 facilities were calculated separately for direct dischargers and indirect dischargers.[3] Impacts on direct dischargers were calculated for compliance with a BAT regulation; impacts on indirect dischargers were calculated for compliance with PSES. EPA divided the industry into two subcategories: Organic Pesticide Chemicals Manufacturing (Subcategory A) and Metallo-organic Pesticide Chemicals Manufacturing (Subcategory B). However, the Agency did not propose additional limitations for Subcategory B. For subcategory A, EPA analyzed the impacts of two regulatory options for BAT and PSES: a discharge option (Option 1) and a zero discharge option based on on-site or off-site injection or incineration (Option 2). Option 2 was projected to result in severe economic impacts and the Agency proposed Option 1.

The proposed EIA assessed three primary impact measures: facility closures, product line closures, and other significant impacts short of closure. Pre-compliance (baseline) estimates of each of the three primary impact measures were first calculated for each facility to gauge the economic vitality of each facility prior to the proposed regulation. If a facility failed one of the measures (e.g., a facility was projected to close) in the baseline scenario, the model did not recount this same level of failure in the post-compliance scenario. The model did, however, allow for progressively severe impacts due to compliance requirements (e.g., a baseline product line closure may become a facility closure in the post-compliance scenario). The analysis of the proposed rule projected that 15 of the 90 facilities would close in the baseline scenario. An

[2] The full economic impact assessment for the proposed rule is set forth in the report titled "Economic Impact Analysis of Proposed Effluent Limitations Guidelines and Standards for the Pesticides Manufacturing Industry", hereafter the "proposed EIA."

[3] One of these facilities is both a direct and an indirect discharger.

additional 20 facilities were projected to close particular pesticide product lines in the baseline.

The economic impacts as projected at the time of proposal for the two regulatory options for Subcategory A are reviewed below by discharge type.

1. Option 1: Treatment and Discharge

a. Impacts of Option 1 on Direct Dischargers at Proposal. For the 32 facilities included in Subcategory A that were direct dischargers and were expected, at the time of proposal, to incur costs, the incremental capital and annualized total costs of complying with BAT limitations were expected to be $14.9 million and $14.7 million (1986 Dollars), respectively. No facilities were projected to close due to compliance with BAT. One facility was projected to close a product line as a result of the regulation. (One other facility projected to close a product line is a zero discharger and was projected to incur only monitoring costs.) No facilities were expected to experience other significant financial impacts short of facility or product line closure. Job losses totalling 31 full-time equivalents (FTE) were expected to occur as a result of the product line closures and the decrease in demand resulting from higher prices. This employment loss represents less than one percent of employment in the pesticide-related portions of all pesticide manufacturing facilities. One firm was expected to experience significant financial impacts as a result of compliance with BAT. Foreign trade in pesticide active ingredients was expected to fall by $5.5 million due to compliance with BAT.

b. Impacts of Option 1 on Indirect Dischargers at Proposal. For the 27 facilities included in Subcategory A that were indirect dischargers and were expected, at the time of proposal, to incur costs, the total projected capital and annualized costs of compliance with PSES were $9.4 million and $5.9 million (1986 Dollars), respectively. No facilities were projected to close due to compliance with PSES. One facility was projected to close a product line as a result of the regulation. No facilities were estimated to experience other significant financial impacts short of facility or product line closure. Job losses totalling 97 FTEs were expected to occur as a result of the product line closures and the decrease in demand resulting from higher prices. This employment loss represents less than one percent of employment in the pesticide-related portions of all pesticide manufacturing facilities. Two firms were expected to sustain significant financial impacts as a result of compliance with PSES. Foreign trade in pesticide active ingredients was expected to fall by $16.1 million due to compliance with PSES.

2. Option 2: Zero Discharge

a. Impacts of Option 2 on Direct Dischargers at Proposal. As presented at proposal, compliance with limitations based on Option 2 was projected to result in costs for 35 facilities (3 additional facilities that currently comply with Option 1 incur costs in order to comply with Option 2, zero discharge) of Subcategory A equal to $1.13 million in incremental capital costs and $4.81 billion in annualized costs (1986 Dollars). Total pesticide-related revenue for all pesticide manufacturing facilities equaled $4.84 billion in 1986—only slightly greater than the projected annualized Option 2 compliance costs for direct dischargers in this subcategory.

Sixteen facilities were projected to close due to compliance with Option 2. Three additional facilities were projected to close a product line under Option 2 (including a zero discharger projected to incur only monitoring costs.) Job losses totalling 7,110 FTEs were expected to occur as a result of the facility closures, product line closures and the decrease in demand resulting from higher prices. This employment loss represents 72 percent of employment in the pesticide-related portions of all pesticide manufacturing facilities. Seven firms were expected to experience significant financial impacts as a result of compliance with Option 2. Foreign trade in pesticide active ingredients was expected to fall by $2.4 billion, shifting the U.S. balance of trade from a $897 million exporter of PAIs in 1986 to a $1.5 billion importer of PAIs.

b. Impacts of Option 2 on Indirect Dischargers at Proposal. As presented at proposal, compliance with limitations based on Option 2 was projected to result in costs for 30 facilities (3 additional facilities that comply with Option 1 incur costs in order to comply with Option 2 zero discharge) of Subcategory A equal to $1.1 million in incremental capital costs and $518.8 million in annualized costs (1986 Dollars). Eleven facilities were projected to close if forced to comply with Option 2. Three facilities were projected to close a product line as a result of Option 2. Job losses totalling 802 FTEs were expected to occur as a result of the facility closures, product line closures and the decrease in demand resulting from higher prices. This employment loss represents 8 percent of employment in the pesticide-related portions of all pesticide manufacturing facilities. Seven firms were expected to sustain significant financial impacts as a result of compliance with Option 2. Foreign trade in pesticide active ingredients was expected to fall by $179.6 million due to compliance with Option 2.

In light of the above, EPA found that Option 2, as presented at proposal, was not economically achievable.

3. Cost-Effectiveness Analysis at Proposal

In addition to the foregoing analyses, the Agency performed a cost-effectiveness (C–E) analysis of the proposed rule for Subcategory A. Cost-Effectiveness is calculated as the ratio of the incremental annual costs to the incremental pounds-equivalent removed for each option. Annual costs for all cost-effectiveness analyses are reported in 1981 dollars for comparison with the cost-effectiveness of regulations for other industries. BAT under Option 1 was projected to result in removals of 5.99 million pounds equal to 1.20 million pound-equivalents, with a cost-effectiveness value of $2 per pound and $10 per pound-equivalent. PSES under Option 1 was projected to result in removals of 109,000 pounds or 4.83 million pound-equivalents, with a cost-effectiveness value of $44 per pound and $1 per pound-equivalent.

The incremental C–E of Option 2 for BAT was $88,000 per pound and $22,000 per pound-equivalent. The incremental C–E of Option 2 for PSES was $277,000 per pound and $13,000 per pound-equivalent.

4. Regulatory Flexibility Analysis

For the preferred option, no regulatory flexibility analysis was performed because the rule was not expected to result in a significant impact on a substantial number of small entities.

B. Changes to the Economic Impact Analysis Since Proposal

Following proposal, the Agency thoroughly reviewed the details of the economic analysis in preparation for the final rule. In response to this review and to public comments, several changes to the analysis have been made. These changes are described below and again noted in section C, which provides a full description of the economic impact assessment conducted for the final rule. The changes, both separately and taken together, do not significantly affect the number of impacts projected or EPA's overall conclusion that the rule is economically achievable.

1. Pesticide Active Ingredient Prices

The analysis of economic impacts required estimation of the price of each cluster of pesticide active ingredients PAIs at each facility. As discussed in the proposed EIA, the prices were first estimated at the PAI level in one of five ways. One of these methods of calculating prices was used in situations where PAI-specific data (e.g. costs, prices) were not reported, multiple PAIs were produced, and price data from a secondary source were available for only some of the PAIs produced.[4] For those PAIs for which secondary price data were not available, prices were estimated by first dividing a facility's revenue from any of the 272 (originally defined as in-scope) pesticides by that facility's production of these pesticides. These price estimates and the secondary data on prices were used as reasonable indicators of the relative prices of the PAIs. If used directly, however, the secondary prices might have overstated the price the manufacturer receives for PAIs, because manufacturers may offer volume discounts or sell to a wholesale distributor. Therefore, the product of the price estimates and the associated facility production were constrained to match the facility's in-scope pesticides revenue. Mathematically, each facility's prices had to satisfy the following constraint:

$$\sum_{i=1}^{n} P_i Q_i = ISREV$$

where:

n=the number of in-scope PAIs produced at the facility;

P_i=the price of active ingredient, i;

Q_i=the quantity of active ingredient, i, produced by the facility;

ISREV=the revenue from in-scope PAI production for the facility.

The programming of this pricing method, as used in the proposed rule, was found to have a minor error that has been corrected. For those PAIs for which secondary price data were not available, an initial price was supposed to be estimated by dividing facility in-scope revenue by that facility's in-scope production. Instead, the initial price was estimated by dividing facility in-scope revenue by that facility's production of only the PAI without a price from a secondary source. Therefore, the estimated price was too high. Since the revenue from all PAIs produced at a facility was constrained to match reported in-scope facility revenue (i.e., the average facility PAI price was unaffected by the error), the impacts on the analysis of correcting this error are minimal. However, the price allocation among a facility's PAIs changed for eleven facilities between the proposed and final rule. These changes did not affect the results of the economic impact analysis.

2. Compliance Costs

Estimates of compliance costs for several facilities have changed since the proposed rule in response to public comments and a number of facility closures.

Revisions to compliance costs increased at some facilities based on cost information submitted after the proposal, while other facilities had decreases in costs based on submittal of information identifying treatment technology installed between the time of the questionnaire or plant visits and the proposal. The total estimated compliance costs for the Treated Discharge Option (Option 1) at proposal, and as promulgated, are shown in the table below.

TABLE 4.1.—COSTS OF OPTION 1 (TREATED DISCHARGE) [1] FOR SUBCATEGORY A

[Millions of 1986 Dollars]

	Proposed		Final	
	Direct dischargers [2]	Indirect dischargers	Direct dischargers [2]	Indirect dischargers
Number of facilities incurring costs	32	27	33	23
Capital and Land	$14.91	$9.41	$24.92	$8.70
O & M	12.36	4.39	14.60	3.82
Annualized Costs	14.67	5.88	18.16	5.08

[1] At proposal, projected costs were included regardless of whether a facility had closed pesticide operations or was projected to close pesticide operations prior to incurring the costs of compliance. The total costs were therefore overstated. For the final rule, costs are included only for facilities not known to have actually closed and facilities that have closed but may be expected to transfer the production to another facility.

[2] Included in the direct dischargers are five zero dischargers. Zero dischargers may be subject to monitoring costs if they have any process wastewater. Monitoring costs would be imposed by the permitting authority (no monitoring requirements are contained in the effluent guidelines for pesticide manufacturers). However, monitoring costs are included in the economic impact analysis to capture the full cost to industry of controlling process wastewater pollutants.

3. Projecting Facility Closures

There have been some changes to the methodology used to project facility closures since the proposed rule, partly as a result of public comments. At proposal, facility closures in both the baseline and post-compliance scenarios were evaluated by comparing facility discounted cash flow to facility liquidation value. If the expected cash flows were less than the liquidation value of the facility, the facility was projected to close because the owner would be better off financially.

Public comments suggested that EPA take advantage of more recently available data in the analysis of impacts. After proposal, data from EPA's section 308 survey questionnaire of pesticide formulating/packaging/repackaging (PFPR) facilities (not covered by today's rule) became available for comparison with the data obtained from the Pesticide Manufacturers Census questionnaire. Forty-five pesticide manufacturing facilities also completed the financial portion of the PFPR questionnaire. Balance sheet and income statement data provided in both questionnaires by these facilities were compared, and any inconsistencies were reconciled through calls and letters to the facilities.

Using these two data sources, EPA also compared estimates of liquidation

[4] Other methods of estimating PAI prices were used when: (1) PAI-specific data were reported in the Questionnaire; (2) PAI-specific data were not reported in the Questionnaire and only one in-scope PAI was produced at the facility; (3) PAI-specific data were not reported in the Questionnaire, multiple PAIs were produced at the facility, and price data for all the PAIs were available from a secondary source; (4) PAI-specific data were not reported, in-scope revenue was not reported, and secondary price information was available for all PAIs produced.

value from the two questionnaires for the pesticide manufacturers that also formulate/package/repackage. In the pesticide manufacturers Census, facilities were asked to estimate the liquidation value of the pesticide production and pesticide formulating/packaging lines and associated fixed assets, working capital, and real estate. For comparison with the data available in the PFPR Survey, *facility* liquidation values were estimated by multiplying the pesticide liquidation values by the ratio of facility revenue to pesticide revenue. The PFPR Survey was designed so that facility liquidation values could be calculated as the quotient of tax assessment values of land, buildings, equipment and machinery divided by the tax assessment percentage.

Of the 45 facilities, only 10 had gross facility liquidation values calculated from the two questionnaires that were within a factor of two of each other. While the two different approaches were not expected to give identical results, the magnitude of the difference caused EPA to question the reliability of liquidation value estimates. Given these discrepancies, EPA conducted an alternate analysis for the final rule that projects facility closure if facilities have negative after-tax cash flow on average over the three years for which data was available from the Census (i.e., if the facility is losing money over a three year period). This methodology does not require the use of liquidation values. This methodology is simpler than comparing discounted cash flow to liquidation value and it avoids the apparent high level of uncertainty in estimates of liquidation value. This change resulted in a shift of five facilities from baseline product line closures to baseline facility closures. Two additional facilities—one of which was previously projected to close a product line post-compliance and which has actually closed since 1986—were also added to projected baseline facility closures. Two facilities, previously estimated to be baseline facility closures, are no longer expected to close. The net result of these changes increases the number of predicted baseline facility closures to 20 (out of the original 90 facilities.) No other changes to baseline or Option 1 impacts resulted from this methodological change.

4. Calculation of Taxes

The final rule incorporates two changes to the calculation of taxes.

a. Post-Compliance Adjustments to Cash Flow. In the proposed rule, the adjustments to cash flow in the post-compliance scenario did not fully account for tax effects. (See page 4.26 of the proposed EIA). Three tax adjustments not included at proposal but taken into account for the final rule correspond to the three factors included in estimating post-compliance facility cash flow. The three cash flow adjustment factors and the associated tax effects added in the final rule are:

(1) The compliance costs, including capital, land, and operating and maintenance. In the final rule, taxes are decreased to account for the decrease in profits due to depreciation on capital purchased to comply with the regulation.

(2) The change in revenue associated with new PAI prices and quantities. In the final rule, taxes are adjusted based on whether revenues (and therefore profits) increase or decrease.

(3) The decrease in variable costs of production due to the reduction in quantity. In the final rule taxes are increased to account for increased profits due to reduced variable costs.

The effect of these changes on the economic impact assessment is negligible.

b. Calculation of Average Corporate Income Tax Rate. In calculating the baseline cash flow in the proposed rule, EPA estimated the average corporate income tax rate (see page 4.21 of the proposed EIA). The text correctly states that this value is calculated as facility taxes divided by facility pre-tax profits. However, the supporting computer program incorrectly calculated the average corporate income tax rate as facility taxes divided by facility revenue. The tax rate used in the program was therefore too low. EPA has corrected the tax rate to equal the facility taxes divided by the facility pre-tax income. The effect of this change was negligible.

5. Price Pass-Through

The economic impact methodology includes a pricing rule that takes into account the effect of supplier competition on the percentage of compliance costs that are passed to the consumer. This rule is partially based upon the assumption that if production incurring compliance costs makes up a small percentage of total cluster production (e.g., pesticides used for a specific purpose on a particular crop), then a price increase due to regulation is unlikely (see page 4.15 of the proposed EIA). The price pass-through factor (i.e., the percentage of cluster production incurring costs) was updated for the final rule to reflect updated production data and compliance costs. The effect of the changes was negligible. In addition, the sensitivity analysis which examines impacts under an assumption of zero price pass through still indicates that the rule is economically achievable.

6. Comparison of Compliance Costs

In response to commenters' concerns over the number of baseline closures, EPA performed an additional analysis of the economic achievability of the regulation by comparing annualized compliance costs with facility revenue for all facilities for the final rule. This comparison is a common gauge of achievability of effluent guidelines, with annualized costs in excess of five percent of revenues typically indicating a significant impact.[5] This analysis also indicated that the final rule is economically achievable. See comment #C033IID in the comment-response document for a more detailed discussion.

7. Revision of Toxic Weighting Factors

In addition to evaluating impacts on industry, the EPA performed a Cost-Effectiveness analysis for both the proposed and the final rule. One component required to calculate cost-effectiveness is toxic weighting factors (TWF), or factors indicating the relative toxicity of pollutants. Between the proposed rule and the final rule, the TWF for one pollutant included in the analysis, organo-tin, fell from 17,829 to 357. The new smaller TWF for organo-tin reflects the updating (based on new data) of the human toxicity value used in the TWF calculation. An updated bioconcentration factor (BCF) for organo-tin resulted in the change in the human toxicity value. The change in the TWF for organo-tin did not have any material effect on the overall cost-effectiveness of the final rule.

8. Facilities Potentially Subject to Regulation

For the proposed rule, data (e.g., costs, impacts) were collected for 88 of the 90 facilities that produced, as of 1986, one or more of the 270 PAIs or classes of PAIs that EPA initially considered for regulation. Continued contact with some of the facilities and publicly available information indicated that 15 of the 90 facilities had actually closed subsequent to completing the Census. Also, nine (subcategory B) metallo-organic PAIs are no longer considered for regulation under the final rule. Therefore, two facilities producing

[5] Costs as a percentage of sales represents a rough approximation of the percentage price increase that would result from 100 percent cost pass through, i.e., the percentage increase in price needed to cover all treatment costs.

Subcategory B PAIs as their only in-scope products are no longer counted as potentially subject to the regulation. For the final rule, data are presented only for the 72 facilities that are not known to have closed.[6]

C. Final Rule

1. Introduction

EPA's economic impact assessment is set forth in the report titled "Economic Impact Analysis of Final Effluent Limitations Guidelines and Standards for the Pesticides Manufacturing Industry" (hereinafter "EIA"). This report details the investment and annualized compliance costs for the facilities covered by the pesticide manufacturer effluent guidelines. The report also estimates the probable economic effect of compliance costs in terms of facility closures, product line closures, other significant impacts short of closure, and compliance costs as a percentage of facility revenues. Firm-level impacts, local community impacts, international trade effects, and effects on new pesticide manufacturing facilities are also presented. A Regulatory Flexibility Analysis detailing the small business impacts is also included in the EIA for this industry.

Based on data from the Census, EPA determined at the time of proposal that there were a total of 90 pesticide manufacturing facilities owned and operated by 59 firms that manufacture one or more PAIs that were potentially subject to regulation. Since the proposal, EPA has received information indicating that 15 of these facilities have closed their in-scope PAI manufacturing operations since 1986. Therefore, for purposes of today's EIA, EPA has determined that there are a total of 73 pesticide manufacturing facilities owned and operated by 49 firms that manufacture one or more PAIs and are potentially subject to regulation.[7] EPA has projected that 55 of these facilities will incur costs as a result of this regulation. The economic impacts on these 55 facilities were calculated separately for direct dischargers and indirect dischargers. Impacts on direct dischargers were calculated for compliance with a BAT regulation; impacts on indirect dischargers were calculated for compliance with PSES. Each discharge category was initially further analyzed by the two subcategories: Organic Pesticide Chemicals Manufacturing (Subcategory A) and Metallo-organic Pesticide Chemicals Manufacturing (Subcategory B). Subcategory B PAIs are not covered by the rule promulgated today. Therefore, there are no associated costs or economic impacts.

The costs and impacts of implementing the regulations have been estimated on an active ingredient-specific basis for each facility. For Subcategory A, total BAT investment costs (capital and land) are projected to be $24.9 million with annualized costs (which include capital, operating and maintenance, monitoring) of $18.2 million. There are no costs associated with Subcategory B because direct discharge of Subcategory B chemicals is already limited to zero under BPT regulations. Total investment costs for PSES Subcategory A are projected to be $8.7 million with annualized costs of $5.1 million including depreciation and interest. All costs are presented in 1986 dollars and are based on the assumption that, whenever possible, facilities will improve existing treatment rather than build new treatment.

EPA also conducted an analysis of the cost-effectiveness of the chosen option. The report, "Cost-Effectiveness of Final Effluent Limitations Guidelines and Standards of Performance for the Pesticide Manufacturing Industry" is included in the record of this rule making.

2. Economic Impact Methodology

The EIA uses three primary impact measures: Facility closures, product line closures, and other significant impacts short of closure. Analysis of significant impacts short of closure includes a composite measure of the effect of compliance costs on the facility's ability to incur debt and on facilities' return on assets. The analysis evaluates these impacts in a hierarchical manner: If a facility closes, product line closures and other significant impacts are not evaluated; if a facility sustains a product line closure, other significant impacts are not evaluated. The hierarchy corresponds to the severity of the projected impact. The impacts are estimated for pesticide manufacturing facilities incurring costs using a combination of data from the 1986 Facility Census (including thorough data cleaning through computerized checks and contacting respondents) and secondary sources (e.g., Compustat financial data). In addition, impact estimates rely on facility-specific compliance cost estimates developed by the Agency (see section III.E of today's notice). Pre-compliance (baseline) estimates of each of the three primary impact measures are first calculated for each facility in order to gauge the economic vitality of each facility prior to regulation. If a facility fails one of the measures (e.g., a facility closes) in the baseline scenario, the model does not recount this same level of failure in the post-compliance scenario. The model does, however, allow for progressively severe impacts due to compliance (e.g., a baseline product line closure may become a facility closure in the post-compliance scenario).

A pesticide manufacturing facility is defined, for purposes of this EIA, as the portion of the facility involved in manufacturing or performing contract work for both in-scope pesticides (i.e., those 260 organic-PAIs now being considered for the final regulation) and out-of-scope pesticides (all others). (Note that compliance cost estimates were developed only for the portion of the facility engaged in manufacturing one or more of the 260 organic-PAIs.) The facility closure analysis is based on an evaluation of baseline and post-compliance facility after-tax cash flows. Following calculation of baseline after-tax cash flow, projected regulatory costs were added to the baseline costs. Total post-compliance costs were then used to estimate a post-compliance cash flow. A facility closure is projected to result from the regulation if the baseline after-tax cash flow is positive and the post-compliance after-tax cash flow is negative (i.e., if a facility begins to lose cash due to the regulation).[8]

A pesticide cluster is defined as a group of PAIs which are substitutes for a specific end-use. For example, insecticides used on corn comprise one cluster. Fifty-five clusters (plus a cluster of "unspecified PAIs) were identified as part of the economic impact analysis. Forty-four of these clusters contain in-scope active ingredients which were produced in 1986. For the purpose of this analysis, a product line is defined as a cluster of PAIs. A baseline product line closure is projected if the unit cost (average variable cost plus average fixed cost per pound of active ingredient) of the PAIs within the cluster exceeds the unit price (average price per pound of

[6] Although 73 facilities are potentially subject to the regulation, the EIA only analyzed 72 facilities for economic impacts. The facility excluded from the economic analysis is an R&D facility with no revenues expected from the manufacture of in-scope PAIs and no expected compliance costs.

[7] Two of the 72 facilities analyzed for economic impacts have closed in-scope PAI operations since 1986 but the production either has been or may be transferred to either another facility or company. To ensure that the costs to the industry are not understated, EPA has retained these facilities in the analysis.

[8] As discussed in Section B.3, the methodology for calculation of facility closures has been changed since the proposed rule due to new information on liquidation values obtained from the pesticide formulator/packager/repackager Section 308 survey. This revision did not result in any changes to the projection of facility closures due to the regulation or the overall conclusion of economic achievability.

active ingredient). EPA obtained prices from its 1986 Facility Census when available. When prices were not provided in the Census, they were obtained from secondary sources including "Doane Marketing Research's Annual Marketing Survey" and DPRA's "Agchemprice." A post-compliance product line closure is projected if the product line remained open in the baseline, but the addition of compliance costs results in unit costs exceeding unit price.

Other significant impacts of compliance with the effluent limitations, short of closure, are calculated based on a comparison of two key financial ratios for each facility with industry averages of these ratios. The financial ratios used are the "interest coverage ratio" also called "times interest earned" (earnings before interest and taxes divided by interest expense) and "return on total assets" (earnings before interest and taxes divided by assets). If a facility falls in the lowest quartile for the industry in the post-compliance scenario but not in the baseline it is said to sustain a significant impact short of closure.

EPA evaluated each of these measures assuming that the market allows a facility to pass on to the customer part of the compliance costs incurred by pesticide manufacturers as a price increase. EPA also evaluated each of these measures with the more stringent assumption that the facility would not be able to pass on to the customer (either PFP or end-user) any of the compliance costs incurred. The extent to which manufacturers are expected to raise prices is calculated as a function of the level of competition of out-of-scope pesticides with in-scope pesticides for each pesticide cluster. The level of competition is estimated based on relative production quantities. The greater the competition from out-of-scope pesticides, the smaller the fraction of costs a producer is assumed to be able to pass on. Demand changes corresponding to these price changes are then calculated using an estimate of the price elasticity of demand for each cluster.

3. *Baseline Analysis*

The baseline economic analysis evaluated each facility's financial operating condition prior to incurring compliance costs for this regulation. This analysis included the estimated costs associated with two significant EPA regulations which were not in place in 1986 (the base year) and whose costs were therefore not reflected in the annual operating expenses provided by facilities in the 1986 Facility Census. First, baseline cost additions include RCRA costs for restricting the land disposal of wastes for facilities that treat, store, and dispose of hazardous wastes. An estimated 30 facilities are projected to incur RCRA costs in the baseline. Annualized RCRA costs absorbed by these 30 facilities are estimated at $641,000 (1986 dollars). Second, baseline cost additions also include compliance with the effluent guidelines for the OCPSF industry. Twenty-five of the 72 pesticide manufacturing facilities are projected to incur costs in order to comply with the OCPSF regulations. Capital and annualized OCPSF costs absorbed by these facilities are estimated at $48.3 million and $16.4 million, respectively (1986 dollars).

After incorporating the costs of RCRA and OCPSF regulations, it is projected that 14 of the 72 facilities close in the baseline analysis. Of the 14 facilities counted as baseline facility closures, 2 have closed product lines since 1986 and 3 have undergone restructuring. Of the 12 facilities counted as baseline product line closures, 4 have closed product lines since 1986 and another 3 have undergone restructuring.

COMPARISON OF BASELINE PREDICTED AND ACTUAL CLOSURES FOR THE 73 FACILITIES POTENTIALLY SUBJECT TO THE REGULATION

	Predicted baseline facility closures Total=14	Predicted baseline product closures Total=12
Actual Product Closures	2	4
Actual Restructured	3	3

4. Total Costs and Impacts of the Regulatory Options for BAT and PSES

At proposal, EPA analyzed the impacts of two possible regulatory options for BAT and PSES: A discharge option (Option 1) and a zero discharge option based on on-site or off-site injection or incineration (Option 2). Today's final rule is based on Option 1. The estimates of compliance costs for Option 2 have not changed since proposal. Therefore, the economic impacts associated with Option 2 were not reassessed. The economic impacts associated with the final rule are discussed below, by discharge type and by each of the subcategories.

a. Impacts of Option 1 on Direct Dischargers. (1) Organic Pesticides Manufacturing (Subcategory A). For manufacturers included in this subcategory, the incremental capital and annualized total costs (which include capital, operating and maintenance, and monitoring costs) of complying with BAT limitations are expected to be $24.9 million and $18.2 million, respectively. The estimate of capital costs has increased 67 percent since proposal while the estimate of total annualized cost has increased by 24 percent. The changes in compliance costs are due to the aggregate effect of decreases in projected annualized compliance costs at 4 facilities and increases in projected annualized compliance costs at 4 facilities. Most of the increase in projected total costs for direct dischargers is due to a substantial projected cost increase at one facility. The estimated investment costs at this facility have increased from $1.6 million to $16.0 million, with an increase in annualized costs from $2.0 million to $7.3 million. This change in costs resulted from comments by the facility indicating that additional activated carbon regeneration and incineration (of off-gas from the regeneration) were necessary. EPA does not believe that these alleged cost increases will necessarily occur as a result of the manufacturing wastewater treatment (a large portion of the wastewater loading comes from formulating and packaging operations, not covered by this rule), but included them for analysis to determine if they would change the projected economic impacts of the regulation. Inclusion of these costs did not change the projected economic impact of the regulation.

Twenty-eight direct discharge facilities are expected to incur BAT compliance costs under Option 1. No facilities are projected to close due to compliance with BAT under Option 1. One facility out of the 28 direct discharge facilities that are expected to incur costs under this subcategory is projected to close a product line as a result of the regulation. (One zero discharging facility, subject only to monitoring costs, is also projected to close a product line.) No facilities are expected to experience other significant financial impacts short of facility or product line closure.

Given that the level of projected economic impacts has not changed since the proposal, the secondary community and foreign trade impacts potentially associated with the regulation have not been re-estimated for the direct dischargers. As presented at proposal, job losses totalling 31 full-time equivalents (FTE) are expected to occur as a result of the product line closures and the decrease in demand resulting from higher prices. This employment loss represents less than

one percent of employment in the pesticide-related portions of all pesticide manufacturing facilities. One firm, equal to about 2.0 percent of the 49 firms owning the facilities potentially subject to the regulations, is expected to experience significant financial impacts as a result of compliance with BAT. Foreign trade in pesticide active ingredients is expected to fall by $5.5 million due to compliance with BAT. In 1986, the United States was a net exporter of PAIs, in the amount of $897 million. Therefore, this decrease in PAI trade represents less than one percent of 1986 trade in PAIs. In 1986, the United States was a net importer of $152 billion in merchandise. The BAT regulation therefore results in a negligible increase in net imports of the national trade balance of all goods.

As an additional check on community impacts, foreign trade impacts, and firm-level impacts, EPA examined the extent of the revenue decrease at the single facility bearing most of the increase in compliance costs. The overall revenue from in-scope pesticides produced at this facility is expected to fall by only about one percent, so significant community or foreign trade impacts are not expected. Further analysis indicates that the firm owning the facility is not expected to be significantly impacted by the rule.

Finally, for the 28 direct discharging facilities that incur costs, the mean compliance cost as a percentage of total facility revenue was 0.4 percent, the median was less than one-tenth of one percent, and the highest value was 4.6 percent. None of the facilities had a ratio of compliance costs to facility revenues that exceeded five percent. The impacts are therefore judged to be minimal.

(2) Metallo-Organic Pesticides Manufacturing (Subcategory B). No new limitations on direct dischargers are promulgated today for the metallo-organic pesticide chemicals manufacturing subcategory. Therefore, there are no associated costs or economic impacts.

b. Impacts of Option 1 on Indirect Dischargers. (1) Organic Pesticides Manufacturing (Subcategory A). For manufacturers included in the organic pesticides subcategory, the total capital and annualized costs of compliance with PSES are projected to be $8.7 million and $5.1 million, respectively. The estimate of capital costs has decreased 8 percent since proposal while the estimate of total annualized cost has decreased by 14 percent. The changes in compliance costs are due to the aggregate effect of decreases in annualized compliance costs at eight facilities and increases in annualized compliance costs at two facilities.

Twenty-three indirect discharger facilities are expected to incur compliance costs under Option 1. None of the indirect discharging facilities are projected to close entirely, close a product line, or experience other significant financial impacts due to compliance with PSES. Therefore, the estimated impacts have decreased slightly since the proposal. (At proposal one facility was projected to close a product line. The facility has actually closed and is counted as a baseline closure in the final rule.) Given this decrease in total costs and impacts, secondary community and foreign trade impacts potentially associated with the regulation have not been re-estimated for the indirect dischargers. Rather, the estimates of these secondary impacts presented at proposal serve as reasonable conservative estimates of the impacts. As presented at proposal, job losses totalling 97 FTEs were expected to occur as a result of the product line closure and the decrease in demand resulting from higher prices. This employment loss represents less than one percent of employment in the pesticide-related portions of all pesticide manufacturing facilities. Two firms are expected to sustain significant financial impacts as a result of compliance with PSES. Foreign trade in pesticide active ingredients is expected to fall by $16.1 million due to compliance with PSES. This decrease in trade represents about two percent of 1986 net exports of PAIs and about one-hundredth of one percent of the 1986 net national trade imports of all goods.

Finally, EPA compared the annualized compliance costs with total facility revenue. For the 23 indirect discharging facilities that will incur costs, the mean compliance costs as a percentage of revenue was 0.7 percent, the median was 0.3 percent, and the highest value was 5.7 percent. The ratio of compliance costs to facility revenue was greater than five percent for only one facility. Impacts are therefore judged to be minimal.

In light of the above, EPA has concluded that Option 1 is economically achievable for both direct and indirect dischargers.

(2) Metallo-Organic Pesticide Manufacturers (Subcategory B). No new limitations on indirect dischargers are promulgated today for the metallo-organic pesticide chemicals manufacturing subcategory. Therefore, there are no associated costs or economic impacts.

5. Cost-Effectiveness Analysis

In addition to the foregoing analyses, the Agency has performed a cost-effectiveness analysis. For the final rule, the estimated pounds-equivalent removed were calculated by weighting the number of pounds of each pollutant removed by the relative toxic weighting factor for each pollutant. The use of pounds-equivalent gives correspondingly 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 pollutants of lesser toxicity are removed. Cost-effectiveness is calculated as the ratio of the incremental annual costs to the incremental pounds-equivalent removed for each option. So that comparisons of the cost-effectiveness among other regulated industries may be made, annual costs for all cost-effectiveness analyses are reported in 1981 dollars.

The cost-effectiveness methodology used in this analysis takes into account reduction of air emissions of volatile organic chemicals expected to result from use of the model technology (steam stripping) upon which the effluent limitations guidelines and standards for volatile priority pollutants are based. Reductions in air emissions of these pollutants are counted in computing the cost-effectiveness of the regulations since the best available treatment technologies identified for the regulation reduce these emissions. The toxic weighting factors used take into account the toxicity and carcinogenicity of these chemicals to humans through inhalation.[11]

Under the final rule, BAT under Option 1 is projected to result in removals of 5,970,948 pounds of pollutants, 1,029,032 pounds-equivalent, and a cost-effectiveness value of $14.41 per pound-equivalent. PSES is projected to result in removals of 27,905 pounds of pollutants, 238,076 pounds-equivalent, and cost-effectiveness value of $17.50.

6. Effects of the Final Regulation on New Sources (NSPS and PSNS)

a. Subcategory A. EPA is promulgating NSPS/PSNS for the organic pesticide chemicals manufacturing subcategory equal to BAT/PSES limitations for PAIs,

[11] At proposal, EPA noted that the single facility producing malathion had closed and that the Cost-Effectiveness ratio without malathion increased (i.e., removals were more costly). The Cost-Effectiveness values presented in the final rule exclude the facility that used to produce malathion because the facility has ceased operation.

modified to reflect a wastewater flow reduction of 28 percent in some cases. NSPS for priority pollutants is being set equal to the BAT limitations.

The impact of the promulgated regulation on new sources is projected to be less burdensome than the impact of the BAT/PSES regulations on existing sources. Designing a new technology prior to facility construction is typically far less expensive than retro-fitting a facility for a new technology. Since compliance with the final rule has been found to be well within the bounds of economic achievability for existing facilities, EPA has determined that compliance with NSPS/PSNS will also be economically achievable for new sources.

b. Subcategory B. NSPS/PSNS for metallo-organic pesticide chemicals are not being promulgated at this time. Therefore, there are no associated impacts on new sources.

7. Regulatory Flexibility Analysis

The Regulatory Flexibility Act (5 U.S.C. 601 et seq., Pub. L. 96–354) calls for the Agency to prepare a Regulatory Flexibility Analysis (RFA) for promulgated regulations that have a significant impact on a substantial number of small entities. The purpose of the Act is to ensure that, while achieving EPA's statutory goals, the Agency's regulations do not impose disproportionate impacts on small entities.

The effects of the BAT and PSES regulations on small businesses were separately considered. EPA defined a small entity based on the U.S. Small Business Administration (SBA) standards. The SBA has established standards based on employment at firms (including all affiliates and divisions) for each SIC group. For SIC 2869 (which includes some pesticide manufacturers) the SBA defines a small business as one employing less than 1,000 people. Employment data for firms that own pesticide manufacturing facilities were obtained from Dun and Bradstreet's Million Dollar Directory. Consistent with the other components of the EIA, significant impacts were defined as facility closures, product line closures, or other significant financial impacts as previously discussed. Using these measures, the results of the small business analysis are discussed below for the two discharge methods.

a. BAT. As previously discussed, it is projected that one direct discharging and one zero discharging facility will close product lines due to BAT regulations. No facility closures or other significant financial impacts are expected to occur. Both firms that are expected to experience facility product line closures have fewer than 1,000 employees. No further analysis was conducted since it was judged that the closure of product lines at two facilities did not constitute a "significant impact on a substantial number of small entities".

b. PSES. No facilities are expected to close, close a product line, or experience another significant impact short of closure. Since no "small entities" are expected to be significantly affected by this regulation, no further analysis was conducted.

Accordingly, based on the above, I hereby certify, pursuant to 5 U.S.C. 605(b), that this regulation will not have a significant impact on a substantial number of small entities.

8. Executive Order 12291

Executive Order 12291 requires EPA and other agencies to perform a Regulatory Impact Analysis (RIA) of a major regulation. Major regulations are those that impose an annual cost to the economy of $100 million or more, or meet other criteria described in the Order. The final rule promulgated today for pesticide chemicals manufacturers is projected to cost under $100 million annually. Therefore, no RIA is required. This rule was submitted to the Office of Management and Budget for review.

9. Paperwork Reduction Act

Today's rule will impose no increase in the reporting or record keeping burden to respondents as covered under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. The final rule contains no information requirements.

VIII. Water Quality and Other Environmental Impacts

A. Water Quality Analysis

The water quality benefits of controlling the discharges from pesticide manufacturing facilities to surface waters and POTWs were evaluated in a national analysis of direct and indirect discharges. All 120 PAIs being regulated have at least one toxic effect (human health carcinogen and/or systemic toxicant or aquatic toxicant). In addition, many of these pollutants bioaccumulate and persist in the environment. While ambient monitoring for PAIs has been limited, studies have demonstrated the bioaccumulation of pesticides in aquatic life and accumulation of pesticides in sediments. Furthermore, human health impacts, primarily through worker exposure, have been reported (respiratory disease, liver impairment, and cancer incidence). Cases of ground water contamination, surface water contamination and impairment of POTW operations have also been documented.

The effects of direct wastewater discharges on receiving stream water quality were evaluated at current and BAT treatment levels. Twenty-five pesticide manufacturing facilities discharging 54 PAIs and 39 priority pollutants to 24 receiving streams were evaluated. Water quality models were used to project pollutant in-stream concentrations based on estimated releases at these levels; the in-stream concentrations were then compared to EPA-published water quality criteria or to toxic effect levels documented where EPA water quality criteria are not available for certain PAIs.

In-stream pollutant concentrations for 8 pollutants are projected to exceed human health criteria or human toxic effect levels in 8 percent of the receiving streams at current and BAT regulated discharge levels. Although the number of pollutants projected to exceed human health criteria or toxic effect levels does not change after implementation of BAT, the magnitude of excursions are reduced by more than 10 fold for some pollutants. The percentage of receiving streams with in-stream pollutant concentrations projected to exceed chronic aquatic life criteria or aquatic toxic effect levels will be reduced from 17 percent at current discharge levels to 8 percent at BAT discharge levels. A total of 9 pollutants at current discharge levels and 6 pollutants at BAT discharge levels are projected to exceed in-stream criteria or toxic effect levels.

In addition, the effects on POTW wastewater discharges of 28 PAIs and 34 priority pollutants on receiving stream water quality were evaluated at current and proposed treatment levels for 26 indirect discharging pesticide manufacturing facilities, which discharge to 20 POTWs on 19 receiving streams. Water quality models were used to project pollutant in-stream concentrations based on estimated releases at current and pretreatment levels; the in-stream concentrations were then compared to EPA published water quality criteria or to toxic effect levels.

EPA projects that in-stream pollutant concentrations for 1 pollutant will exceed human health criteria or human toxic effect levels in 5 percent of the receiving streams at present and after pretreatment. The percentage of receiving streams with in-stream pollutant concentrations projected to exceed chronic aquatic life criteria or aquatic toxic effect levels would be

reduced from 16 percent at current discharge levels to 10 percent after pretreatment. A total of 3 pollutants at present and 2 pollutants after pretreatment discharge are projected to exceed in-stream criteria or toxic effect levels.

The potential impacts of 27 indirect discharging pesticide manufacturing facilities (organo-pesticides and metallo-organic pesticides manufacturers), which discharge to 21 POTWs, were evaluated in terms of inhibition of POTW operation and contamination of sludge. Twenty-eight PAIs and 26 priority pollutants were evaluated for potential POTW operation inhibition. Seven priority pollutants were evaluated for potential sludge contamination problems. At current discharge levels, inhibition problems are projected to occur at 14 percent of the POTWs for a total of 3 pollutants, whereas after pretreatment the inhibition problems are projected to occur at 10 percent of the POTWs for a total of 2 pollutants. No sludge contamination problems are projected for the 7 evaluated pollutants.

The POTW inhibition and sludge values used in this analysis are not, in general, regulatory values. They are based upon engineering and health estimates contained in guidance or guidelines published by EPA and other sources. Thus, in general EPA is not primarily basing its regulatory approach for pretreatment discharge levels upon the 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 pretreatment standards are primarily based upon a determination of pass-through using an analysis of relative removal levels as explained above in today's notice.) However, the values used in the analysis do help indicate the potential benefits for POTW operation and sludge disposal that may result from the compliance with pretreatment standards being promulgated in this final rule.

B. 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 Clean Water Act call for EPA to consider the non-water quality environmental impacts of effluent limitations guidelines and standards. Accordingly, EPA has considered the effect of these regulations on air pollution, solid waste generation, and energy consumption.

1. Air Pollution

Pesticide facilities generate wastewaters that contain significant concentrations of organic compounds, some of which are also on the list of Hazardous Air Pollutants (HAP) in Title 3 of the Clean Air Act Amendments (CAAA) of 1990. These wastewaters typically pass through a series of collection and treatment units that are open to the atmosphere and allow wastewaters containing organic compounds to contact ambient air. Atmospheric exposure of these organic-containing wastewaters may result in significant volatilization of both volatile organic compounds (VOC), which contribute to the formation of ambient ozone, and HAP from the wastewater.

VOCs and HAPs are emitted from wastewater beginning at the first air/water iterface. Thus, VOCs and HAPs from wastewater may be of concern immediately as the wastewater is discharged from the process unit. Emissions occur from wastewater collection units such as process drains, manholes, trenches, sumps, junction boxes, and from wastewater treatment units such as screens, settling basins, equalization basins, biological aeration basins, air or steam strippers lacking air emission control devices, and any other units where the wastewater is in contact with the air.

Today's final regulations are based on the use of steam stripping rather than air stripping as an in-plant technique for controlling volatile organic compounds. Also, steam strippers are included in conjunction with chemical oxidation systems as a combined BAT-level technology to prevent air emissions of chlorinated priority pollutants from the chemical oxidation effluent.

Some increased air emissions could result from generation of the additional energy necessary to operate steam strippers, and from the incineration of the small volumes of wastewater or residuals from treatment systems (spent activated carbon, steam stripper overheads, wastewater treatment solids). However, the overall amounts of the air emissions are expected to significantly decrease due to compliance by pesticide manufacturers with the final rule. Based on raw wastewater loading estimates, air emissions of volatile priority pollutants would decrease by up to six million pounds per year due to the use of steam stripping. The final regulation, however, does not require steam stripping or any specific technology, but only establishes the amount of pollutant that can be discharged to navigable waters. As noted in Section V.C above, the Agency in the OCPSF rule concluded that the issue of volatile air emissions is best addressed under laws that specifically direct EPA to control air emissions. (EPA notes, however, that all of the pesticide manufacturing plants that currently use stripping are using steam strippers and not air strippers.) Also, as mentioned previously in Section V.C, there are activities underway under the Clean Air Act to address emissions of VOCs from industrial wastewaters. Specifically, the Agency plans to issue a Control Techniques Guideline (CTG) for Industrial Wastewater (IWW) under section 110 of the CAA pursuant to Title I of the 1990 Clean Air Act Amendments (CAAA). The Pesticide Industry is one of several industries that would be covered by this CTG. The CTG will provide guidance to States recommending reasonably available control technology (RACT) for VOC emissions from industrial wastewater at (pesticide manufacturing) facilities located in areas failing to attain the National Ambient Air Quality Standards for ozone.

The Agency also plans to issue a National Emission Standards for Hazardous Air Pollutants (NESHAP) under section 112 of the CAA to address air emissions of the HAPs listed in Title III of the 1990 CAAA. This list contains 20 of the 28 priority pollutants and 8 of the 120 PAI pollutants with limitations in this rule. The NESHAP will define maximum achievable control technology (MACT). The 1990 CAAA set maximum technology control requirements on which MACT standards can be based for new and existing sources. RACT for the CTG and MACT for the NESHAP will be based on the same control strategy. That control strategy is:

(1) Identify wastewater streams requiring control;

(2) Control the conveyance of the wastewater to the treatment unit (hardpipe, control vents and openings);

(3) Treat the wastewater to remove or destroy the organic compound (e.g. steam stripping);

(4) Control air emissions from the treatment unit;

(5) Control residuals removed during treatment.

In view of the upcoming air emission guidelines and standards, the Agency encourages facilities to consider integrated multi-media approaches when designing methods of complying with these final pesticide effluent guidelines, such as using steam stripping instead of air stripping. Combining compliance with the effluent guidelines and upcoming CAA regulations will be more economical

than individual compliance with each rule.

2. Solid Waste

Wastewaters from the production of the following PAIs are regulated as RCRA listed hazardous wastes:

K033—Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane.

K038—Wastewater from the washing and stripping of phorate production.

K098—Untreated process wastewater from the production of toxaphene.

K099—Untreated wastewater from the production of 2,4–D.

K123—Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salts.

K124—Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts.

K131—Wastewater from reactor and spent sulfuric acid from the acid dryer from the production of methyl bromide.

The Agency is currently conducting additional hazardous waste listing determinations for waters produced from the manufacture of carbamate, carbamoyl oxime, thiocarbamate, and dithiocarbamate chemicals, which are largely used as pesticides. The Agency expects to propose its hazardous waste listing determination December 30, 1993, for these carbamate pesticides.

Under section 3004(n) of RCRA, standards controlling organic emissions from process vents and equipment leaks at facilities which treat, store, or dispose of hazardous wastes (TSDF) have been enacted (55 FR 25454). Additional standards to control air emissions at TSDFs from open tanks, surface impoundments, and landfills were proposed July 22, 1991 (56 FR 33490), and have not yet been promulgated by the Agency. Wastewater treatment units subject to regulation under either section 402 or 307(b) of the Clean Water Act would be exempt from these regulations under 40 CFR 264.1(g)(6) and 40 CFR 265.1(c)(10).

Solid waste would be generated due to the following technologies, if implemented to meet these final regulations: Steam stripping, hydroxide precipitation, and biological treatment. The solid wastes generated due to the implementation of the technologies discussed above were costed for disposal by off-site incineration. These costs were included in the economic evaluation of the proposed technologies.

The overhead stream from steam stripping will generally contain organic waste. In some cases, due to the large volume of the overhead stream, the Agency costed two steam strippers in series, with the second steam stripper treating the overheads stream from the first stripper. In these cases, the only organic waste that would need disposal is the overheads from the second steam stripper. EPA estimates that about 12 million pounds per year of organic waste would be generated due to steam stripping at 16 facilities.

Hydroxide precipitation technology utilizes calcium hydroxide or a similar chemical reagent to treat metal-containing wastewaters. The precipitated solids represent a solid waste. It is estimated that 31 thousand pounds per year of precipitated solids would be generated due to the implementation of hydroxide precipitation at one facility.

Biotreatment is the model technology for controlling PAI wastewater discharges at two facilities. Biosludge is continuously generated during biotreatment, and part of the sludge must be discharged from the treatment system to ensure proper operation. It is estimated that 48,000 pounds per year of biosludge would be generated due to these final regulations. For comparison, EPA estimates that all POTW's combined generate more than 7.7 million tons of sludge annually, while compliance with OCPSF BAT effluent guidelines is projected to increase solid waste generation by over 22,000 tons annually.

3. Energy Requirements

EPA estimates that the attainment of BAT, NSPS, PSES, and PSNS will increase energy consumption by a small increment over present industry use. The main energy requirement in the final rule is to generate steam used by steam strippers. Steam provides the heat energy necessary to separate volatile pollutants from wastewater streams treated by this technology. It is estimated that about 800 million pounds per year of steam would be required by steam strippers operating at 16 facilities. This would require approximately 187,000 barrels of oil annually; the United States currently consumes about 19 million barrels per day. Energy requirements will also increase minimally due to pumping needs associated with the proposed technologies.

IX. Regulatory Implementation

A. Implementation of Limitations

The limitations contained in the final rule for individual PAIs consist of production-based mass limitations. The limitations for the priority pollutants are concentration based. For both direct and indirect dischargers these limitations must be implemented through conversion by permit writers or local control authorities of the concentration values to allowable mass discharge limits using the process wastewater flows determined to be from the pesticide manufacturing operations.

Comments from one POTW control authority raised concerns over the difficulty of obtaining accurate flow values that were not arbitrary and using the flow information to derive a mass-based limitation for priority pollutants in a manner that would not penalize the industrial user that needs to increase production. The commenter recommended modifying the proposed requirements for converting priority pollutants to a flow-based mass limitation. The commenter suggested that the limitations be either production-based mass limitations (i.e., pounds of pollutants per pound of product produced) or concentration based limitations. EPA disagrees with the commenter that use of flow to derive mass-based limitations penalizes the industrial user by restricting the production levels. The use of historic water flow data in conjunction with actual production level data can allow the control authority to relate the flow to production. (This procedure was used in the process to determine the PAI limitations for this rule.)

The requirement for conversion of the concentration limitations for priority pollutants to mass limits based on flow was proposed for the pesticide manufacturing rule in order to be consistent with the implementation of the limitations in the OCPSF rule (40 CFR part 414). Since the majority of the pesticide manufacturing facilities are also OCPSF facilities, and treatment to meet the priority pollutant limitations is at the end of pipe following the commingling of the wastewaters from both pesticides and OCPSF operations, consistent implementation of these two rules is important in order to reduce confusion for both the industry and the control authorities.

EPA also notes that, as a practical matter, flow measurements will need to be made and are being made at most direct discharger facilities that discharge priority pollutants. The pretreatment standards for priority pollutants (for Subcategory A, organo-pesticide chemicals) will affect 26 of the 28 existing indirect dischargers (2 facilities are Subcategory B metallo-organic pesticide chemicals manufacturers). Of these 26 facilities, 16 facilities manufacture PAIs which have

limitations in the final rule that are production-based mass limitations. (Eight of these 16 facilities are also covered by the OCPSF rule.) For these 16 facilities, the PAI mass discharge allowances will be determined directly from the production rates. Thus, flow measurements (as well as concentration measurements) will need to be made to demonstrate compliance with the mass limits (by determining the product of flow and concentration). The use of mass limits provides a degree of control over the potential for the industrial user to increase flow and dilution in order to meet a concentration based limit. The mass limits for the PAIs also provide an incentive to reduce flow.

In addition to the 16 facilities with PAI limitations, 5 of the other 10 facilities which do not have PAIs with limitations in this rule are also OCPSF facilities. The OCPSF pretreatment standards are required to be converted to mass limitations (based on flow rates) and require the measurement of flow. Thus, 21 of the 26 facilities covered by this rule and discharging into POTWs already are required to measure their flows in some manner, and further identification of the pesticide manufacturing process flows should not be a problem.

For the 5 facilities that either are not also OCPSF facilities or do not have PAI limitations, EPA considered not requiring flow-based mass limits to be determined in order to allow control authorities flexibility to determine the appropriate method of control since the commenter suggests that up-to-date flow information may not be readily available. One of these facilities however, a stand-alone pesticides manufacturer, is already required to report flow by its municipal control authority. Three other manufacturing facilities have submitted to EPA, as part of this rulemaking, a detailed breakdown of their pesticide wastewater volumes. Accordingly, EPA concludes that information on flows can be readily determined by pesticide manufacturers that are indirect dischargers. In fact, all 26 of the facilities covered by the pretreatment standards submitted process flow information for their 1986 production as part of this rulemaking.

For all of the facilities covered by this rule, guidance for the determination of the appropriate flow basis for converting the priority pollutant concentration limitations to mass limits for the pesticide manufacturing operations is the same as that given in the preamble to the OCPSF rule amendment (58 FR 36872, July 9, 1993). The appropriate process wastewater flow to be used must be determined by the permitting or control authority on a case-by-case basis using current information provided by the applicant and other available data. EPA strongly urges the permit writer or control authority to develop an appropriate process wastewater flow for use in computing the mass effluent or internal plant limitations based on water conservation practices. The factors that should be considered in developing the appropriate process wastewater include: Review of the component flows to ensure that the claimed flows are, in fact, process wastewater flows as defined by the regulation; review of plant operations to ensure that sound water conservation practices are being followed (examples include minimization of process water uses; cascading or countercurrent washes or rinses, where possible); reuse or recycle of process waters or treated wastewaters at the process area and in wastewater treatment operations (types of recirculation and recycle/reuse practices being employed to achieve pollution prevention are described in section 7 of the Development Document); and review of barometric condenser use at the process level (barometric condensers often generate relatively large volumes of slightly contaminated wastewater; 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).

Control authorities should use the plant's annual process wastewater flow to convert the concentration-based limitations into mass-based limitations. To clarify, the annual average flow is defined as the average of daily flow measurements calculated over at least a year. These average flows could be based on data from a single year; however, if available, data from multiple years are preferable to obtain a representation of annual average flow. The regulated pesticides manufacturing process wastewater flows, as defined by 40 CFR 455.21(d), are the process waste streams that are subject to this rule.

Based on guidance issued by the EPA Office of Water Enforcement and Compliance, the permitting or control authority is advised to establish, for each direct or indirect point source discharge, a single estimate of the regulated long-term average of daily flow measurements based on three to five years of facility data. In the event that no historical or actual process wastewater flow data exist, such as for new sources, the permitting control authority is advised to establish a reasonable estimate of the facility's projected flow. Historical or projected daily maximum flows, such as, weekly maximum or monthly maximum flows or designed-based or plant-capacity-based flows are not recommended as appropriate bases for determining a facility's regulated long-term or annual average of daily flow measurements and corresponding mass limits. The permitting control authority is advised to establish a flow rate that is expected to be representative during the entire term of the permit or other individual control mechanism. If a plant is planning for significant changes in production during the effective period of the permit, the permitting or control authority may consider establishing multiple tiers of limitations as a function of the significant, projected changes in production. In addition, or in the alternative, a permit may be modified during its term, either at the request of the permittee (or another interested party) or on EPA's initiative, to increase or decrease the flow basis in response to a significant change in production (40 CFR 124.5,122.62). A change in production could be an "alteration" of the permitted activity or "new information" that would provide the basis for a permit modification (40 CFR 122.62 (a) (1), (2)).

The use of the long-term flow value, rather than maximum values from shorter time frames, is appropriate because the concentration values for the maximum daily and maximum monthly limitations were derived by multiplying the long-term average performance level of well-designed, well-operated treatment systems by the respective variability factor for the treatment system. The variability factors already include, among other components, the variability associated with day-to-day and month-to-month production flow variations. As a result, the limitations are, in general, considerably less stringent than the long-term averages achieved by the plants on which the limits and standards were based, and plants that design their operations and treatment systems to achieve the long-term averages for individual pollutants should be able to achieve the limits and standards even during high-flow days and months. The flow from any given day or month may not be representative of the plant's annual flow. Use of the highest monthly mean to set permit limits would provide duplicative allowance for variation in flow that is not justified, since the potential for high flow periods is already accounted for in the promulgated standards.

As noted, most pesticides manufacturers can and do measure their flow. However, the comment from the POTW control authority has led the

Agency to conclude that in cases where flow-based mass limitations have not been developed as required, the source should be required at least to meet the concentration limitations on priority pollutants until such time as mass limits have been developed. Accordingly, EPA has added provisions to the final regulations to this effect (see 40 CFR 455.26 and 455.27). It would not make sense to apply this requirement to direct dischargers since they do not comply directly with the promulgated effluent limitations guidelines but comply with limits issued in NPDES (or State-issued) permits. Indirect dischargers, on the other hand, comply directly with the promulgated pretreatment standards, which are translated into site-specific limits by local control authorities.

Because the pretreatment limitations are ultimately mass-based, they restrict both effluent concentration and dilution of wastewater flow to meet those concentrations. The new regulatory provisions mentioned above will have the effect of requiring the concentration limitations to be met at a minimum for priority pollutants if full implementation of mass-based limitations has not yet occurred. Accordingly, EPA is promulgating these new provisions without notice and comment because pesticides manufacturers were already on notice in the proposal that they would need to meet the concentration-based limits (after translation to mass-based limits on the basis of flow).

B. Upset and Bypass Provisions

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

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

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

C. Variances and Modifications

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

For the BPT effluent limitations, the only exception to the binding limitations is EPA's "fundamentally different factors" ("FDF") variance (40 CFR part 125, subpart D). This variance recognizes factors concerning a particular discharger which are fundamentally different from the factors considered in this rulemaking. Although an FDF variance provision was set forth in EPA's 1973–1976 effluent guidelines, it is now included in the NPDES regulations and not the specific industry regulations. (See 44 FR 32854, 32893 (June 7, 1979) for an explanation of the "fundamentally different factors" variance.) The procedures for application for a BPT FDF variance are set forth at 40 CFR 122.21(m)(1)(i)(A).

Dischargers subject to the BAT limitations in these regulations may also apply for an FDF variance, under the provisions of section 301(n) of the Act, which addresses BAT, BCT, and pretreatment FDFs. In addition, BAT limitations for nonconventional pollutants may be modified under section 301(c) and 301(g) of the Act. Under section 301(l) of the Act, these latter two statutory modifications are not applicable to toxic or conventional pollutants.

Dischargers subject to pretreatment standards for existing sources are also subject to the "fundamentally different factors" variance and credits for pollutants removed by POTWs, as discussed in section V.E. Dischargers subject to pretreatment standards for new sources are subject only to the removal credit provision (see Section V.E). New sources subject to NSPS are not eligible for EPA's "fundamentally different factors" variance or any statutory or regulatory modifications.

D. Relationship to NPDES Permits and Monitoring Requirements

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

One issue is how this regulation will affect the powers of NPDES permit-issuing authorities. EPA has developed the limitations and standards in the final rule to cover the typical facility for this point source category. In specific cases, the NPDES permitting authority may have to establish permit limits on toxic pollutants that are not covered by this regulation. This regulation does 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 policies. For example, if this regulation does not control a particular pollutant, the permit issuer may still limit such pollutants on a case-by-case basis, as appropriate under the Act. In addition, if State water quality standards or other provisions of State or Federal Law require limits on pollutants not covered by this regulation (or require more stringent limits on covered pollutants), the permit-issuing authority must apply those limitations.

Another topic of concern is the operation of EPA's NPDES enforcement program, which was an important consideration in developing today's final regulation. The Agency emphasizes that although the Act is a strict liability statute, EPA can initiate enforcement proceedings at its discretion. EPA has exercised and intends to exercise that discretion in a

manner that recognizes and promotes good faith compliance.

E. Best Management Practices

Section 304(e) of the Act authorizes the Administrator to prescribe "best management practices" (BMPs). EPA may develop BMPs that apply to all industrial sites or to a designated industrial category, and may offer guidance to permit authorities in establishing management practices required by unique circumstances at a given plant. The use of dikes, curbs, and other control measures are being used at some PAI manufacturing facilities to contain leaks and spills as part of good "housekeeping" practices. The Agency sees no need to promulgate any general BMPs at this time.

F. Analytical Methods

Section 304(h) of the Act directs EPA to promulgate guidelines establishing test methods for the analysis of pollutants. These methods are used to determine the presence and concentration of pollutants in wastewater, and are used for compliance monitoring and for filing applications for the NPDES program under 40 CFR 122.41(j)(4) and 122.21(g)(7), and for the pretreatment program under 40 CFR 403.7(d). To date, EPA has promulgated methods for conventional pollutants, toxic pollutants, and for some nonconventional pollutants. The five conventional pollutants are listed at 40 CFR 401.16. Table I–B at 40 CFR part 136 lists the analytical methods approved for these pollutants. The 65 toxic metals and organic pollutants are listed at 40 CFR 401.15. The list of 65 toxic pollutants was expanded to a list of 126 "Priority Pollutants." This list of Priority Pollutants is shown, for example, at 40 CFR part 423, appendix A. The list includes non-pesticide toxic organic pollutants, toxic metal pollutants, cyanide, asbestos, and toxic pesticide pollutants (including 3 of the 120 PAIs with limitations in the final rule). Currently approved methods for metals and cyanide are included in the table of approved inorganic test procedures at 40 CFR 136.3, table I–B. Table I–C at 40 CFR 136.3 lists approved methods for measurement of non-pesticide organic pollutants, and table I–D lists approved methods for the toxic pesticide pollutants and for other pesticide pollutants.

Many of the previously approved promulgated methods for PAIs do not include the most recent advances in technology, particularly the clean up procedures necessary to eliminate interferences and improve reliability, nor do they account for the latest and most sensitive detection devices, which permit accurate detection of PAI pollutants at very low concentrations. This latest technology is used by many companies to monitor wastewaters, and was used by EPA in its sampling of pesticide manufacturing industry wastewaters. All of the PAI pollutant data EPA is relying on for the final effluent limitations used analytical methods employing the latest in analytical technology. EPA is today requiring that compliance monitoring of effluent from the manufacture of the 120 PAIs with limitations in this rule must employ methods listed in table 7.

A number of commenters stated that their plants have analytical methods that differ from the methods listed in table 7 to some degree. Several of those commenters have submitted their methods as part of their comments. EPA has evaluated those methods and has determined that the differences are within the range allowed by the table 7 methods, providing that the quality control criteria in the promulgated methods are met. Several commenters also noted that their methods have been submitted to the permitting authority for their plants and the methods have met the requirements and have been accepted by the permitting authority. The concern expressed was that the promulgation of these methods would require the discharger to resubmit the methods for reevaluation, at possibly considerable expense. Where the methods were submitted with the comments or as supplemental information and comment, EPA has evaluated those methods and has sent letters to the commenter with EPA's evaluation of that method. In all cases, EPA believes that the commenters' method is equivalent to the promulgated method. The commenter may use that letter as demonstration to the permitting authority that the commenter's analytical method is equivalent to the promulgated method and therefore may be used by the commenter for compliance monitoring.

1. Table 7 List of Methods

The table 7 list of methods includes all methods that pesticide manufacturers will be permitted to use; that is, it contains methods already promulgated by EPA in 40 CFR part 136, updated to new versions where appropriate, as well as analytical methods not contained in part 136. The regulatory language makes it clear that pesticides manufacturers will be required to use only methods in table 7 and will not be permitted to use methods contained in part 136 (except to the extent they are identical to the methods in table 7). At a later date, EPA may decide to promulgate the methods contained in table 7 as allowable methods under part 136.

2. Methods for PAI Pollutants

EPA has not previously promulgated methods for most of the PAI pollutants in today's final rule. In 1985, as part of the promulgation of effluent limitations guidelines and standards for the Pesticide Industry, EPA promulgated methods for 61 PAIs (50 FR 40672, October 4, 1985). These methods were contained in a methods compendium titled "Methods for Nonconventional Pesticides Chemicals Analysis—Municipal and Industrial Wastewater", EPA 440/1–83/079–C. This document is presently out of print and unavailable except in photocopy form. The methods were also published in their entirety in the October 4, 1985, **Federal Register**. The promulgated methods were withdrawn as a part of the withdrawal of the 1985 rule to allow for further testing and possible revision.

Since 1986, EPA has conducted additional methods development for PAI pollutants to incorporate the most recent advances in technology, particularly the clean up procedures necessary to eliminate interferences and improve reliability, and to account for the latest and most sensitive detection devices, which permit accurate detection of PAI pollutants at very low concentrations. In addition, EPA requested and received new analytical methods from pesticide manufacturing facilities which monitor their wastewater. EPA is today promulgating all of these methods so they will be available for compliance monitoring of effluent from the manufacture of the 120 regulated PAIs; for many PAIs, more than one analytical method is being promulgated. The availability of more than one method for a specific PAI allows flexibility to the analyst to select the analytical method that provides the most accurate results.

The analytical methods promulgated today are listed in table 7. This list references method numbers contained in the documents identified below. Both of the documents containing the methods are available in the docket for this rulemaking. The documents also can be obtained as follows:

Document title and number	Source
"Methods for the Determination of Nonconventional Pesticides in Municipal and Industrial Wastewater" Volume I EPA-821-R-93-010-A Revision 1.	EPA Sample Control Center, 300 N. Lee Street, Alexandria, VA 22314.
"Methods for the Determination Nonconventional Pesticides in Municipal and Industrial Wastewater" Volume II EPA-821-R-93-010-B.	EPA Sample Control Center, 300 N. Lee Street, Alexandria, VA 22314.

These documents include methods for the 120 PAIs regulated today as well as other PAIs. A number of PAIs which are not manufactured in the United States are incorporated into products that are formulated in the United States. The Agency is continuing its evaluation of these methods, and developing new methods, for potential use in monitoring discharges from PFPR plants. EPA intends to propose effluent guidelines for the PFPR industry in January, 1994.

EPA is approving these analytical methods so that all pesticide methods for water and wastewater developed by EPA to date will be available for use by industry and by laboratories that test for these pesticides, and in anticipation of EPA's future rulemaking for Pesticides Formulators and Packagers. However, the fact that EPA is approving the use of a published method for measuring a specific PAI does not mean that EPA definitely will regulate (or not regulate) that PAI in a future rulemaking.

Most PAIs are manufactured at only one or a few plants. In collecting analytical data for today's rule, EPA generally applied a given method to the wastewater from the specific plant at which the PAI was manufactured. Therefore, most of these methods were tested on the actual wastewater to which EPA expects them to be applied. Most of the rest were tested on several wastewaters, including municipal and industrial wastewaters. Only one of the commenters submitted data indicating that one of the proposed methods, for acifluorfen, is inappropriate for acifluorfen manufacturing process wastewater. The commenters method is essentially the same as a newly developed EPA method, Method 555, which is listed in table 7 in response to that comment.

3. Methods Required for Monitoring

Today's promulgated analytical methods will be used by pesticide manufacturers, by regulatory agencies including POTWs, by commercial testing laboratories, and by others, to determine compliance with the final effluent limitations guidelines and standards. The methods for monitoring the PAIs included in today's notice are listed in table 7. There is at least one method for each PAI, at least two methods for most PAIs, and three methods for many PAIs. EPA's intent in promulgating multiple methods is to permit as much flexibility as possible while controlling the quality of the methods approved.

Method Flexibility. EPA will continue to allow flexibility in the selection of methods and flexibility within methods, as stated in the proposed rule (57 FR 12590), and as consistent with the flexibility allowed with respect to the 40 CFR part 136, appendix A methods (49 FR 43234). To further support this flexibility, EPA has produced a document titled "Guidance on Evaluation, Resolution, and Documentation of Analytical Problems Associated with Compliance Monitoring" (EPA 821-B-93-001, June 1993) (the "Monitoring Guidance"). This document gives details of the flexibility allowed in resolving analytical problems and describes the documentation required under other regulations when a method is altered. This document is also available from the EPA Sample Control Center, 300 N. Lee Street, Alexandria, VA 22314.

The regulated industry has submitted methods to EPA either as a part of EPA's data gathering for this rule or in comments on the proposal of this rule. EPA has reviewed these methods and found that, in every instance, the submitter/commenter's method uses the same analytical technology as at least one of the methods listed in table 7 of today's final rule, although the exact details of the submitter/commenter's method may be different. EPA has also found that, nearly without exception, the submitter/commenters' methods do not contain the extensive quality control (QC) that is in the equivalent EPA method. Although companies might argue that this QC is not necessary for testing at the location or very few locations where an active ingredient is manufactured, EPA might apply the method for the PAI to discharges at other locations where an active ingredient may be suspected to be present, or in other applications. In addition, EPA believes that analytical data collected for monitoring and for other purposes should be supported by the controls necessary to define the quality of the data produced. Therefore, EPA has not included any of the submitter/commenters' methods in today's final rule but has approved for use EPA's own equivalent methods containing QC measures.

Some industry commenters expressed concern that if their methods were not approved and included in today's rule, they could not use these methods for monitoring. Some stated further that their methods had been negotiated and approved by the Regional or State permitting authority. The final rule allows continued use of any method presently in use and approved by a Regional or State permitting authority so long as the performance of that method is equal to or better than the performance of one of the methods listed in table 7 of this final rule. Further, the methods allow the regulated community and others to modify them to improve method performance, lower the costs of measurement, or to overcome interferences, so long as the performance criteria in the method are met. This flexibility is consistent with the flexibility described in the preamble to the 40 CFR part 136, appendix A methods (49 FR 43234) and detailed in the Monitoring Guidance. When a method modification is made, records must be maintained to demonstrate that the performance of the EPA method was not compromised by the modification. The records that must be maintained are outlined in the Monitoring Guidance.

X. Public Participation and Summary of Responses to Selected Comments

A. Public Participation

The Agency received comments from 34 separate commenters on the April 10, 1992 proposal and 4 separate commenters on the April 14, 1993 NOA. These included 4 trade associations, two POTWs, 25 individual companies, one individual, the Small Business Administration and NRDC. In addition to the Federal Register Notices on May 15, 1992, a public meeting on the regulations and a public hearing on the pretreatment standards were held in Washington, DC.

The Agency's responses to comments are contained in the "Comments Summary and Response" section of the rulemaking docket. The Agency's responses to some of the principal comments relating to the rulemaking are included in previous discussions of the notice. A summary of responses to other major comments is included below.

B. Public Comments and EPA Responses

1. Notice and Comment Issues

Comment: The National Agricultural Chemicals Association (NACA) notes that EPA has excluded certain wastewater treatment performance data and other data from the public record for this rulemaking on the grounds that it must be treated as confidential business information (CBI). NACA states that it and its member companies therefore have not been able to obtain and evaluate fully the data base that EPA used to develop the proposed regulations. NACA concludes that it has not had an opportunity to comment fully on the proposed regulations.

Response: EPA has a legal obligation to protect information and data that is claimed to be CBI unless the Agency has made a determination that the information is not entitled to confidential treatment (see 40 CFR part 2, subpart B). Nearly all of the pesticide manufacturers who submitted data to EPA for this rulemaking have claimed that the data on their production rates (i.e., tons of PAI produced per day) are CBI. EPA fully considered these CBI claims and has upheld them (see Class Determination 1–93 issued by the EPA Office of General Counsel). Further, because these companies claimed that their production rates are CBI, the Agency concluded that the claims of confidentiality also extend to the concentration data and flow data submitted by the companies. This is because multiplying the concentration of a particular PAI in wastewater (in pounds per gallon) by the flow (i.e., gallons of wastewater generated per day) would allow the total mass of pollutant per day to be calculated (i.e., pounds of PAI per day in wastewater). Comparing that value to the proposed limit for each PAI, which is expressed in terms of pounds of PAI per ton of PAI produced, would allow the total production rate to be derived, which is claimed as confidential. For example, if 1 pound per day of a certain PAI is generated in wastewater, and EPA's proposed limitation is 1 pound per ton of PAI produced, then the plant's production rate of one ton of PAI per day can be calculated.

Because EPA has upheld the companies' CBI claims with respect to this information, the Agency may not publicly disclose this information. Further, because in most cases there are only one or two manufacturers of any specific PAI, EPA also generally cannot disclose the data in aggregated form as a way of protecting CBI, which is often possible in the case of other industries where there are typically several manufacturers of a specific product.

While protecting the information claimed to be confidential, EPA, at the same time, took steps to ensure the fullest possible review of the proposed regulations. EPA sent copies of the data as entered into our computers to each plant that submitted data we relied upon and informed each that the Agency had analyzed the data using the delta log normal statistical procedure. That procedure was published as part of the record for the OCPSF effluent guidelines and was also included in the record for the proposal here. EPA sent these data to the plants on or before March 31, 1992.

EPA asked each plant to determine if the rulemaking data base contains any data entry errors. The Agency received some corrections from the plants and incorporated them into the database. Other companies confirmed that the data is correct as entered. In another case, a company informed EPA that it has applied the delta lognormal method to its data and has confirmed the results of our analysis. EPA also provided the basis for the estimated costs, including the technology basis and a short summary of our rationale, to each plant that requested that information. Some of the plants that commented on the proposed regulations identified alleged errors in EPA's analysis. Where the commenter's allegation has proven to be valid, EPA has corrected the error in the final rulemaking.

In a small number of cases, proposed limitations that could affect one plant manufacturing a particular PAI were based on data for the same PAI manufactured at another plant. In such cases, if the first plant requested information, EPA informed the first plant that the limitations were based on data from a second plant, some of which is claimed to be confidential. Although EPA did not identify the second plant, from comments received it appears that the first plant would be able to identify the second plant and presumably would be able to determine the production rate at the second plant if provided with the flow and concentration data. Therefore, EPA did not provide that confidential data to the first plant or put it in the public record. However, EPA has information that in some cases, companies shared such data among themselves.

NACA also questions the adequacy of data in the record concerning PAIs for which EPA set limits based on transferred data. As described in the proposal, for a number of PAIs, there are no data available on actual full-scale treatment by manufacturing facilites. However, EPA determined that the PAI is part of a group of PAIs that have similar chemical structures and treatabilities and full-scale treatment performance data are available for other PAIs within the structural group. Therefore, EPA set limitations for these PAIs based on the full scale data for structurally similar PAIs. In addition, in nearly all cases, EPA supplemented its analysis with bench-scale treatability studies to confirm the performance of certain treatment technologies on various structural groups of PAIs. The information on the bench-scale treatability studies is contained in the public record except for certain information claimed confidential by the facilities involved. See section 7 of the Development Document for a further discussion of the derivation of limits for these PAIs.

EPA also held meetings with several companies that had comments on the proposed limitations, including some companies as to which the proposed limitations were based on data from another company. At these meetings or in the comments submitted, some of these companies indicated that significant changes have recently occurred at their facilities, including increased treatment, process changes, or other changes which have the effect of reducing pollutant discharges. Where appropriate, these companies submitted additional data that document the changes at their facilities. EPA has evaluated the additional data provided by these companies. In these cases, the final limitations are based on actual data from the companies and not on the data originally transferred from other facilities.

NACA also asserts that because of the lack of data in the record, NACA is not able to discern whether EPA edited the raw data collected for this rulemaking by screening out certain data points during the statistical analysis of the data. Because of differences between the OCPSF industry and the pesticides manufacturing industry EPA determined that it did not need to edit the data for this rulemaking as extensively as was done for the OCPSF rule. Further discussion of data editing issues is contained in the comment response document for this rulemaking.

In sum, because EPA provided data relevant to the proposed limitations to the companies directly affected, or, in a small number of cases when this was not possible due to CBI considerations, provided information to the affected companies that was sufficient for them to comment on the proposed regulations, EPA believes it has provided adequate opportunity for

NACA and its member companies to comment upon the proposed regulations.

2. Establishment of Limitations at the Analytical Method Detection Limit (MDL)

Comment: Industry commenters criticized EPA's decision to establish limitations, as understood by the commenters, at the MDL, which they claim is not scientifically justified nor can compliance be adequately demonstrated.

Response: EPA did not establish limitations at the MDL. The limitations have been set significantly above the MDL based on variability factors, or based on the LTA/MDL ratios. In most cases, limitations are based on long term data from the plant manufacturing the specific PAI; that data demonstrates that the plant is capable of meeting the limitations. In fact, most of the data demonstrates that the plants already are meeting the limitations; in a few cases, additional treatment technology has been deemed necessary. In some cases, limitations have been transferred from plants manufacturing similar PAIs and/or using the same technology. Technology transfers are supported by either EPA or industry treatability studies or both.

3. TRI Data

Comment: NRDC raised an issue concerning the 1989 Toxic Release Inventory report ("TRI"). NRDC questioned why the pesticides manufacturers effluent guidelines do not cover a number of nonconventional pollutants that, according to the 1989 TRI report, are among those that pesticides manufacturing facilities release to surface waters and POTWs in the greatest quantities. NRDC concludes that the effluent guidelines do not adequately cover nonconventional pollutants.

Response: Under the TRI system, manufacturing industries report their annual releases of pollutants to all media. The requirement for TRI reporting was enacted in section 313 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C. 11023.

EPA considered the TRI data but determined that there were two basic difficulties that prevented the Agency from using these data to determine which pollutants to regulate in the pesticides manufacturers effluent guidelines. First, TRI data are reported by manufacturing plants as total plant data, i.e., the pollutant loadings reported are the discharges and emissions from the entire plant, not just those from the pesticide chemicals manufacturing operations within the plant. Most pesticides chemicals manufacturers also manufacture other non-pesticide chemicals, such as organic chemicals, pharmaceuticals, and inorganic chemicals. The TRI total plant data cannot be broken down to determine what portion of the reported discharges are attributable to a plant's pesticide chemicals manufacturing operations. Discharges from a plant that appear to be large may in fact be coming fully or partially from the non-pesticides operations within the plant.

Second, many of the pollutants of interest for pesticides chemicals manufacturing, particularly the PAIs, are not included in the list of chemicals required to be reported under the TRI system. In addition, the TRI reporting system contains reportable quantity thresholds; quantities below the threshold amounts need not be reported. Thus, the reported TRI data would not give a full indication of the presence of pollutants of concern for this rulemaking.

The limitations on the usefulness of the TRI data for this rulemaking are confirmed in an April 21, 1992 EPA contractor report entitled "The Toxic Release Inventory System: Its Use In Effluent Guidelines Studies." This report which was in the public record for the April 14, 1993 NOA, examines the feasibility of incorporating TRI data into EPA's effluent guidelines studies. For the pesticides manufacturing industry, the report concludes that "the TRI data contribute little information that is not already collected in the course of an effluent guidelines study. Furthermore, the TRI data, when compared to EAD sampling data, tend to be less detailed and less accurate, both in terms of the total number of chemicals covered and released and in terms of the specific chemicals of concern to EAD."

To develop the data base for this rulemaking, EPA acquired data on pollutant discharges and on general manufacturing processes through the industry questionnaires. In addition, EPA visited 32 plants and conducted sampling at 23 of those plants. The analytical protocol for each sampling episode included analysis for all specific pollutants on the TRI list that can exist in water and for which an analytical method is available. EPA analyzed for nearly 500 pollutants or pollutant properties, including PAIs, priority pollutants, several dozen other metals and elements, and more than 200 organic chemicals that are neither pesticides nor priority pollutants. Based on these analyses, EPA chose the pollutants of concern for this rulemaking. In fact, comparison of the questionnaire data and sampling data that EPA collected for this rulemaking shows that these data correlate very poorly with the TRI data on total plant discharges.

Based on the TRI data, NRDC cited to a number of chemicals and questioned why they are not covered by the pesticides manufacturers effluent guidelines. NRDC apparently did not understand the limitations discussed above on the use of the TRI data for purposes of this rulemaking. Nevertheless, in the comment-response document for this rulemaking, EPA has explained its reasons for not including each of the chemicals cited by NRDC within the scope of the regulations. As explained there, in most cases, the reason for not covering these chemicals is that EPA has determined that they do not exist in significant amounts in wastewaters from pesticides chemicals manufacturing operations.

4. Scope of Coverage

Comment: Industry commenters stated that intermediate products in the production of PAIs should not automatically be considered covered by the OCPSF effluent guidelines but instead should be regulated on a case-specific, "best professional judgment" basis. They do not believe that the pesticide intermediate chemicals were fully considered in connection with the OCPSF guidelines. In addition, they assert that in many cases, the production processes for the intermediates are so intricately connected by recycle/recovery steps and commingling of resulting wastewaters that it is virtually impossible to determine where to draw the line between intermediate process wastestreams and final pesticide process wastestreams.

Response: The pesticides manufacturers effluent guidelines apply only to the manufacturing of PAIs and not to the manufacturing of intermediate products. The objective of these regulations is to limit the presence of PAIs in wastewater discharges.

The applicability of the OCPSF guidelines is set forth in 40 CFR 414.11. That regulation, and not today's rulemaking, governs the applicability of the OCPSF guidelines to PAI intermediates. EPA believes, however, that wastewaters from the manufacturing of PAI intermediate products will generally fall within the coverage of the OCPSF guidelines. For example, a number of PAI intermediates are included within SIC Code 2869, and therefore would generally be covered by

the OCPSF guidelines (see 40 CFR 414.11(a)(5)). However, although EPA indicated in the proposal that pesticide intermediate chemicals would be covered by the OCPSF guidelines (57 FR 12563), EPA did not mean to imply that this would necessarily be true in the case of every intermediate. Commenters identified some instances in which the OCPSF guidelines may not apply to intermediates. For example, the intermediates in the production of organo-tin pesticides may be inorganic chemicals, and therefore may fall within the scope of the inorganic chemicals effluent guidelines (40 CFR part 415) and not the OCPSF guidelines.

In another case, commenters pointed out that the analytical method for the PAI benomyl does not distinguish between benomyl and its intermediate, carbendazim, which may also be present in the final PAI wastewaters. EPA agrees and, in this instance, EPA has revised the final limitations for benomyl to cover the discharge of both benomyl and carbendazim.

EPA does not agree that other effluent guidelines cannot apply to the pesticide intermediate chemicals wastestreams because of commingling of those wastestreams with those from the production of final PAIs. In many cases, commingling of these wastestreams does not exist (in some cases, the PAIs and intermediates are not even manufactured at the same facility). Even in cases where there is commingling, permit writers and local control authorities have regulatory tools that allow them to account for contributions of pollutants from different processes (see, e.g., 40 CFR 122.45; 40 CFR 403.6(e)). Moreover, commingling of wastestreams will not hinder the application of the pesticides manufacturers effluent guidelines to the final PAI wastewaters. The PAI limits in today's final rule are mass-based. Therefore, commingling of process wastewaters from the production of the intermediates and production of the PAIs could have the effect of reducing the concentration of the PAI but not its mass.

EPA does agree that in cases where there are no effluent guidelines that apply, the pesticide intermediate chemicals should be regulated on a case-specific, best professional judgment basis.

To clarify that the regulations do not apply to wastewaters from the production of intermediate chemicals, EPA has added a statement to this effect to the definition of "process wastewater flow" (see § 455.21 (d)).

Comment: Some commenters expressed confusion over the coverage of the term "process wastewater flow."

Response: In response, EPA has clarified the coverage of these regulations by adding an explicit definition of this term. See 40 CFR 455.21(d). In response to the commenters' specific concerns, the term "process wastewater flow" is defined to include, among other things, wastewater flows from safety shower water, safety equipment cleaning water, equipment and floor washes, contaminated storm water, and product/process laboratory quality control wastewater. Laboratory wastewaters generated by activities other than quality control analysis, such as evaluations of waste characteristics, are not included in this definition. Wastewaters from employee showers and laundry operations are also not included. A description of these wastewater streams is contained in section 5 of the Technical Development Document. Although the term "process wastewater flow" was not explicitly defined in the proposed regulations, it was clear from the record for the proposal that the items listed in this definition are the ones that were included in the wastewater flows that were analyzed and costed for the proposed rulemaking. Thus, the addition of this definition to the regulations is simply a clarification of material that was in the record for the proposal. As a further clarifying measure, EPA is also adding a definition of the term "process wastewater pollutants" to § 455.21. This term is defined to mean pollutants that are contained in process wastewater flow.

XI. Pollution Prevention Aspects of This Rule

In the Pollution Prevention Act of 1990 (42 U.S.C. 13101 et seq., Pub.L. 101–508, November 5, 1990)("PPA"), Congress declared it to be the national policy of the United States that:

- Pollution should be prevented or reduced at the source whenever feasible;
- Pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible;
- Pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and,
- Disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

See 42 U.S.C. 13101(b). This policy identifies source reduction as the first priority within the environmental management hierarchy. Source reduction, as defined by the PPA, means "any practice which * * * reduces the amount of any * * * pollutant or contaminant entering any waste stream or otherwise released into the environment * * * prior to recycling, treatment, or disposal * * *" (42 U.S.C. 13102(5)). The term "source reduction" includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control. If source reduction cannot be achieved, the policy's hierarchy emphasizes recycling, followed by treatment and then by disposal or release to the environment in an environmentally safe manner.

In recognition of this environmental management hierarchy, EPA has incorporated pollution prevention and recycling measures into these final effluent limitations guidelines and standards for pesticides manufacturers to the fullest extent possible based on available data. The final rule is in fact based to a large degree on source reduction and recycling practices that are available in this industry.

EPA's data gathering efforts for this rulemaking assisted the Agency in determining the status of pollution prevention and recycling activites and opportunities in the pesticides industry. As described earlier, EPA relied on three principal data gathering efforts: (1) Review of existing information on the pesticide chemicals manufacturing industry and collection of additional information through industry questionnaires; (2) a wastewater sampling and analysis program; and (3) bench-scale treatability studies. These data collections provided information related to the pollution prevention hierarchy. The industry questionnaire requested details on PAI manufacturing operations; the quantity, treatment, and disposal of wastewater generated during PAI manufacturing; PAI process wastewater analytical monitoring data; treatability study information; and the extent of wastewater source reduction and recycling at each facility. Questionnaire responses included information pertinent to each element of pollution prevention hierarchy. Through the wastewater sampling and analysis program, the Agency was able to observe and evaluate the pesticide manufactures' employment of source reduction and recycling techniques and treatment disposal operations. In addition, plant visits gave the Agency the opportunity to determine if any pollution prevention modifications had been incorporated since the 1986

questionnaire response. Also, bench scale treatability studies allowed the Agency to evaluate the ability to treat pollutants in process wastewater.

The information collected by EPA, and the pollution prevention and recycling measures currently practiced by pesticide chemicals manufacturers, are fully described in section VII of the Technical Development Document for this rulemaking. The following summarizes the discussion in the Technical Development Document of existing and available pollution prevention and recycling practices in the pesticide chemicals manufacturing industry and the way that EPA has accounted for these practices in the final effluent guidelines.

The source reduction and recycling measures that have been implemented by pesticides manufacturers consist primarily of recirculation and reuse of both water streams (which include waters used in the manufacturing process as well as wastewaters generated at various stages in the process) and non-water streams (which include solvents, acids and other materials used in the manufacturing process as well as wastestreams containing these materials). "Recirculation" is used here to mean placing water or non-water streams generated during the manufacturing process back into the waters or non-waters for the same manufacturing process (at either the same or a different step in the process). "Reuse" is used here to mean placing waters or non-water streams generated during some part of the manufacturing process into the manufacturing process streams for different chemicals.

Water streams generated during the manufacturing of PAIs typically include carrier/reaction media, reaction water, process stream washes, product washes, equipment washes, pump seal wastewater, steam jet and vacuum pump wastewater, and blowdown from air pollution control scrubbers. Non-wastewater streams that are generated during the manufacturing of PAIs typically include solvents, other organic chemicals streams, acids, bases, alcohols, and PAI product recovery streams.

Through the questionnaire distributed to the entire industry in 1988 and site visits and sampling visits to selected facilities, EPA found that 20 plants practice water recirculation or reuse in the manufacturing processes for 51 PAIs. (There are a total of 51 pesticides manufacturing plants that produce one or more of the 120 PAIs that are covered by this final rule.) In general, these 20 plants recirculate or reuse waters in the following ways: Recirculation of a process input water stream; recirculation or reuse of waters as cooling water or scrubber water; reuse into a pesticides formulating process; reuse into a wash water step; and reuse of contaminated stormwater into the manufacturing process.

In addition, the Agency identified recirculation and reuse of non-water/non-wastewater streams at 37 facilities in connection with the manufacturing of 80 PAIs. (There is some overlap between these numbers and those in the preceeding paragraph because the production of some PAIs involves recirculation or reuse of both water and non-water streams.) Recycling of these streams includes, for example, reuse of solvents and reuse of PAI product after it has been reclaimed, typically through solvent extraction.

EPA has relied on the pollution prevention and recycling practices identified at these facilities to the fullest possible extent in establishing the technology bases for the final regulations. For 28 PAIs, complete recirculation or reuse of all waters or non-water streams has been achieved by current manufacturers through the use of closed-loop recycling (which eliminates the need for discharges, including blowdown discharges). The final rule therefore sets a zero discharge BAT limit for these 28 PAIs. See table 2 of subpart A. (There are two other PAIs for which EPA has set a zero discharge BAT limit in the final rule; a limit of zero was established in these cases because these two PAIs are manufactured without the use of water.)

EPA also relied on existing pollution prevention and recycling practices as part of the technology basis for setting BAT limitations for 68 other PAIs in the final rule, where these practices do not eliminate all discharges of pollutants. Consequently, numeric (non-zero) BAT limits have been set for these 68 PAIs. Nonetheless, based on the identified BAT technologies, which are highly effective in controlling PAI discharges, the numeric BAT limits for these PAIs (as well as the other PAIs regulated in this rule) have been set at stringent levels that require treatment to effluent levels that are usually at or near each PAI's detection limit. Overall, EPA has relied on pollution prevention and recycling practices to set either zero discharge BAT limits or stringent non-zero BAT limits for 96 of the 120 regulated PAIs. Consequently, the limitations for existing sources in the final rule are based extensively on existing pollution prevention and recycling practices in the pesticides manufacturing industry.

EPA has also incorporated additional source reduction and recycling measures into the new source performance standards set in the final rule for many PAIs. The Agency determined that there are source reduction and recycling measures that new sources can employ to achieve reduced wastewater discharge volumes, and hence lower pollutant mass loadings in the effluent, compared to those of existing plants. The NSPS standards for these PAIs have therefore been set equal to the BAT limits plus an additional reduction to account for lower flows and pollutant loadings that new sources can achieve through employing additional pollution prevention and recycling measures. Consequently, the NSPS standards incorporate both the pollution prevention and recycling measures that serve as the bases for BAT limitations and the additional pollution prevention and recycling practices that new sources will be able to employ. For a more detailed discussion of the NSPS flow reduction issue, see section V above.

The NSPS standards are based on EPA's determination that new pesticides manufacturing plants can do more than is currently being done in many cases to achieve pollution prevention. EPA also considered whether there were further source reduction and recycling measures that even existing plants could implement and that could be incorporated within BAT limitations. Although existing plants could redesign and retrofit their facilities to achieve source reduction, the costs of implementing those measures could be very high. For example, the cost of relocating reactor vessels or other tanks, plus associated above-ground and underground piping, could be very high for existing facilities, while it costs no more for a new source to design and construct its facility in an efficient configuration from the outset than it would for the source to implement any other design. More important, EPA does not have data to determine what additional source reduction and recycling measures could be achieved at each existing facility and what the costs would be to retrofit those facilities to achieve source reduction. Therefore, consistent with the proposal, EPA has determined in the final rule that additional source reduction and recycling measures could not be incorporated beyond those already employed at existing facilities as part of the basis for BAT limitations for those facilities.

The final limitations for many PAIs are based on full-scale data from the plants that manufacture those PAIs. In

other cases, EPA has transferred the limits derived for one PAI to apply to other PAIs with similar chemical structures (see section V above). Consequently, where pollution prevention and recycling practices have been incorporated into the limitations for a particular PAI, those practices serve as the technology bases for both that PAI and all others for which the same limitation has been imposed as a transferred limitation.

As a result, the final regulations incorporate some form of pollution prevention or recycling with respect to the majority of PAIs. However, pollution prevention or recycling could not be incorporated into the regulations for every single PAI. The Technical Development Document describes in detail why EPA could not consider the source reduction and recycling measures that have been incorporated into the manufacturing processes for certain PAIs to be applicable to other PAIs that have different chemical structures and manufacturing processes. In brief, as the Development Document describes, because the manufacturing processes for the various PAIs are highly individualized and complex, it is not possible to conclude that source reduction and recycling practices associated with the manufacturing process for one PAI would necessarily be available to the same degree with respect to a structurally different PAI subject to a different manufacturing process. For example, it may be possible to recirculate a large portion of a product wash water stream within one PAI's manufacturing process whereas for a chemically different PAI, very little recirculation of the wash water stream could be tolerated before significantly affecting product quality. The Technical Development Document describes further why "transfers" of source reduction and recycling practices are not possible in the case of PAIs with different chemical structures.

For priority pollutants, EPA did not separately consider source reduction and recycling measures in this rulemaking since the limitations have been transferred from the OCPSF rulemaking. In fact, limitations for priority pollutants in this rulemaking cannot account for source reduction practices (which limit the generation of effluent and pollutants per unit of product produced) because these limitations are necessarily concentration-based and not mass-based. These national regulations must be concentration-based because the priority pollutants in question are generally present within more than one PAI manufacturing process, and the production of these PAIs each involve different flow generation rates per unit of product. The regulations therefore leave it to the permit writer or control authority to derive mass-based limits for priority pollutants based on the flows at individual facilities. It will be within the permit writer's or control authority's discretion to decide whether source reduction and recycling measures are available and should be imposed as part of the basis for mass-based priority pollutant limitations at each individual facility.

Nevertheless, source reduction and recycling measures that are incorporated into PAI limitations in this rulemaking, as a practical matter, will similarly reduce the amounts of priority pollutants in cases where PAIs and priority pollutants coexist in the wastewaters. Recirculation and reuse practices that are undertaken to meet PAI mass-based limitations will typically reduce the flow of all pollutants at a facility, including priority pollutants.

One commenter, NRDC, asserts that the effluent limitations guidelines and standards for pesticides manufacturers do not satisfy the requirements of the Pollution Prevention Act. NRDC believes that the proposed regulations improperly focused on end-of-pipe pollution controls rather than source reduction, in violation of the PPA. NRDC claims that the regulations must be reevaluated with an eye to full evaluation of pollution prevention opportunities and options.

EPA has, in fact, done a thorough job of considering source reduction opportunities in this rulemaking to the fullest extent possible based on the available information, and the Agency has extensively incorporated pollution prevention and recycling into the regulations. As noted above, EPA has relied on pollution prevention and recycling practices to set either zero discharge BAT limits or stringent non-zero BAT limits for 96 of the 120 PAIs regulated in this rulemaking. NRDC appears to have misunderstood the full extent to which pollution prevention was considered and incorporated into these regulations. See NRDC comments, p. 4 ("EPA has proposed yet another set of effluent guidelines that focus only on end-of-the-pipe controls") and p. 5 ("the proposal fails to include reuse/recycle").

The Agency cannot agree with NRDC's conclusion that the mandates of the PPA have not been satisfied. Section 6604 of the PPA directs the Administrator to set up an office for the purpose, among other things, of reviewing for the EPA Administrator the impact that Agency regulations would have on source reduction. See PPA sec. 6604, 42 U.S.C. 13103; S. Rep. No. 526, 101st Cong., 2d Sess. at 2 (1990). This office is to "consider" the effect of Agency programs on source reduction efforts and to "review" EPA's regulations prior and subsequent to their proposal to determine their effect on source reduction. *Id.* The PPA does not, by its terms, require anything more than this consideration of source reduction. In particular, it does not require the Agency to forego reliance altogether on end-of-pipe treatment technologies within the effluent guidelines program in cases where, as here, source reduction opportunities do not fully account for pollutant reductions that can be achieved. Instead, BAT has been determined in this rule by identifying a combination of source reduction opportunities (where available) and end-of-pipe treatment technologies. The PPA is designed simply as a first step toward accomplishing pollution prevention objectives. (S. Rep. No. 526, p. 1.) It does not legally mandate any particular level or consideration of source reduction in the regulations themselves. Nevertheless, EPA is committed to pursuing pollution prevention objectives and has already described how the Agency has, in fact, fully considered source reduction opportunities in this rule based on available information. Further, the end-of-pipe treatment technologies identified as BAT in today's rulemaking destroy the pollutants in the pesticide chemicals wastewaters to a high degree. The effect of these technologies, together with the source reduction practices on which the regulations are based, prevents most of the generated pollutants from being discharged to the environment or shifted to another medium, which is consistent with the goals of the PPA.

List of Subjects in 40 CFR Part 455

Pesticide chemicals manufacturing, Water treatment and disposal, Water pollution control.

Dated: September 10, 1993.

Carol M. Browner,

Administrator.

Appendix A To The Preamble. Abbreviations, Acronyms, and Other Terms Used in This Notice

Act—Clean Water Act

Agency—U.S. Environmental Protection Agency.

BAT—The best available technology economically achievable, as defined by section 304(b)(2)(B) of the Act.

BCT—The best conventional pollutant control technology, as defined by section 304(b)(4) of the Act.
BMP—Best management practices, as defined by section 304(e) of the Act.
BPT—The best practicable control technology currently available, as defined by section 304(b)(1) of the Act.
Clean Water Act—The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1251 et seq.), as amended by the Clean Water Act of 1977 (Pub. L. 95–217), and the Water Quality Act of 1987 (Pub. L. 100–4).
Conventional Pollutants—Constituents of wastewater as determined by section 304(a)(4) of the Act, including, but not limited to, pollutants classified as biochemical oxygen demand, suspended solids, oil and grease, fecal coliform, and pH.
Direct Discharger—An industrial discharger that introduces wastewater to a water of the United States with or without treatment by the discharger.
Effluent Limitation—A maximum amount, per unit of time, production or other unit, of each specific constituent of the effluent from an existing point source that is subject to limitation. Effluent limitations may be expressed as a mass loading in pound per 1,000 pound PAI produced or as a concentration in milligrams per liter.
End-of-Pipe Treatment (EOP)—Refers to those processes that treat a plant waste stream for pollutant removal prior to discharge. EOP technologies are classified as primary (physical separation processes), secondary (biological processes), and tertiary (treatment following secondary) processes. Different combinations of these treatment technologies may be used depending on the nature of the pollutants to be removed and the degree of removal required.
Indirect Discharger—An industrial discharger that introduces wastewater into a publicly owned treatment works.
In-Plant Control or Treatment Technologies—Controls or measures applied within the manufacturing process to reduce or eliminate pollutant and hydraulic loadings of raw wastewater. Typical in-plant control measures include process modification, instrumentation, recovery of raw materials, solvents, products or by-products, and water recycle.
Nonconventional Pollutants—Pollutants that have not been designated as either conventional pollutants or priority pollutants.
NPDES—National Pollutant Discharge Elimination System, a Federal program requiring industry dischargers, including municipalities, to obtain permits to discharge pollutants to the nation's waters, under section 402 of the Act.
NSPS—New source performance standards, as defined by section 306 of the Act.
OCPSF—Organic chemicals, plastics, and synthetic fibers manufacturing point source category (40 CFR part 414).
PAI—Pesticide Active Ingredient.
POTW—Publicly owned treatment works.
Priority Pollutants—The toxic pollutants listed in 40 CFR part 423, appendix A.
PSES—Pretreatment Standards for existing sources of indirect discharges, under section 307(b) of the Act.
PSNS—Pretreatment standards for new sources of indirect discharges under section 307(b) and (c) of the Act.
SIC—Standard Industrial Classification, a numerical categorization scheme used by the U.S. Department of Commerce to denote segments of industry.
Technical Development Document—Development Document for Effluent Limitations Guidelines and Standards for the Pesticide Chemicals Manufacturing Point Source Category.

Appendix B to the Preamble. Priority Pollutants for Which Limitations Are Being Transferred From the Organic Chemicals, Plastics and Synthetic Fibers Effluent Guidelines and Standards (40 CFR part 414)

Pollutant No.	Pollutant name
004	Benzene
006	Tetrachloromethane
007	Chlorobenzene
010	1,2-Dichloroethane
011	1,1,1-Trichloroethane
023	Trichloromethane
024	2-chlorophenol
025	1,2-Dichlorobenzene
027	1,4-Dichlorobenzene
029	1,1-Dichloroethylene
030	1,2-trans-Dichoroethylene
031	2,4-Dichlorophenol
032	1,2-Dichloropropane
033	1,3-Dichloropropene
034	2,4-Dimethylphenol
038	Ethylbenzene
044	Dichloromethane
045	Chloromethane
055	Naphthalene
065	Phenol
085	Tetrachloroethylene
086	Toluene
122	Lead (Total)

Appendix C to the Preamble. Toxic Pollutants Excluded From Regulation

1. EPA is excluding certain toxic pollutants from regulation for the following reasons:

a. The pollutant is not detectable in the effluent with the use of analytical methods promulgated pursuant to section 304(h) of the Act or other state-of-the-art methods.

Acrylonitrile
1,1,2-Trichloroethane
2-Chloroethyl vinyl ether
3,3'-Dichlorobenzidine
2,6-Dinitrotoluene
4,6-Dinitro-*o*-cresol
Bis (2-Chloroisopropyl) ether
Bis (2-Chloroethoxy) methane
N-Nitrosodimethylamine
N-Nitrosodiphenylamine
Pentachlorophenol
Butyl benzyl phthalate
Acenaphthlene
Benzo (A) pyrene
Benzo (GHI) perylene
Dimethyl phthalate
Dibenzo (A,H) anthracene
Ideno (1,2,3-CD) pyrene
Aldrin
Dieldrin
Chlordane
4,4'-DDT
4,4'-DDE
4,4'-DDD
å-Endosulfan
β-Endosulfan
Endosulfan sulfate
å-BHC
β-BHC
Ω-BHC
∂-BHC
PCB-1242
PCB-1254
PCB-1221
PCB-1232
PCB-1248
PCB-1260
PCB-1016
2,3,7,8-Tetrachlorodibenzo-*p*-dioxin

b. The pollutant is present only in trace amounts and is neither causing nor likely to cause toxic effects. In addition, the pollutant is present in amounts too small to be effectively reduced by technologies known to the Administrator.

2-Chloronaphthalene
1,3-Dichlorobenzene
2,4-Dinitrotoluene
1,2-Diphenylhydrazine
Bis (2-ethylhexyl) phthalate
Di-*n*-butyl phthalate
Diethyl phthalate
Antimony
Arsenic
Beryllium
Cadmium
Chromium
Copper
Mercury
Nickel
Selenium
Silver
Thallium
Zinc
1,1-Dichloroethane

c. The pollutant is detectable in the effluent from only a small number of sources and the pollutant is uniquely related to only those sources.

Acenapthene
Acrolein
Benzidene
1,2,4-Trichlorobenzene
Hexachlorobenzene
1,1,2,2-Tetrachloroethane
Chloroethane
Bis (2-Chloroethyl) ether
Parachlorometacresol
Fluoranthene
4-Chlorophenyl phenyl ether
4-Bromophenyl phenyl ether
Isophorone
Nitrobenzene
2-Nitrophenol
2,4-Dinitrophenol
Di-*n*-octyl Phthalate
Benzo (A) anthracene
Benzo fluoranthene
Benzo (B) fluoranthene
Chrysene
Anthracene
Fluorene

Phenanthrene
Pyrene
Vinyl chloride

d. The pollutant will be effectively controlled by the technologies which are the basis for controlling certain pesticide active ingredients in today's effluent limitations guidelines and standards.

Hexachloroethane
N-Nitroso-di-*n*-propylamine
Endrin aldehyde
Heptachlor epoxide
1,1,2-Trichloroethylene
2,4,6-Trichlorophenol

2. In addition, EPA is not regulating certain priority pollutants for the following reasons:

a. EPA is not regulating the following priority pollutants due to lack of treatability data. These priority pollutants were not detected during sampling but would be expected in wastewaters from the manufacture of certain pesticides. However, those pesticides were not in production when sampling activities were scheduled by EPA.

Hexachlorobutadiene
Hexachlorocyclopentadiene
4-Nitrophenol

b. EPA is also not regulating Asbestos because there is no promulgated sec. 304(h) analytical method for that pollutant in water.

For the reasons set forth in the preamble, 40 CFR part 455 is amended as follows:

PART 455—PESTICIDE CHEMICALS

1. The authority citation for part 455 is revised to read as follows:

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

2. Section 455.10 is amended by adding paragraph (f) to read as follows:

§ 455.10 General definitions.

* * * * *

(f) *Priority Pollutants* means the toxic pollutants listed in 40 CFR part 423, appendix A.

3. A new § 455.11 is added to subpart A to read as follows:

§ 455.11 Compliance date for pretreatment standards for existing sources (PSES).

All discharges subject to pretreatment standards for existing sources (PSES) in this part must comply with the standards no later than September 28, 1996.

4. Section 455.20 is amended by revising paragraph (a) and by adding paragraphs (d) and (e) to read as follows:

§ 455.20 Applicability; description of the organic pesticide chemicals manufacturing subcategory.

(a) For the purpose of calculating and applying effluent limitations for COD, BOD5, and TSS, and applying pH limits under BPT (§ 455.22), BCT (§ 455.23), and NSPS (§ 455.25), the provisions of this subpart are applicable to discharges resulting from the manufacture of organic pesticide active ingredients and organo-tin pesticide active ingredients, excluding the following: Allethrin; Benzyl Benzoate; Bisethylxanthogen; Chlorophacinone; Coumafuryl; Dimethyl Phthalate; Diphacinone; Endothall Acid; EXD (Herbisan); Gibberellic Acid; Glyphosate; Naphthalene Acetic Acid; Propargite; 1,8 Naphthalic Anhydride; Quinmethionate; Rotenone; Sulfoxide; Triazine compounds (both symmetrical and asymmetrical); and Warfarin and similar anticoagulants. Provided, however, that the effluent limitations of this subpart for BOD5 and TSS, but not COD, apply to manufacturers of Ametryn, Prometon, Prometryn, Terbutryn, Cyanazine, Atrazine, Propazine, Simazine, Terbuthylazine, Hexazinone, and Glyphosate.

* * * * *

(d) A plant that manufactures a pesticide active ingredient listed in Table 1 of this part must comply with the BAT effluent limitations and new source performance and pretreatment standards for that pesticide active ingredient listed in table 2 (BAT and PSES) or Table 3 of this part (NSPS and PSNS). A plant that manufactures a pesticide active ingredient listed in Table 1 of this part must also comply with the BAT effluent limitations and new source performance and pretreatment standards for priority pollutants listed in Tables 4, 5 and 6 of this part. The limitations in Table 4 of this part (BAT and NSPS) are applicable to existing and new direct discharge point sources that use End-of-Pipe biological treatment. The limitations in Table 5 of this part (BAT and NSPS) are applicable to existing and new direct discharge point sources that do not use end-of-pipe biological treatment. The limitations in Table 6 of this part (PSES and PSNS) are applicable to existing and new sources that discharge to Publicly Owned Treatment Works.

(e) In the case of lead and total cyanide, the discharge quantity (mass) shall be determined by multiplying the concentrations listed in the applicable tables in this subpart times the flow from non-complexed lead-bearing waste streams for lead and times the flow from non-complexed cyanide-bearing waste streams for total cyanide. Discharges of cyanide in cyanide-bearing waste streams are not subject to the cyanide limitation and standards of this subpart if the permit writer or control authority determines that the cyanide limitations and standards are not achievable due to elevated levels of non-amenable cyanide (i.e., cyanide that is not oxidized by chlorine treatment) that result from the unavoidable complexing of cyanide at the process source of the cyanide-bearing waste stream and establishes an alternative total cyanide or amenable cyanide limitation that reflects the best available technology economically achievable. The determination must be based upon a review of relevant engineering, production, and sampling and analysis information, including measurements of both total and amenable cyanide in the waste stream. An analysis of the extent of complexing in the waste stream, based on the foregoing information, and its impact on cyanide treatability shall be set forth in writing and, for direct dischargers, be contained in the fact sheet required by 40 CFR 124.8.

5. Section 455.21 is amended by adding paragraphs (d) and (e) to read as follows:

§ 455.21 Specialized definitions.

* * * * *

(d) *Process wastewater flow* means the sum of the average daily flows from the following wastewater streams: Process stream and product washes, equipment and floor washes, water used as solvent for raw materials, water used as reaction medium, spent acids, spent bases, contact cooling water, water of reaction, air pollution control blowdown, steam jet blowdown, vacuum pump water, pump seal water, safety equipment cleaning water, shipping container cleanout, safety shower water, contaminated storm water, and product/process laboratory quality control wastewater. Notwithstanding any other regulation, process wastewater flow for the purposes of this subpart does not include wastewaters from the production of intermediate chemicals.

(e) *Process wastewater pollutants* means those pollutants present in process wastewater flow.

6. New §§ 455.23, 455.24, 455.25, 455.26 and 455.27 are added to subpart A to read as follows:

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

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology: The limitations for

BOD, TSS and pH are the same as those specified in 40 CFR 455.22.

BCT EFFLUENT LIMITATIONS

Effluent Limitations

Pollutant or pollutant property	Maximum for any one day**	Average of daily values shall not exceed**
BOD_5	7.400	1.6000
TSS	6.100	1.8000
pH	*	*

*Within the range 6.0 to 9.0

**Metric units: Kilogram pollutant/1,000 kg of total organic active ingredients.

English units: Pound pollutant/1,000 lb of total organic active ingredients

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

Except as provided in 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology as specified in 40 CFR 455.20(d). For the priority pollutants, such sources must achieve discharges not exceeding the quantity (mass) determined by multipying the process wastewater flow subject to this subpart as defined in 40 CFR 455.21 (d) times the concentrations listed in table 4 or table 5 of this part, as appropriate, of this subpart.

§ 455.25 New source performance standards (NSPS).

(a) Any new source subject to this subpart which discharges process wastewater pollutants must achieve the new source performance standards specified in 40 CFR 455.20(d), and subject to 455.20(a), must meet the following standards for BOD5, TSS, COD and pH:

NEW SOURCE PERFORMANCE STANDARDS

Standards

Pollutant or pollutant property	Maximum for any one day**	Average of daily values shall not exceed**
COD	9.360	6.480
BOD_5	5.328	1.1520
TSS	4.392	1.2960
pH	*	*

*Within the range 6.0 to 9.0

**Metric units: Kilogram pollutant /1,000 kg of total organic active ingredients.

English units: Pound pollutant/1,000 lb of total organic active ingredients

(b) For the priority pollutants, such sources must achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart as defined in 40 CFR 455.21(d) times the concentrations listed in table 4 or table 5 of this part, as appropriate, of this subpart.

§ 455.26 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7, 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 the pretreatment standards for existing sources (PSES) as specified in 40 CFR 455.20(d). For the priority pollutants, such sources must achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart as defined in 40 CFR 455.21(d) times the concentrations listed in Table 6 of this part. If mass limitations have not been developed as required, the source shall achieve discharges not exceeding the concentration limitations listed in Table 6 of this part.

§ 455.27 Pretreatment standards for new sources (PSNS).

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 must achieve the pretreatment standards for new sources (PSNS) as specified in 40 CFR 455.20(d). For the priority pollutants, the source must achieve discharges not exceeding the quantity (mass) determined by multiplying the process wastewater flow subject to this subpart as defined in 40 CFR 455.21(d) times the concentrations listed in table 6 of this part. If mass limitations have not been developed as required, the source shall achieve discharges not exceeding the concentration limitations listed in table 6 of this part.

7. New §§ 455.33, 455.34, 455.35, 455.36 and 455.37 are added to subpart A and reserved to read as follows:

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

§ 455.34 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available control technology economically achievable (BAT). [Reserved]

§ 455.35 New source performance standards (NSPS). [Reserved]

§ 455.36 Pretreatment standards for existing sources (PSES). [Reserved]

§ 455.37 Pretreatment standards for new sources (PSNS). [Reserved]

8. A new subpart D consisting of § 455.50 is added as follows:

Subpart D—Test Methods for Pesticide Pollutants

§ 455.50 Identification of test procedures.

The pesticide active ingredients to which this regulation applies and for which effluent limitations guidelines and standards are specified in this part are named, together with the Chemical Abstracts Service (CAS) number (provided to assist in identifying the pesticide active ingredient only) and analytical method(s) designation(s) in table 7 of this part. Except as provided in 40 CFR 136.5, the discharge parameter values required under the Clean Water Act must be determined by one of the analytical methods cited and described in table 7 of this part. Pesticide manufacturers may not use the analytical method cited in table 1B, table 1C, or table 1D of 40 CFR part 136 to make these determinations (except where the method cited in those tables is identical to the method specified in table 7 of this part). The full texts of the analytical methods cited in table 7 of this part are contained in the "Methods For The Determination of Nonconventional Pesticides In Municipal and Industrial Wastewater, Volume I," EPA 821–R–93–010A (August 1993 Revision I) and "Volume II", EPA 821–R–93–010B (August 1993) (the "Compendium"). Each pesticide chemical manufacturer that is required to determine discharge parameter values under this part using one of the analytical methods cited in table 7 of this part must request in writing a copy of the Compendium from the permit authority or local control authority (as applicable) prior to determining such discharge parameter values, unless the manufacturer already has a copy.

9. Part 455 is amended by adding tables 1 through 7 to read as follows:

TABLE 1 TO PART 455.—LIST OF ORGANIC PESTICIDE ACTIVE INGREDIENTS

EPA census code	Pesticide code	Pesticide name	CAS No.
1	10501	Dicofol [1,1-Bis(chlorophenyl)-2,2,2-trichloroethanol]	00115-32-2
2	51501	Maleic Hydrazide	00123-33-1
3	42002	EDB [1,2-Ethylene dibromide]	00106-93-4
4	82901	Vancide TH [1,3,5-Triethylhexahydro-s-triazine]	07779-27-3
5	29001	Dichloropropene	00542-75-6
7	17901	Dowicil 75 [1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantanechloride]	04080-31-3
8	109901	Triadimefon	43121-43-3
9	44901	Hexachlorophene (nabac)	00070-30-4
10	55004	Tetrachlorophene	01940-43-8
11	55001	Dichlorophene	00097-23-4
12	84001	Dichlorvos	00062-73-7
13	102401	Landrin-2 [2,3,5-trimethylphenylmethylcarbamate]	02686-99-9
14	82601	Fenac [2,3,6-Trichlorophenylacetic acid]	00085-34-7
14	(1)	Fenac Salts and Esters	(1)
15	82001	2,4,5-T [2,4,5-Trichlorophenoxyacetic acid]	00093-76-5
15	(1)	2,4,5-T Salts and Esters	(1)
16	30001	2,4-D [2,4-Dichlorophenoxyacetic acid]	00094-75-7
16	(1)	2,4-D Salts and Esters	(1)
17	30801	2,4-DB [2,4-Dichlorophenoxybutyric acid]	00094-82-6
17	(1)	2,4-DB Salts and Esters	(1)
18	80811	Anilazine [2,4-Dichloro-6-(o-chloroanilino)-s-triazine]	00101-05-3
19	36001	Dinocap	39300-45-3
20	31301	Dichloran (2,6-dichloro-4-nitroaniline)	00099-30-9
21	8707	Busan 90 [2-Bromo-4-hydroxyacetophenone]	02491-38-5
22	15801	Mevinphos	07786-34-7
23	39001	Sulfallate [2-chloroallyldiethyldithiocarbamate]	00095-06-7
24	84101	Chlorfenvinphos	00470-90-6
25	10010	Cyanazine	21725-46-2
26	19101	Propachlor	01918-16-7
27	30501	MCPA [2-Methyl-4-chlorophenoxyacetic acid]	00094-74-6
27	(1)	MCPA Salts and Esters	(1)
28	99901	Octhilinone	26530-20-1
29	67703	Pindone	00083-26-1
30	31401	Dichlorprop [2-(2,4-Dichlorophenoxy) propionic acid]	00120-36-5
30	(1)	Dichlorprop Salts and Esters	(1)
31	31501	MCPP [2-(2-Methyl-4-chlorophenoxy)propionic acid]	00093-65-2
31	(1)	MCPP Salts and Esters	(1)
32	60101	Thiabendazole	00148-79-8
33	80815	Belclene 310 [2-(methylthio)-4-(ethylamino)-6-(1,2-dimethylamino)-s-triazine]	22936-75-0
34	21201	Cloprop [2-(m-Chlorophenoxy)propionic acid]	00101-10-0
34	(1)	Cloprop Salts and Esters	(1)
35	35603	TCMTB [2-(Thiocyanomethylthio)benzothiazole]	21564-17-0
36	99001	HAE [2-((Hydroxymethyl)amino) ethanol	34375-28-5
37	6770	Chlorophacinone	03691-35-8
38	102401	Landrin-1 [3,4,5-trimethylphenylmethylcarbamate]	02686-99-9
39	101701	Pronamide	23950-58-5
40	100501	Methiocarb	02032-65-7
41	28201	Propanil	00709-98-8
42	107801	3-Iodo-2-propynyl butylcarbamate	55406-53-6
43	86001	3-(a-Acetonylfurfuryl)-4-hydroxycoumarin [Coumafuryl]	00117-52-2
43	(1)	Coumafuryl Salts and Esters	(1)
44	37507	DNOC (4,6-dinitro-*o*-cresol)	00534-52-1
45	101101	Metribuzin	21087-64-9
46	19401	CPA (4-chlorophenoxyacetic acid)	00122-88-3
46	(1)	CPA Salts and Esters	(1)
47	19201	MCPB [4-(2-Methyl-4-chlorophenoxy)butyric acid]	00094-81-5
47	(1)	MCPB Salts and Esters	(1)
48	44401	Aminocarb [4-(dimethylamino)-m-tolylmethylcarbamate]	02032-59-9
49	84701	Etridiazole	02593-15-9
50	55501	Ethoxyquin	00091-53-2
51	59804	Quinoliol sulfate (8-Quinoliol sulfate)	00134-31-6
52	103301	Acephate	30560-19-1
53	114401	Acifluorfen	50594-66-6
53	114402	Acifluorfen Salts and Esters	62476-59-9
54	90501	Alachlor	15972-60-8
55	98301	Aldicarb	00116-06-3
56	69105	Hyamine 3500 [Alkyl* dimethyl benzyl ammonium chloride* (50% C14, 40% C12, 10% C16)].	68424-85-1
57	4001	Allethrin (all isomers and allethrin coil)	00584-79-2
58	80801	Ametryn	00834-12-8
59	106201	Amitraz	33089-61-1

TABLE 1 TO PART 455.—LIST OF ORGANIC PESTICIDE ACTIVE INGREDIENTS—Continued

EPA census code	Pesticide code	Pesticide name	CAS No.
60	80803	Atrazine	01912-24-9
61	105201	Bendiocarb	22781-23-3
62	99101	Benomyl and Carbendazim	17804-35-2
63	8901	Benzene Hexachloride	00608-73-1
64	9501	Benzyl benzoate	00120-51-4
65	10101	Lethane 384 [Beta-Thiocyanoethyl esters of mixed fatty acids containing from 10-18 carbons].	00301-11-1
66	104301	Bifenox	42576-02-3
68	12301	Bromacil	00314-40-9
68	12302	Bromacil, lithium	53404-19-6
69	35301	Bromoxynil	01689-84-5
69	35302	Bromoxynil octanoate	01689-99-2
70	112301	Butachlor	23184-66-9
70	101401	Giv-gard [β-Bromo-β-nitrostyrene]	07166-19-0
73	81701	Captafol	02425-06-1
74	81301	Captan	00133-06-2
75	56801	Carbaryl [Sevin]	00063-25-2
76	90601	Carbofuran	01563-66-2
77	90602	Carbosulfan	55285-14-8
78	29901	Chloramben	00133-90-4
78	(1)	Chloramben Salts and Esters	(1)
79	58201	Chlordane	00057-74-9
80	27301	Chloroneb	02675-77-6
81	81501	Chloropicrin	00076-06-2
82	81901	Chlorothalonil	01897-45-6
83	25501	Chloroxuron	01982-47-4
84	83701	Stirofos	00961-11-5
85	59102	Chlorpyrifos methyl	05598-13-0
86	59101	Chlorpyrifos	02921-88-2
87	14504	Mancozeb	08018-01-7
90	109301	Fenvalerate	51630-58-1
91	43401	Cycloheximide	00066-81-9
92	28901	Dalapon (2,2-dichloropropionic acid)	00075-99-0
92	(1)	Dalapon Salts and Esters	(1)
93	27501	Dienochlor	02227-17-0
94	57601	Demeton [O,O-Diethyl O-(and S-) (2-ethylthio)ethyl) phosphorothioate]	08065-48-3
95	104801	Desmedipham	13684-56-5
96	14502	Diammonium ethylenebisdithiocarbamate	03566-10-7
97	11301	DBCP [Dibromo-3-chloropropane]	00096-12-8
98	29801	Dicamba [3,6-Dichloro-o-anisic acid]	01918-00-9
98	(1)	Dicamba Salts and Esters	(1)
99	29601	Dichlone (Phygon)	00117-80-6
100	103401	Thiophanate ethyl	23564-06-9
101	32101	Perthane [Diethyl diphenyl dichloroethane and related compounds]	00072-56-0
102	86501	EXD [Diethyl dithiobis (thionoformate)]	00502-55-6
103	57801	Diazinon	00333-41-5
104	108201	Diflubenzuron	35367-38-5
105	69122	Benzethonium chloride	00121-54-0
106	35001	Dimethoate	00060-51-5
107	53501	Parathion methyl	00298-00-0
108	35201	Dicrotophos	00141-66-2
109	58801	Crotoxyphos	07700-17-6
110	78701	DCPA [Dimethyl 2,3,5,6-tetrachloroterephthalate]	01861-32-1
111	57901	Trichlorofon	00052-68-6
112	37505	Dinoseb	00088-85-7
113	37801	Dioxathion	00078-34-2
114	67701	Diphacinone	00082-66-6
115	36601	Diphenamid	00957-51-7
116	38501	Diphenylamine	00122-39-4
116	47201	MGK 326 [Dipropyl isocinchomeronate]	00113-48-4
118	63301	Nabonate [Disodium cyanodithioimidocarbonate]	00138-93-2
119	35505	Diuron	00330-54-1
120	44303	Metasol DGH [Dodecylguanidine hydrochloride]	13590-97-1
121	44301	Dodine (dodecylquanidine acetate)	02439-10-3
122	79401	Endosulfan [Hexachlorohexahydromethano-2,4,3-benzodioxathiepin-3-oxide]	00115-29-7
123	38901	Endothall	00145-73-3
123	(1)	Endothall Salts and Esters	(1)
124	41601	Endrin	00072-20-8
125	113101	Ethalfluralin	55283-68-6
126	58401	Ethion	00563-12-2
127	41101	Ethoprop	13194-48-4

TABLE 1 TO PART 455.—LIST OF ORGANIC PESTICIDE ACTIVE INGREDIENTS—Continued

EPA census code	Pesticide code	Pesticide name	CAS No.
128	100601	Fenamiphos	22224-92-6
129	28801	Chlorobenzilate	00510-15-6
130	41405	Butylate	02008-41-5
131	59901	Famphur	00052-85-7
132	206600	Fenarimol	60168-88-9
133	53301	Fenthion	00055-38-9
134	34801	Ferbam	14484-64-1
135	35503	Fluometuron	02164-17-2
136	75002	Fluoroacetamide	00640-19-7
137	81601	Folpet	00133-07-3
138	103601	Glyphosate [N-(Phosphonomethyl) glycine]	01071-83-6
138	(1)	Glyphosate Salts and Esters	(1)
139	103602	Glyphosine	02439-99-8
140	44801	Heptachlor	00076-44-8
141	115601	Cycloprate	54460-46-7
142	107201	Hexazinone	51235-04-2
143	109401	Isofenphos	25311-71-1
144	100201	Isopropalin	33820-53-0
145	47601	Propham	00122-42-9
146	97401	Karbutilate	04849-32-5
147	9001	Lindane	00058-89-9
148	35506	Linuron	00330-55-2
149	39504	Malachite green [Ammonium(4-(p-(dimethylamino)-alpha-phenylbenzylidine)-2,5-cyclohexadien-1-ylidene)-dimethyl chloride].	00569-64-2
150	57701	Malathion	00121-75-5
151	14505	Maneb	12427-38-2
152	34802	Manganous dimethyldithiocarbamate	15339-36-3
153	114001	Mefluidide [N-(2,4-dimethyl-5-(((trifluoromethyl) sulfonyl)-amino) phenyl acetamide]	53780-34-0
153	(1)	Mefluidide Salts and Esters	(1)
154	101201	Methamidophos	10265-92-6
155	100301	Methidathion	00950-37-8
156	90301	Methomyl	16752-77-5
157	105401	Methoprene	40596-69-8
158	34001	Methoxychlor	00072-43-5
159	69134	Methylbenzethonium chloride	15716-02-6
160	53201	Methylbromide	00074-83-9
162	69129	Hyamine 2389 [Methyldodecylbenzyl trimethyl ammonium chloride 80% and methyldodecylxylylene bis (trimethylammoniumchloride) 20%].	01399-80-0
163	68102	Methylenebisthiocyanate	06317-18-6
164	54101	Quinmethionate	02439-01-2
165	108801	Metolachlor	51218-45-2
166	44201	Mexacarbate	00315-18-4
167	14601	Metiram	09006-42-2
168	35502	Monuron TCA	00140-41-0
169	35501	Monuron	00150-68-5
170	103001	Napropamide	15299-99-7
171	80301	Deet	00134-62-3
172	14503	Nabam	00142-59-6
173	34401	Naled	00300-76-5
174	35801	Norea	18530-56-8
175	105801	Norflurazon	27314-13-2
176	30701	N-1-Naphthylphthalimide	05333-99-3
176	30702	Naptalam [N-1-Naphthylphthalamic acid]	00132-66-1
176	30703	Naptalam Salts and Esters	00132-67-2
177	57001	MGK 264 [N-2-Ethylhexyl bicycloheptene dicarboximide]	00136-45-8
178	84301	Benfluralin	01861-40-1
179	79501	Sulfotepp	03689-24-5
180	79101	Aspon	03244-90-4
181	36501	Coumaphos	00056-72-4
182	32701	Fensulfothion	00115-90-2
183	32501	Disulfoton	00298-04-4
184	105901	Fenitrothion	00122-14-5
185	59201	Phosmet	00732-11-6
186	58001	Azinphos Methyl	00086-50-0
187	58702	Oxydemeton methyl	00301-12-2
192	(1)	Organo-tin pesticides	(1)
194	104201	Oryzalin	19044-88-3
195	103801	Oxamyl	23135-22-0
196	111601	Oxyfluorfen	42874-03-3
197	111501	Bolstar [Sulprofos]	35400-43-2
198	219900	Sulprofos Oxon	38527-90-1

TABLE 1 TO PART 455.—LIST OF ORGANIC PESTICIDE ACTIVE INGREDIENTS—Continued

EPA census code	Pesticide code	Pesticide name	CAS No.
199	41801	Santox (O-Ethyl O-(p-nitrophenyl) phenylphosphonothioate	02104-64-5
200	41701	Fonofos	00944-22-9
201	47802	Propoxur (o-isopropylphenylmethylcarbamate)	00114-26-1
202	57501	Parathion	00056-38-2
203	108501	Pendimethalin	40487-42-1
204	56502	Pentachloronitrobenzene	00082-68-8
205	63001	Pentachlorophenol	00087-86-5
206	63003	Pentachlorophenol Salts and Esters	00131-52-2
207	108001	Perfluidone	37924-13-3
208	109701	Permethrin	52645-53-1
209	98701	Phenmedipham	13684-63-4
210	64501	Phenothiazine	00092-84-2
211	64103	Phenylphenol	00090-43-7
212	57201	Phorate	00298-02-2
213	97701	Phosalone	02310-17-0
214	18201	Phosphamidon	13171-21-6
215	5101	Picloram	01918-02-1
215	5104	Picloram Salts and Esters	02545-60-0
216	67501	Piperonyl butoxide	00051-03-6
217	69183	PBED (Busan 77) [Poly (oxyethylene (dimethylimino) ethylene (dimethylimino) ethylene dichloride].	31512-74-0
218	34803	Busan 85 [Potassium dimethyldithiocarbamate]	00128-03-0
219	102901	Busan 40 [Potassium N-hydroxymethyl-N-methyldithiocarbamate]	51026-28-9
220	39002	KN Methyl [Potassium N-methyldithiocarbamate]	00137-41-7
221	101301	Metasol J26 [Potassium N-(alpha-(nitroethyl) benzyl)-ethylenediamine]	53404-62-9
222	111401	Profenofos	41198-08-7
223	80804	Prometon	01610-18-0
224	80805	Prometryn	07287-19-6
225	97601	Propargite	02312-35-8
226	80808	Propazine	00139-40-2
227	77702	Propionic acid	00079-09-4
228	119301	Propamocarb and Propamocarb HCL	24579-73-5
229	69004	Pyrethrin coils	00121-21-1
230	69001	Pyrethrin I.	
231	69002	Pyrethrum (other than pyrethrins)	08003-34-7
232	69006	Pyrethrin II	00121-29-9
233	97801	Resmethrin	10453-86-8
234	58301	Ronnel	00299-84-3
235	71003	Rotenone	00083-79-4
236	74801	DEF [S,S,S-Tributyl phosphorotrithioate]	00078-48-8
237	35509	Siduron	01982-49-6
238	82501	Silvex [2-(2,4,5-Trichlorophenoxypropionic acid)]	00093-72-1
238	(1)	Silvex Salts and Esters	(1)
239	80807	Simazine	00122-34-9
240	103901	Bentazon	25057-89-0
241	34804	Carbam-S [Sodium dimethyldithiocarbanate]	00128-04-1
242	75003	Sodium monofluoroacetate	00062-74-8
243	39003	Vapam [Sodium methyldithiocarbamate]	00137-42-8
244	57101	Sulfoxide	00120-62-7
245	41301	Cycloate	01134-23-2
246	41401	EPTC [S-Ethyl dipropylthiocarbamate]	00759-94-4
247	41402	Molinate	02212-67-1
248	41403	Pebulate	01114-71-2
249	41404	Vernolate	01929-77-7
250	35604	HPTMS [S-(2-Hydroxypropyl) thiomethanesulfonate]	29803-57-4
251	9801	Bensulide	00741-58-2
252	105501	Tebuthiuron	34014-18-1
253	59001	Temephos	03383-96-8
254	12701	Terbacil	05902-51-2
255	105001	Terbufos	13071-79-9
256	80814	Terbuthylazine	05915-41-3
257	80813	Terbutryn	00886-50-0
258	63004	Tetrachlorophenol	25167-83-3
258	63007	Tetrachlorophenol Salts and Esters	(1)
259	35602	Dazomet	00533-74-4
260	102001	Thiophanate methyl	23564-05-8
261	79801	Thiram	00137-26-8
262	80501	Toxaphene	08001-35-2
263	74901	Merphos [Tributyl phosphorotrithioate]	00150-50-5
264	36101	Trifluralin	01582-09-8
265	86002	Warfarin [3-(a-Acetonylbenzyl)-4-hydroxycoumarin]	00081-81-2

TABLE 1 TO PART 455.—LIST OF ORGANIC PESTICIDE ACTIVE INGREDIENTS—Continued

EPA census code	Pesticide code	Pesticide name	CAS No.
265	(1)	Warfarin Salts and Esters	(1)
266	51705	Zinc MBT [Zinc 2-mercaptobenzothiazolate]	00155-04-4
267	14506	Zineb	12122-67-7
268	34805	Ziram	00137-30-4
269	78802	S-(2,3,3-trichloroallyl) diisopropylthiocarbamate	02303-17-5
270	69005	Phenothrin	26002-80-2
271	69003	Tetramethrin	07696-12-0
272	18301	Chloropropham	00101-21-3

Note:
[1] Multiple compounds for active ingredient.

TABLE 2 TO PART 455.—ORGANIC PESTICIDE ACTIVE INGREDIENT EFFLUENT LIMITATIONS BEST AVAILABLE TECHNOLOGY ECONOMICALLY ACHIEVABLE (BAT) AND PRETREATMENT STANDARDS FOR EXISTING SOURCES (PSES)

Pesticide	kg/kkg (lb/1,000 lb) Pounds of pollutant per 1000 lbs. product		Notes
	Daily maximum shall not exceed	Monthly average shall not exceed	
2,4-D	1.97×10^{-3}	6.40×10^{-4}	
2,4-D Salts and Esters	(1)	(1)	
2,4-DB Salts and Esters	(1)	(1)	
Acephate	6.39×10^{-4}	1.97×10^{-4}	
Acifluorfen	2.45	9.3×10^{-1}	
Alachlor	5.19×10^{-3}	1.54×10^{-3}	
Aldicarb	7.23×10^{-4}	3.12×10^{-4}	
Ametryn	7.72×10^{-3}	2.53×10^{-3}	
Atrazine	5.12×10^{-3}	1.72×10^{-3}	
Azinphos Methyl	2.74×10^{-2}	1.41×10^{-2}	
Benfluralin	3.22×10^{-4}	1.09×10^{-4}	1
Benomyl and Carbendazim	3.50×10^{-2}	8.94×10^{-3}	2
Bolstar	1.69×10^{-2}	8.72×10^{-3}	
Bromacil	3.83×10^{-1}	1.16×10^{-1}	
Bromacil, lithium	(1)	(1)	
Bromoxynil	3.95×10^{-3}	1.27×10^{-3}	
Bromoxynil octanoate	3.95×10^{-3}	1.27×10^{-3}	
Busan 40 [Potassium N-hydroxymethyl-N-methyldithiocarbamate]	5.74×10^{-3}	1.87×10^{-3}	
Busan 85 [Potassium dimethyldithiocarbamate]	5.74×10^{-3}	1.87×10^{-3}	
Butachlor	5.19×10^{-3}	1.54×10^{-3}	
Captafol	4.24×10^{-6}	1.31×10^{-6}	
Carbam-S [Sodium dimethyldithiocarbamate]	5.74×10^{-3}	1.87×10^{-3}	
Carbaryl	1.6×10^{-3}	7.3×10^{-4}	
Carbofuran	1.18×10^{-4}	2.80×10^{-5}	
Chloroneb	8.16×10^{-2}	3.31×10^{-2}	
Chlorothalonil	1.51×10^{-3}	4.57×10^{-4}	
Chlorpyrifos	8.25×10^{-4}	2.43×10^{-4}	
Cyanazine	1.03×10^{-2}	3.33×10^{-3}	
Dazomet	5.74×10^{-3}	1.87×10^{-3}	
DCPA	7.79×10^{-2}	2.64×10^{-2}	
DEF [S,S,S-Tributyl phosphorotrithioate]	1.15×10^{-2}	5.58×10^{-3}	
Diazinon	2.82×10^{-3}	1.12×10^{-3}	
Dichlorprop Salts and Esters	(1)	(1)	
Dichlorvos	9.6×10^{-5}	2.95×10^{-5}	
Dinoseb	4.73	1.43	
Dioxathion	3.40×10^{-2}	1.29×10^{-2}	
Disulfoton	7.33×10^{-3}	3.79×10^{-3}	
Diuron	3.15×10^{-2}	1.4×10^{-2}	
Endothall Salts and Esters	(1)	(1)	
Endrin	2.2×10^{-2}	5.1×10^{-3}	
Ethalfluralin	3.22×10^{-4}	1.09×10^{-4}	1
Ethion	5.51×10^{-3}	1.57×10^{-3}	
Fenarimol	1.02×10^{-1}	3.61×10^{-2}	
Fensulfothion	1.48×10^{-2}	7.64×10^{-3}	
Fenthion	1.83×10^{-2}	9.45×10^{-3}	
Fenvalerate	5.40×10^{-3}	2.08×10^{-3}	
Heptachlor	8.8×10^{-3}	2.9×10^{-3}	
Isopropalin	7.06×10^{-3}	2.49×10^{-3}	1
KN Methyl [Potassium N-methyldithiocarbamate]	5.74×10^{-3}	1.87×10^{-3}	

TABLE 2 TO PART 455.—ORGANIC PESTICIDE ACTIVE INGREDIENT EFFLUENT LIMITATIONS BEST AVAILABLE TECHNOLOGY ECONOMICALLY ACHIEVABLE (BAT) AND PRETREATMENT STANDARDS FOR EXISTING SOURCES (PSES)—Continued

Pesticide	kg/kkg (lb/1,000 lb) Pounds of pollutant per 1000 lbs. product		Notes
	Daily maximum shall not exceed	Monthly average shall not exceed	
Linuron	2.69x10^{-3}	1.94x10^{-3}	
Malathion	2.35x10^{-4}	9.55x10^{-5}	
MCPA Salts and Esters	[1]	[1]	
MCPP Salts and Esters	[1]	[1]	
Merphos	1.15x10^{-2}	5.58x10^{-3}	
Methamidophos	1.46x10^{-2}	7.53x10^{-3}	
Methomyl	3.82x10^{-3}	1.76x10^{-3}	
Methoxychlor	3.23x10^{-3}	1.31x10^{-3}	
Metribuzin	1.36x10^{-2}	7.04x10^{-3}	
Mevinphos	1.44x10^{-4}	5.10x10^{-5}	
Nabam	5.74x10^{-3}	1.87x10^{-3}	
Nabonate	5.74x10^{-3}	1.87x10^{-3}	
Naled	[1]	[1]	
Norflurazon	7.20x10^{-4}	3.10x10^{-4}	
Organo-tin pesticides	1.72x10^{-2}	7.42x10^{-3}	3
Parathion	7.72x10^{-4}	3.43x10^{-4}	
Parathion methyl	7.72x10^{-4}	3.43x10^{-4}	
PCNB	5.75x10^{-4}	1.90x10^{-4}	
Pendimethalin	1.17x10^{-2}	3.62x10^{-3}	
Permethrin	2.32x10^{-4}	6.06x10^{-5}	
Phorate	3.12x10^{-4}	9.37x10^{-5}	
Phosmet	[1]	[1]	4
Prometon	7.72x10^{-3}	2.53x10^{-3}	
Prometryn	7.72x10^{-3}	2.53x10^{-3}	
Pronamide	6.64x10^{-4}	2.01x10^{-4}	
Propachlor	5.19x10^{-3}	1.54x10^{-3}	
Propanil	1.06x10^{-3}	4.84x10^{-4}	
Propazine	7.72x10^{-3}	2.53x10^{-3}	
Pyrethrin I and Pyrethrin II	1.24x10^{-2}	3.33x10^{-3}	
Simazine	7.72x10^{-3}	2.53x10^{-3}	
Stirofos	4.10x10^{-3}	1.35x10^{-3}	
TCMTB	3.89x10^{-3}	1.05x10^{-3}	
Tebuthiuron	9.78x10^{-2}	3.40x10^{-2}	
Terbacil	3.83x10^{-1}	1.16x10^{-1}	
Terbufos	4.92x10^{-4}	1.26x10^{-4}	
Terbuthylazine	7.72x10^{-3}	2.53x10^{-3}	
Terbutryn	7.72x10^{-3}	2.53x10^{-3}	
Toxaphene	1.02x10^{-2}	3.71x10^{-3}	
Triadimefon	6.52x10^{-2}	3.41x10^{-2}	
Trifluralin	3.22x10^{-4}	1.09x10^{-4}	1
Vapam [Sodium methyldithiocarbamate]	5.74x10^{-3}	1.87x10^{-3}	
Ziram [Zinc dimethyldithiocarbanate]	5.74x10^{-3}	1.87x10^{-3}	

[1] No discharge of process wastewater pollutants.

Notes:
1 Monitor and report as total Trifluralin.
2 Pounds of product include Benomyl and any Carbendazim production not converted to Benomyl.
3 Monitor and report as total tin.
4 Applies to purification by recrystalization portion of the process.

TABLE 3 TO PART 455.—ORGANIC PESTICIDE ACTIVE INGREDIENT NEW SOURCE PERFORMANCE STANDARDS (NSPS) AND PRETREATMENT STANDARDS FOR NEW SOURCES (PSNS)

Pesticide	kg/kkg (lb/1,000 lb) pounds of pollutant per 1000 lbs product		Notes
	Daily maximum shall not exceed	Monthly average shall not exceed	
2,4-D	1.42x10^{-3}	4.61x10^{-4}	
2,4-D Salts and Esters	[1]	[1]	
2,4-DB Salts and Esters	[1]	[1]	
Acephate	6.39 x 10^{-4}	1.97 x 10^{-4}	
Acifluorfen	1.77	6.69 x 10^{-1}	

TABLE 3 TO PART 455.—ORGANIC PESTICIDE ACTIVE INGREDIENT NEW SOURCE PERFORMANCE STANDARDS (NSPS) AND PRETREATMENT STANDARDS FOR NEW SOURCES (PSNS)—Continued

Pesticide	kg/kkg (lb/1,000 lb) pounds of pollutant per 1000 lbs product		Notes
	Daily maximum shall not exceed	Monthly average shall not exceed	
Alachlor	3.74 x 10-3	1.11 x 10-3	
Aldicarb	5.21 x 10-4	2.25 x 10-4	
Ametryn	5.56 x 10-3	1.82 x 10-3	
Atrazine	3.69 x 10-3	1.24 x 10-3	
Benfluralin	3.22 x 10-4	1.09 x 10-4	1
Benomyl and Carbendazom	2.52 x 10-2	6.44 x 10-3	2
Bolstar	1.22 x 10-2	6.28 x 10-3	
Bromacil	2.76 x 10-1	8.36 x 10-2	
Bromacil, lithium	(1)	(1)	
Bromoxynil	2.84 x 10-3	9.14 x 10-4	
Bromoxynil Octanoate	2.84 x 10-3	9.14 x 10-4	
Busan 40 [Potassium N-hydroxymethyl-N-methyldithiocarbamate]	4.14 x 10-3	1.35 x 10-3	
Busan 85 [Potassium dimethyldithiocarbamate]	4.14 x 10-3	1.35 x 10-3	
Butachlor	3.74 x 10-3	1.11 x 10-3	
Captafol	4.24 x 10-6	1.31 x 10-6	
Carbam-S [Sodium dimethyldithiocarbanate]	4.14 x 10-3	1.35 x 10-3	
Carbaryl	1.18 x 10-3	5.24 x 10-4	
Carbofuran	1.18 x 10-4	2.80 x 10-5	
Chloroneb	5.87 x 10-2	2.39 x 10-2	
Chlorothalonil	1.09 x 10-3	3.29 x 10-4	
Chlorpyrifos	5.94 x 10-4	1.75 x 10-4	
Cyanazine	7.42 x 10-3	2.40 x 10-3	
Dazomet	4.14 x 10-3	1.35 x 10-3	
DCPA	5.61 x 10-2	1.90 x 10-2	
DEF [S,S,S-Tributyl phosphorotrithioate]	1.15 x 10-2	5.58 x 10-3	
Diazinon	2.05 x 10-3	8.13 x 10-4	
Dichlorprop Salts and Esters	(1)	(1)	
Dichlorvos	6.88 x 10-5	2.13 x 10-5	
Dinoseb	3.41	1.03	
Dioxathion	2.54 x 10-2	9.31 x 10-3	
Disulfoton	5.28 x 10-3	2.72 x 10-3	
Diuron	2.27 x 10-2	1.01 x 10-2	
Endothall Salts and Esters	(1)	(1)	
Endrin	1.57 x 10-2	3.69 x 10-3	
Ethalfluralin	3.22 x 10-4	1.09 x 10-4	1
Ethion	3.97 x 10-3	1.33 x 10-3	
Fenarimol	1.02 x 10-1	3.61 x 10-2	
Fensulfothion	1.06 x 10-2	5.50 x 10-3	
Fenthion	1.32 x 10-2	6.79 x 10-3	
Fenvalerate	3.91 x 10-3	1.50 x 10-3	
Guthion	1.97 x 10-2	1.02 x 10-2	
Heptachlor	6.31 x 10-3	2.06 x 10-3	
Isopropalin	5.07 x 10-3	1.82 x 10-3	
KN Methyl [Potassium N-methyldithiocarbamate]	4.14 x 10-3	1.35 x 10-3	
Linuron	1.94 x 10-3	1.40 x 10-3	
Malathion	1.69 x 10-4	6.88 x 10-5	
MCPA Salts and Esters	(1)	(1)	
MCPP Salts and Esters	(1)	(1)	
Merphos	1.15 x 10-2	5.58 x 10-3	
Methamidophos	1.05 x 10-2	5.42 x 10-3	
Methomyl	2.75 x 10-3	1.27 x 10-3	
Methoxychlor	2.34 x 10-3	9.25 x 10-4	
Metribuzin	9.80 x 10-3	5.06 x 10-3	
Mevinphos	1.03 x 10-4	3.69 x 10-5	
Nabam	4.14 x 10-3	1.35 x 10-3	
Nabonate	4.14 x 10-3	1.35 x 10-3	
Naled	(1)	(1)	
Norflurazon	7.20 x 10-4	3.10 x 10-4	
Organo-tin pesticides	1.25 x 10-2	5.36 x 10-3	3
Parathion Ethyl	5.56 x 10-4	2.45 x 10-4	
Parathion Methyl	5.56 x 10-4	2.45 x 10-4	
PCNB	4.16 x 10-4	1.38 x 10-4	
Pendimethalin	1.17 x 10-2	3.62 x 10-3	
Permethrin	1.68 x 10-4	4.39 x 10-5	
Phorate	3.12 x 10-4	9.37 x 10-5	
Phosmet	(1)	(1)	4
Prometon	5.56 x 10-3	1.82 x 10-3	

TABLE 3 TO PART 455.—ORGANIC PESTICIDE ACTIVE INGREDIENT NEW SOURCE PERFORMANCE STANDARDS (NSPS) AND PRETREATMENT STANDARDS FOR NEW SOURCES (PSNS)—Continued

Pesticide	kg/kkg (lb/1,000 lb) pounds of pollutant per 1000 lbs product		Notes
	Daily maximum shall not exceed	Monthly average shall not exceed	
Prometym	5.56×10^{-3}	1.82×10^{-3}	
Pronamide	4.78×10^{-4}	1.45×10^{-4}	
Propachlor	3.74×10^{-3}	1.11×10^{-3}	
Propanil	7.63×10^{-4}	3.48×10^{-4}	
Propazine	5.56×10^{-3}	1.82×10^{-3}	
Pyrethrin I and Pyrethrin II	8.91×10^{-3}	2.40×10^{-3}	
Simazine	5.89×10^{-3}	1.91×10^{-3}	
Stirofos	2.95×10^{-3}	9.72×10^{-4}	
TCMTB	2.80×10^{-9}	7.54×10^{-4}	
Tebuthiuron	9.78×10^{-2}	3.41×10^{-2}	
Terbacil	2.76×10^{-1}	8.36×10^{-2}	
Terbufos	4.92×10^{-4}	1.26×10^{-4}	
Terbuthylazine	5.56×10^{-3}	1.82×10^{-3}	
Terbutryn	5.56×10^{-3}	1.82×10^{-3}	
Toxaphene	7.35×10^{-3}	2.67×10^{-3}	
Triadimefon	4.69×10^{-2}	2.46×10^{-2}	
Trifluralin	3.22×10^{-4}	1.09×10^{-4}	1
Vapam [Sodium methyldithiocarbamate]	4.14×10^{-3}	1.35×10^{-3}	
Ziram [Zinc dimethyldithiocarbanate]	4.14×10^{-3}	1.35×10^{-3}	

[1] No discharge of process wastewater pollutants.

Notes:
1 Monitor and report as total Trifluralin.
2 Pounds of product shall include Benomyl and any Carbendazim production not converted to Benomyl.
3 Monitor and report as total tin.
4 Applies to purification by recrystalization portion of the process.

TABLE 4 TO PART 455.—BAT AND NSPS EFFLUENT LIMITATIONS FOR PRIORITY POLLUTANTS FOR DIRECT DISCHARGE POINT SOURCES THAT USE END-OF-PIPE BIOLOGICAL TREATMENT

[Micrograms per liter (μg/l)]

Pollutant	Daily maximum shall not exceed	Monthly average shall not exceed
1,1-Dichloroethylene	25	16
1,1,1-Trichloroethane	54	21
1,2-Dichloroethane	211	68
1,2-Dichloropropane	230	153
1,2-Dichlorobenzene	163	77
1,2-trans-Dichloroethylene	54	21
1,3-Dichloropropene	44	29
1,4-Dichlorobenzene	28	15
2-chlorophenol	98	31
2,4-Dichlorophenol	112	39
2,4-Dimethylphenol	36	18
Benzene	136	37
Bromodichloromethane	380	142
Bromomethane	380	142
Chlorobenzene	28	15
Chloromethane	190	86
Cyanide (Total)	640	220
Dibromochloromethane	794	196
Dichloromethane	89	40
Ethylbenzene	108	32
Lead (Total)	690	320
Naphthalene	59	22

TABLE 4 TO PART 455.—BAT AND NSPS EFFLUENT LIMITATIONS FOR PRIORITY POLLUTANTS FOR DIRECT DISCHARGE POINT SOURCES THAT USE END-OF-PIPE BIOLOGICAL TREATMENT—Continued

[Micrograms per liter (μg/l)]

Pollutant	Daily maximum shall not exceed	Monthly average shall not exceed
Phenol	26	15
Tetrachloroethylene	56	22
Tetrachloromethane	38	18
Toluene	80	26
Tribromomethane	794	196
Trichloromethane	46	21

TABLE 5 TO SUBPART A.—BAT AND NSPS EFFLUENT LIMITATIONS FOR PRIORITY POLLUTANTS FOR DIRECT DISCHARGE POINT SOURCES THAT DO NOT USE END-OF-PIPE BIOLOGICAL TREATMENT

[Micrograms per liter (μg/l)]

Pollutant	Daily maximum shall not exceed	Monthly average shall not exceed
1,1-Dichloroethylene	60	22
1,1,1-Trichloroethane	59	22
1,2-trans-Dichloroethylene	66	25

TABLE 5 TO SUBPART A.—BAT AND NSPS EFFLUENT LIMITATIONS FOR PRIORITY POLLUTANTS FOR DIRECT DISCHARGE POINT SOURCES THAT DO NOT USE END-OF-PIPE BIOLOGICAL TREATMENT—Continued

[Micrograms per liter (μg/l)]

Pollutant	Daily maximum shall not exceed	Monthly average shall not exceed
1,2-Dichlorobenzene	794	196
1,2-Dichloropropane	794	196
1,2-Dichloroethane	574	180
1,3-Dichloropropene	794	196
1,4-Dichlorobenzene	380	142
2,4-Dimethylphenol	47	19
Benzene	134	57
Bromodichloromethane	380	142
Bromomethane	380	142
Chlorobenzene	380	142
Chloromethane	295	110
Cyanide (Total)	640	220
Dibromochloromethane	794	196
Dichloromethane	170	36
Ethylbenzene	380	142
Lead (Total)	690	320
Naphthalene	47	19
Phenol	47	19
Tetrachloroethylene	164	52
Tetrachloromethane	380	142
Toluene	74	28
Tribromomethane	794	196
Trichloromethane	325	111

TABLE 6 TO PART 455.—PSES AND PSNS FOR PRIORITY POLLUTANTS

[Micrograms per liter (µg/l)]

Pollutant	Daily maximum shall not exceed	Monthly maximum shall not exceed
1,1-Dichloroethylene	60	22
1,1,1-Trichloroethane	59	22
1,2-trans-Dichloroethylene ...	66	25
1,2-Dichlorobenzene	794	196
1,2-Dichloropropane .	794	196
1,2-Dichloroethane ...	574	180
1,3-Dichloropropene .	794	196
1,4-Dichlorobenzene	380	142
Benzene	134	57

TABLE 6 TO PART 455.—PSES AND PSNS FOR PRIORITY POLLUTANTS—Continued

[Micrograms per liter (µg/l)]

Pollutant	Daily maximum shall not exceed	Monthly maximum shall not exceed
Bromodichloromethane	380	142
Bromomethane	380	142
Chlorobenzene	380	142
Chloromethane	295	110
Cyanide (Total)	640	220
Dibromochloromethane	794	196
Dichloromethane	170	36

TABLE 6 TO PART 455.—PSES AND PSNS FOR PRIORITY POLLUTANTS—Continued

[Micrograms per liter (µg/l)]

Pollutant	Daily maximum shall not exceed	Monthly maximum shall not exceed
Ethylbenzene	380	142
Lead (Total)	690	320
Naphthalene	47	19
Tetrachloroethylene ..	164	52
Tetrachloromethane .	380	142
Toluene	74	28
Tribromomethane	794	196
Trichloromethane	325	111

TABLE 7 TO PART 455.—TEST METHODS FOR PESTICIDE ACTIVE INGREDIENTS

EPA survey code	Pesticide name	CAS No.	EPA analytical method No.(s)
8	Triadimefon	43121-43-3	507/633/525.1/1656
12	Dichlorvos	00062-73-7	1657/507/622/525.1
16	2,4-D; 2,4-D Salts and Esters [2,4-Dichlorophenoxyacetic acid]	00094-75-7	1658/515.1/615/515.2/555
17	2,4-DB; 2,4-DB Salts and Esters [2,4-Dichlorophenoxybutyric acid]	00094-82-6	1658/515.1/615/515.2/555
22	Mevinphos	07786-34-7	1657/507/622/525.1
25	Cyanazine	21725-46-2	629/507
26	Propachlor	01918-16-7	1656/508/608.1/525.1
27	MCPA; MCPA Salts and Esters [2-Methyl-4-chlorophenoxyacetic acid]	00094-74-6	1658/615/555
30	Dichlorprop; Dichlorprop Salts and Esters [2-(2,4-Dichlorophenoxy) propionic acid].	00120-36-5	1658/515.1/615/515.2/555
31	MCPP; MCPP Salts and Esters [2-(2-Methyl-4-chlorophenoxy) propionic acid].	00093-65-2	1658/615/555
35	TCMTB [2-(Thiocyanomethylthio) benzothiazole]	21564-17-0	637
39	Pronamide	23950-58-5	525.1/507/633.1
41	Propanil	00709-98-8	632.1/1656
45	Metribuzin	21087-64-9	507/633/525.1/1656
52	Acephate	30560-19-1	1656/1657
53	Acifluorfen	50594-66-6	515.1/515.2/555
54	Alachlor	15972-60-8	505/507/645/525.1/1656
55	Aldicarb	00116-06-3	531.1
58	Ametryn	00834-12-8	507/619/525.1
60	Atrazine	01912-24-9	505/507/619/525.1/1656
62	Benomyl	17804-35-2	631
68	Bromacil; Bromacil Salts and Esters	00314-40-9	507/633/525.1/1656
69	Bromoxynil	01689-84-5	1625/1661
69	Bromoxynil octanoate	01689-99-2	1656
70	Butachlor	23184-66-9	507/645/525.1/1656
73	Captafol	02425-06-1	1656
75	Carbaryl [Sevin]	00063-25-2	531.1/632/553
76	Carbofuran	01563-66-2	531.1/632
80	Chloroneb	02675-77-6	1656/508/608.1/525.1
82	Chlorothalonil	01897-45-6	508/608.2/525.1/1656
84	Stirofos	00961-11-5	1657/507/622/525.1
86	Chlorpyrifos	02921-88-2	1657/508/622
90	Fenvalerate	51630-58-1	1660
103	Diazinon	00333-41-5	1657/507/614/622/525.1
107	Parathion methyl	00298-00-0	1657/614/622
110	DCPA [Dimethyl 2,3,5,6-tetrachloroterephthalate]	01861-32-1	508/608.2/525.1/515.1/515.2/1656
112	Dinoseb	00088-85-7	1658/515.1/615/515.2/555
113	Dioxathion	00078-34-2	1657/614.1
118	Nabonate [Disodium cyanodithioimidocarbonate]	00138-93-2	630.1
119	Diuron	00330-54-1	632/553
123	Endothall	00145-73-3	548/548.1
124	Endrin	00072-20-8	1656/505/508/608/617/525.1
125	Ethalfluralin	55283-68-6	[1]1656/[1]627
126	Ethion	00563-12-2	1657/614/614.1
127	Ethoprop	13194-48-4	1657/507/622/525.1
132	Fenarimol	60168-88-9	507/633.1/525.1/1656
133	Fenthion	00055-38-9	1657/622
138	Glyphosate [N-(Phosphonomethyl) glycine]	01071-83-6	547

TABLE 7 TO PART 455.—TEST METHODS FOR PESTICIDE ACTIVE INGREDIENTS—Continued

EPA survey code	Pesticide name	CAS No.	EPA analytical method No.(s)
140	Heptachlor	00076-44-8	1656/505/508/608/617/525.1
144	Isopropalin	33820-53-0	1656/627
148	Linuron	00330-55-2	553/632
150	Malathion	00121-75-5	1657/614
154	Methamidophos	10265-92-6	1657
156	Methomyl	16752-77-5	531.1/632
158	Methoxychlor	00072-43-5	1656/505/508/608.2/617/525.1
172	Nabam	00142-59-6	630/630.1
173	Naled	00300-76-5	1657/622
175	Norflurazon	27314-13-2	507/645/525.1/1656
178	Benfluralin	01861-40-1	[1] 1656/[1] 627
182	Fensulfothion	00115-90-2	1657/622
183	Disulfoton	00298-04-4	1657/507/614/622/525.1
185	Phosmet	00732-11-6	1657/622.1
186	Azinphos Methyl	00086-50-0	1657/614/622
192	Organo-tin pesticides	12379-54-3	Ind-01/200.7/200.9
197	Bolstar	35400-43-2	1657/622
203	Parathion	00056-38-2	1657/614
204	Pendimethalin	40487-42-1	1656
205	Pentachloronitrobenzene	00082-68-8	1656/608.1/617
206	Pentachlorophenol	00087-86-5	625/1625/515.2/555/515.1/ 525.1
208	Permethrin	52645-53-1	608.2/508/525.1/1656/1660
212	Phorate	00298-02-2	1657/622
218	Busan 85 [Potassium dimethyldithiocarbamate]	00128-03-0	630/630.1
219	Busan 40 [Potassium N-hydroxymethyl-N-methyldithiocarbamate]	51026-28-9	630/630.1
220	KN Methyl [Potassium N-methyldithiocarbamate]	00137-41-7	630/630.1
223	Prometon	01610-18-0	507/619/525.1
224	Prometryn	07287-19-6	507/619/525.1
226	Propazine	00139-40-2	507/619/525.1/1656
230	Pyrethrin I	00121-21-1	1660
232	Pyrethrin II	00121-29-9	1660
236	DEF [S,S,S-Tributyl phosphorotrithioate]	00078-48-8	1657
239	Simazine	00122-34-9	505/507/619/525.1/1656
241	Carbam-S [Sodium dimethyldithiocarbanate]	00128-04-1	630/630.1
243	Vapam [Sodium methyldithiocarbamate]	00137-42-8	630/630.1
252	Tebuthiuron	34014-18-1	507/525.1
254	Terbacil	05902-51-2	507/633/525.1/1656
255	Terbufos	13071-79-9	1657/507/614.1/525.1
256	Terbuthylazine	05915-41-3	619/1656
257	Terbutryn	00886-50-0	507/619/525.1
259	Dazomet	00533-74-4	630/630.1/1659
262	Toxaphene	08001-35-2	1656/505/508/608/617/525.1
263	Merphos [Tributyl phosphorotrithioate]	00150-50-5	1657/507/525.1/622
264	Trifluralin	01582-09-8	1656/508/617/627/525.1
268	Ziram [Zinc dimethyldithiocarbamate]	00137-30-4	630/630.1

[1] Monitor and report as total Trifluralin.

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