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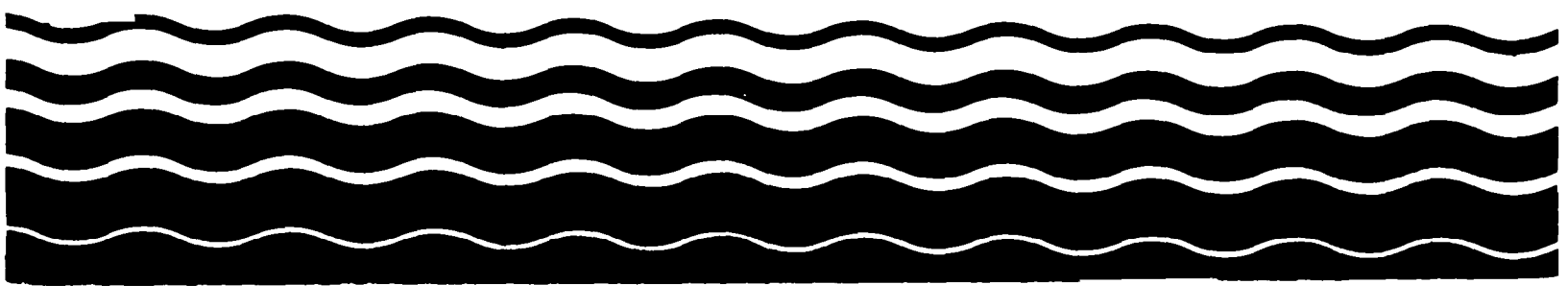
Guidance Manual for Pulp, Paper, and Paperboard and Builders' Paper and Board Mills Pretreatment Standards



GUIDANCE MANUAL
FOR
PULP, PAPER, AND PAPERBOARD
AND BUILDERS' PAPER AND BOARD MILLS
PRETREATMENT STANDARDS

Prepared by
The
Effluent Guidelines Division
Office of Water Regulations and Standards
and
Permits Division
Office of Water Enforcement and Permits

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U.S. Environmental Protection Agency
401 M. Street S.W.
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 21 1984

OFFICE OF
WATER

MEMORANDUM

SUBJECT: Guidance Manual for Pulp, Paper, and Paperboard and Builders' Paper and Board Mills Pretreatment Standards

FROM: Martha G. Prothro, Director Martha G. Prothro
Permits Division (EN-336)

& Jeffery D. Denit, Director D Barnes
Effluent Guidelines Division (WH-552)

TO: Users of the Guidance Manual

This manual provides information to assist Control Authorities and Approval Authorities in implementing the National Categorical Pretreatment Standards for Pulp, Paper and Paperboard and Builders' Paper and Board Mills (Pulp and Paper) Point Source Categories (40 CFR Part 430). It is designed to supplement the more detailed documents listed as references in the manual; it is not designed to replace them. If you need more complete information on a specific item, you should refer to the appropriate reference.

EPA developed this manual to fill several needs. First, it should be useful to Control Authorities in responding to most routine inquiries from regulated mills. More complex inquiries may require the use of the listed references.

Second, the manual addresses application of the combined wastestream formula to integrated facilities with regulated and unregulated wastestreams. It also provides current information on removal credits, variances and reporting requirements. It further explains how facilities subject to these regulations may use the certification procedure to minimize their sampling and analysis for zinc, trichlorophenol, and pentachlorophenol.

This manual is the second in a series of industry-specific guidance manuals for implementing categorical pretreatment standards. The first manual for the electroplating and metal finishing industry was published in February 1984 and several others will be published soon. We also plan to issue manuals covering removal credits, the combined wastestream formula and the conversion of production-based categorical standards to equivalent concentration-based standards.

Please feel free to write to either the Office of Water Regulations and Standards (WH-552) or the Office of Water Enforcement and Permits (EN-336) with suggestions, additions, or improvements.

ACKNOWLEDGEMENTS

We wish to acknowledge the considerable efforts and cooperation of the many people whose contributions helped in the successful completion of this document.

This document was prepared under the direction of Mr. Marvin Rubin, Office of Quality Review, Effluent Guidelines Division and Dr. James Gallup, National Pretreatment Coordinator. Mr. Robert Dellinger and Ms. Wendy Smith of the Effluent Guidelines Division, and Mr. Timothy Dwyer of the National Pretreatment Program are to be acknowledged for their valuable input. In addition, members of the Office of General Counsel and other members of the Effluent Guidelines Division and Office of Water Enforcement of Permits are acknowledged for their important contributions.

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1. INTRODUCTION

The National Pretreatment Program establishes an overall strategy for controlling the introduction of nondomestic wastes to publicly owned treatment works (POTWs) in accordance with the overall objectives of the Clean Water Act. Sections 307(b) and (c) of the Act authorize the Environmental Protection Agency to develop national pretreatment standards for new and existing dischargers to POTWs. The Act made these pretreatment standards enforceable against dischargers to publicly owned treatment works.

The General Pretreatment Regulations (40 CFR Part 403) establish administrative mechanisms requiring nearly 1,500 POTWs to develop local pretreatment programs to enforce the general discharge prohibitions and specific Categorical Pretreatment Standards. These Categorical Pretreatment Standards are designed to prevent the discharge of pollutants which pass through, interfere with, or are otherwise incompatible with the operation of the POTWs. The standards are technology-based for removal of toxic pollutants and contain specific numerical limitations based on an evaluation of specific technologies for the particular industrial categories. As a result of a settlement agreement, the EPA was required to develop Categorical Pretreatment Standards for 34 industrial categories with a primary emphasis on 65 classes of toxic pollutants.

This manual will provide guidance to POTWs on the application and enforcement of the Categorical Pretreatment Standards for the Pulp, Paper and Paperboard and Builders' Paper and Board Mills Point Source Categories. This document is based primarily on two sources: Federal Register notices, which include the official announcements of the Categorical Standards, and the Final Development Documents for the Pulp, Paper and Paperboard and Builders' Paper and Board Mills, which provide a summary of the technical support for the regulations. Additional information on the regulations, manufacturing processes, and control technologies can be found in these sources. A listing of the references used in the development of this manual is provided at the end of this document.

1.1 HISTORY OF THE PULP, PAPER AND PAPERBOARD AND BUILDERS' PAPER AND BOARD MILLS EFFLUENT LIMITATIONS GUIDELINES AND STANDARDS

EPA promulgated BPT, BAT, NSPS, and PSNS for the builders' paper and roofing felt subcategory of the builders' paper and board mills point source category on May 9, 1974 (39 FR 16578; 40 CFR Part 431). EPA promulgated BPT, BAT, NSPS, and PSNS for the unbleached kraft, sodium-based neutral sulfite semi-chemical, ammonia-based neutral sulfite semi-chemical, unbleached kraft-neutral sulfite semi-chemical (cross recovery), and paperboard from wastepaper subcategories of the pulp, paper, and paperboard point source category on May 29, 1974 (39 FR 18742; 40 CFR Part 430). EPA promulgated BPT for the dissolving kraft, market bleached kraft, BCT (board, coarse, and tissue) bleached kraft, fine bleached kraft, papergrade sulfite (blow pit wash), dissolving sulfite pulp, groundwood-thermo-mechanical, groundwood-CMN papers, groundwood-fine papers, soda, deink, nonintegrated-fine papers, nonintegrated-tissue papers, tissue from wastepaper, and papergrade sulfite (drum wash) subcategories of the pulp, paper, and paperboard point source category on January 6, 1977 (42 FR 1398; 40 CFR Part 430).

Several industry members challenged the regulations promulgated on May 29, 1974, and on January 6, 1977. These challenges were heard in the District of Columbia Circuit Court of Appeals. The promulgated regulations were upheld in their entirety with one exception. The Agency was ordered to reconsider the BPT BOD5 limitation for acetate grade pulp production in the dissolving sulfite pulp subcategory (Weyerhauser Company, et al. v. Costle, 590 F. 2nd 1011; D.C. Circuit 1978). In response to this remand, the Agency proposed BPT regulations for acetate grade pulp production in the dissolving sulfite pulp subcategory on March 12, 1980 (45 FR 15952). The Agency is currently assessing the costs and economic impacts associated with attainment of the proposed BPT limitation. Promulgation of this rule will occur at a later date.

EPA published proposed effluent limitations guidelines for BAT, BCT, NSPS, PSES, and PSNS for the pulp, paper, and paperboard and the builders' paper and board mills point source categories in the Federal Register on January 6, 1981 (46 FR 1430). At the time of proposal, the subcategorization scheme was modified to include 25 subcategories in the pulp, paper, and paperboard industry.

These 25 subcategories of the pulp, paper, and paperboard industry (40 CFR Parts 430 and 431) are as follows:

40 CFR Part 430

- Subpart F - dissolving kraft
- Subpart G - market bleached kraft
- Subpart H - board, coarse, and tissue (BCT) bleached kraft
- Subpart I - fine bleached kraft
- Subpart P - soda
- Subpart A - unbleached kraft
- Subpart B - semi-chemical
- Subpart V - unbleached kraft and semi-chemical (BPT limitations for some mills in this subcategory are included in subpart D - unbleached kraft - neutral sulfite semi-chemical (cross recovery))
- Subpart K - dissolving sulfite pulp
- Subpart J - papergrade sulfite (blow pit wash)
- Subpart U - papergrade sulfite (drum wash)
- Subpart L - groundwood-chemi-mechanical
- Subpart M - groundwood-thermo-mechanical
- Subpart N - groundwood-coarse, molded, and news (CMN) papers
- Subpart O - groundwood-fine papers
- Subpart Q - deink
- Subpart E - paperboard from wastepaper
- Subpart T - tissue from waste-paper
- Subpart W - wastepaper molded products
- Subpart R - nonintegrated-fine papers
- Subpart S - nonintegrated-tissue papers
- Subpart X - nonintegrated-lightweight papers
- Subpart Y - nonintegrated-filter and nonwoven papers
- Subpart Z - nonintegrated-paperboard

40 CFR Part 431

- Subpart A - builders' paper and roofing felt

On November 18, 1982, EPA promulgated BPT effluent limitations for four new subcategories of 40 CFR 430:

- Subpart W - Wastepaper Molded Products
- Subpart X - Nonintegrated-Lightweight Papers
- Subpart Y - Nonintegrated-Filter and Nonwoven Papers
- Subpart Z - Nonintegrated-Paperboard.

and for new subdivisions of two existing subcategories of 40 CFR 430:

- Subpart E - Paperboard from Wastepaper
- Subpart R - Nonintegrated-Fine papers.

BAT, NSPS, PSES and PSNS limitations were also promulgated for 24 of the 25 subcategories to control toxic pollutants. NSPS also controls conventional pollutants.

All pulp, paper and paperboard and builders' paper and board mills must comply with Pretreatment Standards for Existing Sources (PSES) for pentachlorophenol and trichlorophenol by July 1, 1984. In addition, Subpart M - Groundwood-Thermo-Mechanical, Subpart N - Groundwood-Coarse, Molded and News (CMN) Papers, and Subpart O - Groundwood-Fine Papers must comply with PSES for zinc by July 1, 1984. A more complete discussion of compliance dates is presented in subsequent sections of this manual.

2. PULP, PAPER AND PAPERBOARD CATEGORICAL PRETREATMENT STANDARDS (40 CFR 430)

2.1 AFFECTED INDUSTRY

The Pulp, Paper and Paperboard Categorical Pretreatment Standards are applicable to wastewater from mills which fall into three specific segments of the industry:

(1) Integrated Segment
(2) Secondary Fibers Segment
(3) Nonintegrated Segment.

These three segments and their components are discussed below:

(1) Integrated Segment - Mills where pulp alone or pulp and paper or paperboard are manufactured on-site are referred to as integrated mills.

(2) Secondary Fiber Segment - Mills where wastepaper is used as the primary raw material to produce paper or paperboard are referred to as secondary fiber mills.

(3) Nonintegrated Segment - Mills where paper or paperboard are manufactured but pulp is not manufactured on-site are referred to as nonintegrated mills.

Each of the 25 subcategories of the pulp, paper and paperboard industry falls into one of these segments. Table 2.1 lists the subcategories by segment.

The following is a brief overview of the two major manufacturing operations of pulp, paper and paperboard mills: 1) pulp production and 2) paper production.

TABLE 2.1

PULP, PAPER AND PAPERBOARD SUBCATEGORIES GROUPED
BY MAJOR INDUSTRY SEGMENTS

Integrated Segment

Dissolving Draft
Market Bleached Draft
BCT (Board, Coarse, and Tissue) Bleached Draft
Fine Bleached Draft
Soda
Unbleached Kraft
- Linerboard
- Bag and Other Products

Semi-Chemical
Unbleached Kraft and Semi-Chemical
Dissolving Sulfite Pulp
- Nitration
- Viscose
- Cellophane
- Acetate

Papergrade Fulfite (Blow Pit Wash)
Papergrade Sulfite (Drum Wash)
Groundwood-Thermo-Mechanical
Groundwood - Coarse, Molded, and News (C, M, N) Papers
Groundwood - Fine Papers
Groundwood-Chemi-Mechanical

Secondary Fibers Segment

Deink
- Fine Papers
- Tissue Papers
- Newsprint

Tissue from Wastepaper
Paperboard from Wastepaper
- Corrugating Medium Furnish
- Noncorrugating Medium Furnish

Wastepaper-Molded Products
Builders' Paper and Roofing Felt

Nonintegrated Segment

Nonintegrated-Fine Papers
- Wood Fiber Furnish
- Cotton Fiber Furnish

Nonintegrated-Tissue Papers
Nonintegrated-Lightweight Papers
- Lightweight Papers
- Lightweight Electrical papers

Nonintegrated-Filter and Nonwoven Papers
Nonintegrated-Paperboard

Pulp Production

The four major steps in the production of wood pulp are wood preparation, pulping, washing and screening, and bleaching (if required). The end result is a brown or white pulp that can be used in the manufacture of paper and paperboard products.

The initial step in the production of wood pulp is raw material preparation. A common sequence of operations employed during preparation of whole logs is slashing, debarking, washing, chipping, and storage. This may vary depending on the form in which the raw materials arrive at the mill.

After preparation, the wood is reduced to a usable form of fiber. This operation is called "pulping" and is accomplished by several possible combinations of mechanical and/or chemical "cooking" processes. The most common types of pulping processes employed are: 1) mechanical pulping (i.e., groundwood and thermo-mechanical) and 2) chemical pulping (i.e., alkaline (kraft and soda), sulfite, or semi-chemical processes).

After pulping, the brown stock (pulp fibers) is washed and screened. The screened rejects are then either repulped or discarded. Where a white or lightly colored pulp is required, an optional stage, bleaching, is employed.

In the bleaching process, the brown stock is decolored (brightened or whitened) through the use of chemicals such as chlorine, chlorine dioxide, sodium hypochlorite, zinc hydrosulfite, or sodium hydrosulfite. The mechanism of decoloring results from the removal or brightening of lignins and resins. After the brown stock is washed and screened, or bleached, it is stored for use in making paper or paperboard.

At secondary fiber mills, wastepaper is prepared to produce a stock to be used in the manufacture of paper or board products. Fibers suitable for papermaking result after wastepaper is cooked in a pulper, where it is repeatedly exposed to rotating impeller blades. Depending on the end product usage, heavily-printed wastepaper may be deinked. Ink and other nondesirable components are removed by flotation and washing using detergents, dispersants, fixing and softening agents, and other chemicals. If desired, these fibers

can be bleached using chlorine, sodium hypochlorite, or chlorine dioxide; if wastepaper is high in groundwood content, peroxides or hydrosulfites are used. After washing and screening, the stock is stored prior to papermaking.

Paper Production

At all mills (integrated, secondary fiber, or nonintegrated) where paper or paperboard are produced, purchased pulp or pulp produced on-site is resuspended in water and blended with other components. The stock is then mechanically processed in beaters or continuous refiners to ensure that the necessary matting characteristics are provided to obtain the desired strength in the paper or paperboard. Another aspect of stock preparation is the addition of chemical additives. The most common chemical additives are alum and rosin (for sizing), fillers (clays, calcium carbonate, and titanium dioxide for opacity, smoothness, and brightness), resins (to improve wet strength), dyes, and starches (for improved strength, erasability, and abrasion resistance).

After the stock has been prepared to the specifications required to make the product, the sheet (paper) or plies (paperboard) are made. There are two principal methods to make paper or board: on a Fourdrinier or a cylinder machine. Both methods are similar with the major significant differences occurring in the "wet-end" formation process. On the Fourdrinier machine, the slurry (diluted pulp) flows from the headbox onto an endless moving wire screen where the sheet is formed and through which water drains by gravity and suction. On a cylinder machine, a revolving wire-mesh cylinder rotates in a vat of diluted pulp and picks up a layer of fibers which are deposited onto a moving felt. The cylinder machine has the capacity to make multi-layered sheets, which accounts for its principal use in the manufacture of paperboard.

Both types of machines are equipped with press and dryer sections. The sheet is transferred from the wire or felt to the press section where additional water is removed through mechanical means prior to drying. In the dryer section, the sheet or board is carried through a series of heated hollow steel or iron cylinders. Sizing or coatings can be applied at the dry end or on separate machines. Following the drying section, the sheet can be calendered for a smooth finish and packaged for shipment.

A flow diagram depicting the major elements of pulp and paper production is presented in Figure 2.1.

The pulp, paper, and paperboard industry is a high water use industry. Major uses of water are industry-wide although the amount varies from segment to segment. At some mills, recycle streams or evaporative techniques are used so that little or no water is discharged or water that is discharged has been utilized for a number of different purposes prior to discharge. Figure 2.1 indicates where water or recycle streams are utilized in the pulp and paper production processes and the waste products (solid, liquid and gaseous) associated with each.

It has been estimated that wastewater discharges from pulp, paper, and paperboard mills total approximately 4.2 billion gallons per day. The largest contributor of wastewater is the integrated segment where discharges total approximately 3.6 billion gallons per day followed by the nonintegrated segment (0.32 billion gallons per day) and the secondary fibers segment (0.26 billion gallons per day). In addition, approximately 37 percent of all pulp, paper, and paperboard mills discharge their wastewater to publicly owned treatment works (POTWs). However, the majority of these indirect discharging mills fall into the lower water use segments (secondary fibers and non-integrated). Therefore, although in general the pulp, paper, and paperboard industry is a high volume water use industry, its indirect dischargers are average to low wastewater generators.

2.2 PRETREATMENT STANDARDS FOR THE PULP, PAPER, AND PAPERBOARD INDUSTRY

Indirect dischargers in 24 of the 25 subcategories that manufacture pulp, paper, and paperboard, under the Pulp, Paper, and Paperboard and Builders' Paper and Board Mills Point Source Categories (40 CFR Parts 430 and 431, respectively), are currently subject to Categorical Pretreatment Standards for pentachlorophenol (PCP) and trichlorophenol (TCP). The only subcategory without PSES for PCP and TCP is groundwood chemi-mechanical pulp. Zinc is only controlled for groundwood mills. Table 2.2 presents PSES categorical standards for the pulp, paper, and paperboard industry. Certification for PCP and TCP as an alternative to these standards is explained in the next section.

FIGURE 2.1
GENERAL FLOW SHEET
PULPING AND PAPERMAKING PROCESS

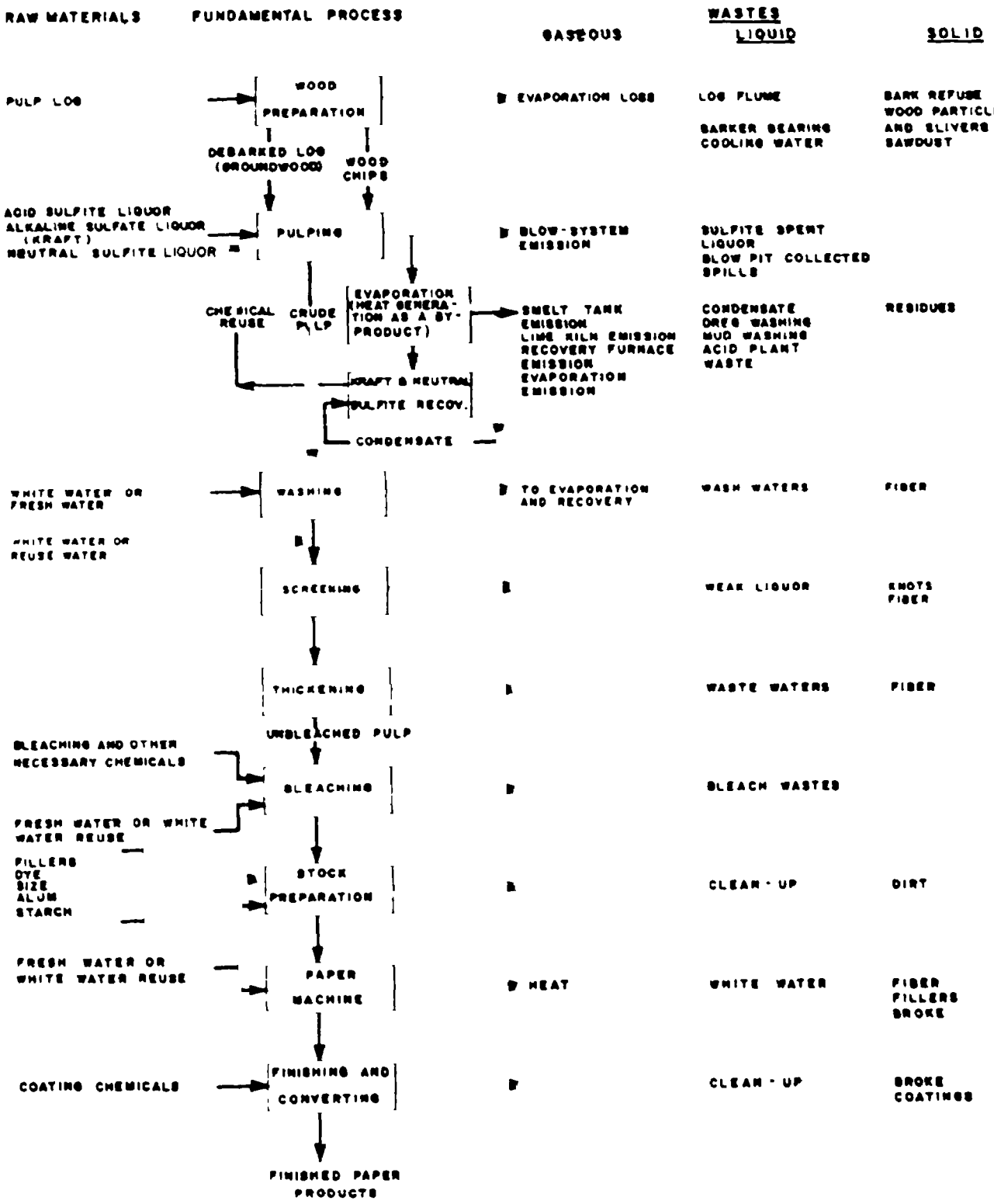

TABLE 2.2

PRETREATMENT STANDARDS FOR EXISTING SOURCES
(concentrations mg/l)

Subcategory	Maximum Day PCP[1]	Maximum Day TCP[2]	Maximum Day Zinc
Integrated Segment			
Dissolving Kraft	(0.011)(55.1)/Y	(0.082)(55.1)/Y	NA
Market Bleached Kraft	(0.011)(41.6)/Y	(0.082)(41.6)/Y	NA
BCT Bleached Kraft	(0.011)(35.4)/Y	(0.082)(35.4)/Y	NA
Alkaline-Fine[3]	(0.011)(30.9)/Y	(0.082)(30.9)/Y	NA
Unbleached Kraft			
o Linerboard	(0.011)(12.6)/Y	(0.010)(12.6)/Y	NA
o Bag	(0.011)(12.6)/Y	(0.010)(12.6)/Y	NA
Semi-Chemical	(0.032)(10.3)/Y	(0.010)(10.3)/Y	NA
Unbleached Kraft and Semi-Chemical	(0.011)(14.0)/Y	(0.010)(14.0)/Y	NA
Dissolving Sulfite Pulp			
o Nitration	(0.011)(66.0)/Y	(0.082)(66.0)/Y	NA
o Viscose	(0.011)(66.0)/Y	(0.082)(66.0)/Y	NA
o Cellophane	(0.011)(66.0)/Y	(0.082)(66.0)/Y	NA
o Acetate	(0.011)(72.7)/Y	(0.082)(72.7)/Y	NA
Papergrade Sulfite[4]	*	*	
Groundwood-Thermo-Mechanical	(0.011)(21.1)/Y	(0.010)(21.1)/Y	(3.0)(21.1)/Y
Groundwood-CMN Papers	(0.011)(23.8)/Y	(0.010)(23.8)/Y	(3.0)(23.8)/Y
Groundwood-Fine Papers	(0.011)(21.9)/Y	(0.010)(21.9)/Y	(3.0)(21.9)/Y
Secondary Fibers Segment			
Deink			
o Fine Papers	(0.032)(24.4)/Y	(0.082)(24.4)/Y	NA
o Tissue Papers	(0.032)(24.4)/Y	(0.082)(24.4)/Y	NA
o Newsprint	(0.032)(24.4)/Y	(0.010)(24.4)/Y	NA
Tissue From Wastepaper	(0.032)(25.2)/Y	(0.010)(25.2)/Y	NA
Paperboard From Wastepaper			
o Corrugating Medium Furnish	(0.032)(7.2)/Y	(0.010)(7.2)/Y	NA
o Noncorrugating Medium Furnish	(0.032)(7.2)/Y	(0.010)(7.2)/Y	NA
Wastepaper-Molded Products	(0.032)(21.1)/Y	(0.010)(21.1)/Y	NA
Builders' Paper and Roofing Felt	(0.032)(14.4)/Y	(0.010)(14.4)/Y	NA
Nonintegrated Segment			
Nonintegrated-Fine Papers			
o Wood Fiber Furnish	(0.032)(15.2)/Y	(0.010)(15.2)/Y	NA
o Cotton Fiber Furnish	(0.032)(42.3)/Y	(0.010)(42.3)/Y	NA
Nonintegrated-Tissue Papers	(0.032)(22.9)/Y	(0.010)(22.9)/Y	NA
Nonintegrated-Lightweight Papers			
o Lightweight	(0.032)(48.7)/Y	(0.010)(48.7)/Y	NA
o Electrical	(0.032)(76.9)/Y	(0.010)(76.9)/Y	NA
Nonintegrated-Filter and Nonwoven Papers	(0.032)(59.9)/Y	(0.010)(59.9)/Y	NA
Nonintegrated-Paperboard	(0.032)(12.9)/Y	(0.010)(12.9)/Y	NA

Y = Mill wastewater discharged per ton of product.
NA = Not Applicable

*Papergrade Sulfite Equations:

PCP = ((0.011)(12.67) exp(0.017x))/Y
TCP = ((0.082)(12.67) exp(0.017x))/Y
Where x equals percent sulfite pulp produced on-site in the final product.

[1]PCP = Pentachlorophenol

[2]TCP = Trichlorophenol

[3]Includes Fine Bleached Kraft and Soda subcategories

[4]Includes Papergrade Sulfite (Blow Pit Wash) and Papergrade Sulfite (Drum Wash) subcategories.

TABLE 2.2 (continued)

PSES OPTIONAL MASS LIMITS
(kg/kkg or lb/1000 lbs)

Subcategory	Maximum Day PCP[1]	Maximum Day TCP[2]	Zinc
Integrated Segment			
Dissolving Kraft	0.0025	0.019	NA
Market Bleached Kraft	0.0019	0.014	NA
BCT Bleached Kraft	0.0016	0.012	NA
Alkaline-Fine[3]	0.0014	0.011	NA
Unbleached Kraft			
o Linerboard	0.00058	0.00053	NA
o Bag	0.00058	0.00053	NA
Semi-Chemical	0.0016	0.00043	NA
Unbleached Kraft and Semi-Chemical	0.00064	0.00059	NA
Dissolving Sulfite Pulp			
o Nitration	0.0030	0.023	NA
o Viscose	0.0030	0.023	NA
o Cellophane	0.0030	0.023	NA
o Acetate	0.0033	0.025	NA
Papergrade Sulfite[4]	*	*	NA
Groundwood-Thermo-Mechanical	0.00097	0.00088	0.26
Groundwood-CMN Papers	0.0011	0.00099	0.30
Groundwood-Fine Papers	0.0010	0.00092	0.27
Secondary Fibers Segment			
Deink			
o Fine Papers	0.0033	0.0084	NA
o Tissue Papers	0.0033	0.0084	NA
o Newsprint	0.0033	0.0012	NA
Tissue From Wastepaper	0.0034	0.0011	NA
Paperboard From Wastepaper			
o Corrugating Medium Furnish	0.00096	0.00030	NA
o Noncorrugating Medium Furnish	0.00096	0.00030	NA
Wastepaper-Molded Products	0.0028	0.00088	NA
Builders' Paper and Roofing Felt	0.0019	0.00060	NA
Nonintegrated Segment			
Nonintegrated-Fine Papers			
o Wood Fiber Furnish	0.0020	0.00064	NA
o Cotton Fiber Furnish	0.0056	0.0018	NA
Nonintegrated-Tissue Papers	0.0031	0.00096	NA
Nonintegrated-Lightweight Papers			
o Lightweight	0.0065	0.0020	NA
o Electrical	0.010	0.0032	NA
Nonintegrated-Filter and Nonwoven Papers	0.0080	0.0025	NA
Nonintegrated-Paperboard	0.0017	0.00054	NA

Y = Mill wastewater discharged per ton of product
NA = Not Applicable

*Papergrade Sulfite Equations

PCP = 0.00058 exp(0.017x)
TCP = 0.0043 exp(0.017x)
Where x equals percent sulfite pulp produced on-site in the final product

[1]PCP = Pentachlorophenol

[2]TCP = Trichlorophenol

[3]Includes Fine Bleached Kraft and Soda subcategories.

[4]Includes Papergrade Sulfite (Blow Pit Wash) and Papergrade Sulfite (Drum Wash) subcategories.

PSES for zinc are identical to BPT limitations for control of this toxic metal. Standards are based on the maximum anticipated discharge concentration of zinc after the application of lime precipitation. EPA expects that this standard will be attained through substitution of sodium hydrosulfite for zinc hydrosulfite in bleaching groundwood pulp.

EPA assessed TCP discharge characteristics at mills in the pulp, paper, and paperboard industry taking into account whether chlorophenolic-containing biocides were used in the manufacturing process. EPA found that TCP discharges were significantly lower at those mills where chlorophenolic-containing biocides were not used. To determine the discharge levels of TCP that result from substitution of chlorophenolic-containing biocides, EPA then assessed all available data for mills where chlorophenolic-containing biocides were not employed. EPA found that higher levels of TCP were discharged from mills where chlorine-containing compounds were used to bleach pulp than from other mills. This is because low levels of TCP are formed in the bleaching process at mills where chlorine-containing compounds are used to bleach pulp. EPA determined the maximum discharge levels of TCP for mills where chlorine-containing compounds were used in the bleaching process and for mills where no chlorine-containing compounds were used. Based on all available data, the maximum discharge concentration of trichlorophenol at indirect discharging mills where chlorophenolic-containing biocides were not used and chlorine-containing compounds were used to bleach pulp was determined to be 82 ug/l. PSES were established using this concentration for those mills which bleach pulp as part of their production processes. The maximum discharge concentration of trichlorophenol at indirect discharging mills where chlorophenolic-containing biocides were not used and where chlorine-containing compounds were not used to bleach pulp was determined to be 10 ug/l. PSES were established using this concentration for those mills which do not bleach pulp as part of their production processes.

EPA assessed PCP discharge characteristics at mills in the pulp, paper, and paperboard industry taking into account whether chlorophenolic-containing biocides were used in the manufacturing process. EPA found that PCP discharges were significantly lower at those mills where chlorophenolic-containing biocides were not used. To determine the discharge levels of PCP

that result from substitution of chlorophenolic-containing biocides, the Agency assessed all available data for mills where chlorophenolic-containing biocides were not employed. EPA found that higher levels of PCP were discharged from mills where wastepapers were processed than from other mills. This is caused by low level PCP contamination of wastepaper. EPA determined the maximum discharge levels of PCP for mills where wastepaper was processed and for mills where wastepaper was not processed. Based on all available data, the maximum discharge concentration of pentachlorophenol at indirect discharging mills where chlorophenolic-containing biocides were not used and where wastepaper was processed was determined to be 32.0 ug/l. PSES were established using this concentration for those mills which utilize wastepaper as a raw material. The maximum discharge concentration of pentachlorophenol at indirect discharging mills where chlorophenolic-containing biocides were not used and where wastepaper was not processed was determined to be 11 ug/l. PSES were established using this concentration for those mills which do not utilize wastepaper as a raw material.

PSES are expressed as allowable maximum daily concentrations (milligrams per liter). Final pretreatment standards include a mathematical formula that accounts for flow differences to ensure that the standards do not discourage the implementation of water conservation technologies at indirect discharging mills. Mass limitations (kg/kkg or lb/1000 lb of product) are provided as guidance in cases where it is necessary to impose mass limitations for control of pollutants discharged from contributing pulp, paper, and paperboard mills to POTWs. Mass limitations were calculated as the product of the maximum allowable concentrations and the flows that formed the basis of BPT limitations for each subcategory.

2.3 EXCEPTIONS FROM REGULATION COVERAGE: PCP/TCP/ZINC CERTIFICATION

As stated in previous sections, pretreatment standards for existing (PSES) and new sources (PSNS) were promulgated in 24 of 25 subcategories for pentachlorophenol and trichlorophenol and in three of 25 subcategories for zinc. Pentachlorophenol (PCP) and trichlorophenol (TCP) are associated with certain biocides and slimicides used in pulp and paper production processes. The basis of pretreatment standards controlling PCP and TCP was discussed in the previous section. The categorical pretreatment standards allow, in

situations where a mill can certify, through sampling and analysis of its wastewaters or through careful inventory of its biocide and slimicide formulations that it does not utilize chlorophenolic-containing biocides and slimicides, the POTW authority to not require routine compliance monitoring for verification of PSES and PSNS categorical standards. However, the industry may be required to perform sampling and analysis of its wastewater for purposes of Baseline Monitoring Reports (BMRs) (see Section 4.3.2). EPA estimated that approximately 80 percent of all pulp, paper and paperboard mills were already utilizing alternative formulations at the time of promulgation.

As described previously, PSES and PSNS for zinc were promulgated for three of the four groundwood subcategories because groundwood mills have historically used zinc hydrosulfite as a bleaching chemical and zinc was found to pass through POTWs (see Section 6 of EPA Document 440/1-82/025 for further explanation of this). However, zinc categorical standards and routine compliance monitoring requirements are only applicable to groundwood mills using zinc hydrosulfite as a bleaching agent and will allow POTW authorities to not require this monitoring to verify PSES and PSNS if a mill can certify that zinc hydrosulfite is not being used. However, groundwood mills must perform sampling and analysis for zinc as part of the BMR efforts.

2.4 POLLUTANTS EXCLUDED FROM REGULATION

EPA excluded from regulation all but three of the 126 toxic pollutants authorized for regulatory consideration. Tables 2.3 through 2.5 present the criteria for which each pollutant was excluded from regulation under PSES.

2.5 COMPLIANCES DATES

As stated in earlier sections, all mills included in the Pulp, Paper and Paperboard and Builders Paper and Board Mills Point Source Categories must achieve compliance with applicable PSES categorical standards by July 1, 1984. As discussed previously, mills may not have to perform routine compliance monitoring with the approval of the POTW authority if they certify that (a) chlorophenolic - containing biocides are not used at the mill, and/or (b) zinc hydrosulfite is not used to bleach mechanical pulps. One mechanism commonly

TABLE 2.3
CRITERIA FOR ELIMINATION OF TOXIC POLLUTANTS
BASED ON SCREENING PROGRAM RESULTS
AND TOXIC POLLUTANTS ELIMINATED

Paragraph 8 (a) (iii) "For a specific pollutant, the pollutant is not detectable....."

1. acenaphthene
2. acrolein
8. 1,2,4-trichlorobenzene
9. hexachlorobenzene
12. hexachloroethane
16. chloroethane
19. 2-chloroethylvinyl ether (mixed)
26. 1,3-dichlorobenzene
28. 3,3'-dichlorobenzidine
32. 1,2-dichloropropane
37. 1,2-diphenylhydrazine
40. 4-chlorophenylphenyl ether
41. 4-bromophenylphenyl ether
46. methyl bromide (bromomethane)
52. hexachlorobutadiene
57. 2-nitrophenol
61. N-nitrosodimethylamine
63. N-nitrosodi-n-propylamine
72. benzo[a]anthracene (1,2-benzanthracene)
73. benzo[a]pyrene (3,4-benzopyrene)
74. 3,4-benzofluoranthene
75. benzo[k]fluoranthene (11,12-benzo fluoranthene)
79. benzo[ghi]perylene (1,12-benzoperylene)
80. fluorene
83. indeno[1,2,3-cd]pyrene
88. vinyl chloride (chloroethylene)
89. aldrin
90. dieldrin
91. chlordane (technical mixture and metabolites)
92. 4,4'-DDT
93. 4,4'-DDE (p,p'-DDX)
94. 4,4'-DDD (p,p'-TDE)
95. α-endosulfan
96. β-endosulfan
97. endosulfan sulfate
98. endrin
99. endrin aldehyde
100. heptachlor
101. heptachlor epoxide
102. α-BHC
103. β-BHC
104. γ-BHC (lindane)
105. δ-BHC
113. toxaphene
116. asbestos (fibrous)
129. 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)

TABLE 2.3 (Continued)

Paragraph 8 (a) (iii) "For a specific pollutant.....is present in amounts too small to be effectively reduced by technologies known to the Administrator....."

3. acrylonitrile
5. benzidine
14. 1,1,2-trichloroethane
20. 2-chloronaphthalene
25. 1,2-dichlorobenzene
27. 1,4-dichlorobenzene
30. 1,2-dichloroethylene
33. 1,3-dichloropropylene (1,3-dichloropropene)
34. 2,4-dimethylphenol
35. 2,4-dinitrotoluene
36. 2,6-dinitrotoluene
42. bis(2-chloroisopropyl) ether
43. bis(2-chloroethoxy) methane
45. methyl chloride (chloromethane)
53. hexachlorocyclopentadiene
56. nitrobenzene
58. 4-nitrophenol
60. 4,6-dinitro-o-cresol
62. N-nitrosodiphenylamine
71. dimethyl phthalate
114. antimony
115. arsenic
117. beryllium
118. cadmium
125. selenium
126. silver
127. thallium

Paragraph 8 (a) (iii) "For a specific pollutant.....is detectable in the effluent from only a small number of sources..... and the pollutant is uniquely related to only those sources....."

18. bis (2-chloroethyl) ether
29. 1,1-dichloroethylene
82. dibenzo[a,h]anthracene (1,2,5,6-dibenzanthracene)

TABLE 2.4

TOXIC POLLUTANTS ELIMINATED FROM ASSESSMENT BASED ON VERIFICATION PROGRAM RESULTS DETECTED BELOW TREATABILITY LEVEL

6.	carbon tetrachloride (tetrachloromethane)	59.	2,4-dinitrophenol[1]
7.	chlorobenzene	66.	bis(2-ethylhexyl) phthalate[3]
10.	1,2-dichloroethane	69.	di-n-octyl phthalate
13.	1,1-dichloroethane	76.	chrysene[4]
15.	1,1,2,2-tetrachloroethane[1]	77.	acenaphthylene
22.	parachlorometa cresol[2]	78.	anthracene
39.	fluoranthene	81.	phenanthrene[5]
44.	methylene chloride[3] (dichloromethane)	108.	PCB-1221 (Arochlor 1221)
48.	dichlorobromomethane	109.	PCB-1232 (Arochlor 1232)
		112.	PCB-1016 (Arochlor 1016)
51.	chlorodibromomethane	119.	chromium (total)
54.	isophorone	120.	copper (total)
		123.	mercury (total)
		124.	nickel (total)

[1] Not detected during verification sampling; detected in final effluent(s) during screening program below treatability level.

[2] Not detected in raw waste or final effluent samples during screening or verification programs.

[3] Laboratory contaminant.

[4] Not detected during verification sampling; detected in raw waste stream(s) below treatability levels during screening program.

[5] Not detected during verification sampling; co-elutes with anthracene using screening procedures.

TABLE 2.5

EXCLUSION OF TOXIC POLLUTANTS OF POTENTIAL CONCERN FROM PRETREATMENT STANDARDS

Toxic Pollutant	Reason for Exclusion
4. benzene	Below treatability in raw waste at all but one mill.
11. 1,1,1-trichloroethane	Below treatability in raw waste at all but one mill.
23. chloroform	Average POTW removal is 61 percent[1] However, the only POTW sampled by EPA that receives wastewater from a mill where chlorine is used to bleach pulp removed 97.8 percent of the raw waste chloroform[1]. Direct discharger removal averages 96.7 percent. Pass through is unlikely.
24. 2-chlorophenol	Below treatability in raw waste at all but one mill.
31. 2,4-dichlorophenol	Below treatability in raw waste at all but one mill.
38. ethylbenzene	Below treatability in raw waste at all but one mill.
47. bromoform	Average raw waste discharge is below treatability
55. naphthalene	Below treatability in raw waste at all but two mills in two different subcategories.
65. phenol	POTW removal is 83 percent[1]. Direct discharger removal ranges from 0 to 100 percent; average removal is approximately 91 percent. Pass through is unlikely.
67. butyl benzyl phthalate	POTW removal is 99 percent[1]. Pass through is unlikely.
68. di-n-butyl phthalate	Below treatability in raw waste at all but three mills in three different subcategories.

TABLE 2.5 (cont.)

70.	diethyl phthalate	POTW removal is 99 percent[1]. Pass through is unlikely.
84.	pyrene	Average raw waste discharge is below treatability.
85.	tetrachloroethylene	Below treatability in raw waste at all but two mills in two different subcategories.
86.	toluene	POTW removal is 91 percent[1]. Direct discharger removal ranges from 39.1 to 100 percent. Average removal is approximately 90 percent. Pass through is unlikely.
87.	trichloroethylene	Below treatability in raw waste at all but one mill.
106.	PCB-1242	POTW removal is comparable to proposed BAT[2]. Pass through is unlikely.
107.	PCB-1254	Never used in the manufacture of carbonless copy paper. Found at low levels only periodically.
110.	PCB-1248	Never used in the manufacture of carbonless copy paper. Found at low levels only periodically.
111.	PCB-1260	Never used in the manufacture of carbonless copy paper. Found at low levels only periodically.
121.	cyanide	POTW removal is 61 percent[1]. Direct discharger removal ranges from 31.2 to 91.6 percent; average removal is approximately 70 percent. Pass through is unlikely.
122.	lead	Below treatability in raw waste at all but four mills in four different subcategories.

[1]Based on information contained in Fate of Priority Pollutants in Publicly Owned Treatment Works, US Environmental Protection Agency, September 1982.

[2]Based on a comparison of information contained in Fate of Priority Pollutants in Publicly Owned Treatment Works, US Environmental Protection Agency, September 1982 (43) and information contained in the Development Document for Proposed Effluent Limitations Guidelines and Standards for Control of Polychlorinated Biphenyls in the Deink Subcategory of the Pulp, Paper and Paperboard Point Source Category, US Environmental Protection Agency, October 1982

used in the NPDES program when such monitoring is not required is to ban the use of chlorophenolic - containing biocides and/or zinc hydrosulfite for the life of the permit.

3. TREATMENT TECHNOLOGIES

As stated in earlier sections of this manual, the recommended treatment option for control of toxic pollutants regulated under PSES categorical standards is chemical substitution. As explained in Section 2.2 of this manual, PSES for PCP and TCP were calculated using effluent data collected at mills which were known not to utilize chlorophenolic-containing biocides and slimicides. Although chemical substitution of sodium hydrosulfite for zinc hydrosulfite is recommended for control of zinc at groundwood mills, PSES for zinc were calculated using treatment performance data for lime precipitation. A brief description of the treatment options mentioned above is presented below.

3.1 LIME PRECIPITATION

The removal of zinc from waste waters by groundwood mills using zinc hydrosulfite as a bleaching agent can be achieved through either 1) chemical coagulation and clarification or by 2) changing to another chemical bleaching agent such as sodium hydrosulfite. Several alternative chemical coagulation and clarification technologies and their application to industrial and municipal waste waters are discussed below.

The lime application and settling process treatment consists of adding a milk of lime slurry to the waste water to precipitate the hydroxide of the heavy metals and reduce dissolved sulfate concentrations through the formation of gypsum. Sufficient lime is needed to adjust the pH to between 10 and 11.5. Also, settling may have to be aided by adding small quantities of organic polyelectrolytes.

3.2 CHEMICAL SUBSTITUTION

It is often possible to use different process chemicals to accomplish the same goal. For example, both zinc hydrosulfite and sodium hydrosulfite can be used to bleach mechanical (groundwood) pulps. In recent years, at most groundwood mills, a substitution to the use of sodium hydrosulfite rather than zinc hydrosulfite has been made. This was prompted, at least in part, by the establishment of BPT effluent limitations controlling the discharge of zinc.

Rather than invest in costly end-of-pipe treatment, mill management determined that a less costly and equally effective control option would be chemical substitution. This substitution of chemicals resulted in attainment of BPT effluent limitations. EPA believes that this treatment option is readily transferable to indirect discharging mills and will not affect their economic viability.

Other opportunities exist to minimize the discharge of toxic and nonconventional pollutants through chemical substitution and are discussed below.

Toxic Pollutants. Slimicide and biocide formulations containing pentachlorophenol are used at mills in the pulp, paper, and paperboard industry. Initially, pentachlorophenol was used as a replacement for heavy metal salts, particularly mercuric types. Trichlorophenols are also used because of their availability as a by-product from the manufacture of certain herbicides. Formulations containing the following three types of materials are also currently being used:

1. Organo-bromides,
2. Organo-sulfur compounds, and
3. Carbamates.

Substitution to the use of alternate slimicide and biocide formulations can lead to the virtual elimination of pentachlorophenol and trichlorophenol from these sources.

Nonconventional Pollutants. Ammonia is used as a cooking chemical at mills in the semi-chemical, dissolving sulfite pulp, and both papergrade sulfite subcategories. One method for reducing ammonia (NH_3) discharges is the substitution of a different chemical, such as sodium hydroxide, for ammonia in the cooking liquor. The equipment changes necessary to receive and feed a 50 percent solution of NaOH are not likely to be significant.

After conversion to the use of sodium-based chemicals, spent liquor could be incinerated, and sulfur dioxide, sodium sulfate, carbonate, or sulfide could be recovered. These compounds could be sold for use at nearby kraft

mills or for other industrial uses; however, markets are not likely to be readily available.

Reducing smelting furnaces that produce a high-sulfidity, kraft-like green liquor are now employed at sodium-based sulfite mills. EPA anticipates that it would be necessary to replace the existing recovery boilers at ammonia-based mills if chemical substitution to a sodium base were employed. Additionally, it is likely that, because the heat value of sodium spent liquor is lower than ammonia spent liquor, evaporator modification may be required if excess capacity does not now exist.

No indirect discharging mills in the semi-chemical, dissolving sulfite pulp, and papergrade sulfite subcategories currently use ammonia-based chemicals.

4. REQUIREMENTS OF THE GENERAL PRETREATMENT REGULATIONS

4.1 INTRODUCTION

This section provides a brief overview of the General Pretreatment Regulations and identifies those provisions of the Regulations which have a direct bearing on the application and enforcement of Categorical Pretreatment Standards for the pulp, paper, and paperboard industry.

The General Pretreatment Regulations for Existing and New Sources (40 CFR Part 403) establish the framework and responsibilities for implementation of the National Pretreatment Program. The effect of 40 CFR Part 403 is essentially three-fold. First, the General Pretreatment Regulations establish general and specific discharge prohibitions as required by Sections 307(b) and (c) of the Clean Water Act. The general and specific prohibitions are described in Section 403.5 of the Pretreatment Regulations and apply to all nondomestic sources introducing pollutants into a POTW whether or not the source is subject to Categorical Pretreatment Standards.

Second, the General Pretreatment Regulations establish an administrative mechanism to ensure that National Pretreatment Standards (Prohibited Discharge Standards and Categorical Pretreatment Standards) are applied and enforced upon industrial users. Approximately 1,500 POTWs are required to develop a locally run pretreatment program to ensure that non-domestic users comply with applicable pretreatment standards and requirements.

Third, and most importantly for the purposes of this guidance manual, the General Pretreatment Regulations contain provisions relating directly to the implementation and enforcement of the Categorical Pretreatment Standards. Reporting requirements, local limits, monitoring or sampling requirements, and category determination provisions are discussed. POTW representatives should refer to 40 CFR Part 403 for specific language and requirements where appropriate.

4.2 CATEGORY DETERMINATION REQUEST

An existing industrial user (IU) or its POTW may request written certification from EPA or the delegated State specifying whether or not the industrial user falls within a particular industry category or subcategory and is subject to a categorical pretreatment standard. Although the deadline for submitting a category determination request by existing industrial users subject to the pulp, paper, and paperboard industry categorical pretreatment standards has passed, a new industrial user or its POTW may request this certification for a category determination anytime prior to commencing its discharge. The contents of a category determination request and procedures for review are presented in Section 403.6(a) of the General Pretreatment Regulations.

4.3 MONITORING AND REPORTING REQUIREMENTS OF THE GENERAL PRETREATMENT REGULATIONS

In addition to the requirements contained in the Pulp, Paper, and Paperboard Categorical Pretreatment Standards, industrial users subject to these Standards must fulfill the reporting requirements contained in Section 403.12 of the General Pretreatment Regulations. These requirements include the submission of baseline monitoring reports, compliance schedules, compliance reports (initial and periodic), notices of slug loading, and recordkeeping requirements. Each of these reporting requirements is briefly summarized below.

4.3.1 Baseline Monitoring Reports

All industrial users subject to Categorical Pretreatment Standards must submit a baseline monitoring report (BMR) to the Control Authority. The purpose of the BMR is to provide information to the Control Authority to document the industrial user's current compliance status with a Categorical Pretreatment Standard. The Control Authority is defined as the POTW if it has an approved pretreatment program, otherwise the BMR will be submitted to the State (if the State has an approved State Pretreatment Program) or to the EPA Region. Additional guidance on BMR reporting is available from the EPA Regional Pretreatment Coordinator.

4.3.2 BMR Reporting of PCP/TCP/Zinc

BMR sampling requirements clearly apply to PCP, TCP, and zinc. However, since monitoring for toxic organics such as PCP and TCP can be expensive, BMR sampling and analysis will only be required for those pollutants "which would reasonably be expected to be present" in the industrial user's effluent [Section 413.03(c)]. For routine compliance monitoring, not BMR monitoring, the regulations allow for the control authority to certify that the regulated pollutants are not used at the facility. Even if the industrial user expects to use the certification procedure to demonstrate regular compliance with the PCP, TCP or zinc limitation, the user must still sample and analyze for PCP, TCP, or zinc if the pollutant is "reasonably expected to be present" for the purpose of the baseline monitoring report. If these organics are not used or expected to be discharged, monitoring for PCP or TCP is not required for the BMR.

4.3.3 BMR Due Dates

Section 403.12(b) requires that BMRs be submitted to the Control Authority within 180 days after the effective date of a Categorical Pretreatment Standard or 180 days after the final administrative decision made upon a category determination request [403.6(a)(4)], whichever is later. The due date for pulp, paper, and paperboard industry BMRs was July 2, 1983.

4.3.4 BMR Content

A BMR must contain the following information as required by Section 403.12(b).

1. Name and address of the facility, including names of operator(s) and owner(s).

2. List of all environmental control permits held by or for the facility.

3. Brief description of the nature, average production rate and SIC code for each of the operation(s) conducted, including a schematic process diagram which indicates points of discharge from the regulated processes to the POTW.

4. Flow measurement information for regulated process streams discharged to the municipal system. Flow measurements of other wastestreams

will be necessary if application of the combined wastestream formula is necessary.

5. Identification of the pretreatment standards applicable to each regulated process and results of measurements of pollutant concentrations and/or mass. All samples must be representative of daily operations and results reported must include values for daily maximum and average concentration (or mass, where required). Where the flow of the regulated stream being sampled is less than or equal to 250,000 gallons per day, the industrial user must take three samples within a two week period. Where the flow of the stream is greater than 250,000 gallons per day, the industrial user must take six samples within a two week period. If samples cannot be taken immediately downstream from the regulated process and other wastewaters are mixed with the regulated process, the industrial user should measure flows and concentrations of the other wastestreams sufficient to allow use of the combined wastestream formula.

6. Statement of certification concerning compliance or noncompliance with the Pretreatment Standards.

7. If not in compliance, a compliance schedule must be submitted with the BMR that describes the actions the user will take and a timetable for completing those actions to achieve compliance with the standard. This compliance schedule must contain specific increments of progress in the form of dates for the commencement and completion of major events, however, no increment of the schedule shall exceed 9 months. Within 14 days of each completion date in the schedule, the industrial user shall submit a progress report to the Control Authority indicating whether or not it complied with the increment of progress to be met on such date, and, if not, the date on which it expects to comply with this increment of progress and the steps being taken to return to the schedule.

4.3.5 Report on Compliance

Within 90 days after the compliance date for the Pulp, Paper, and Paperboard Pretreatment Standards or in the case of a New Source following commencement of the introduction of wastewater into the POTW, any industrial user subject to the Standards must submit to the Control Authority a "report on compliance" that states whether or not applicable pretreatment standards are being met on a consistent basis. The report must indicate the nature and concentration of all regulated pollutants in the facility's regulated process wastestreams; the average and maximum daily flows of the regulated streams; and a statement of whether compliance is consistently being achieved, and if not, what additional operation and maintenance and/or pretreatment is necessary to achieve compliance. See 40 CFR 403.12(d).

4.3.6 Periodic Reports on Continued Compliance

Unless required more frequently by the Control Authority, all industrial users subject to the Pulp, Paper, and Paperboard Categorical Pretreatment Standards must submit a biannual "periodic compliance report" during the months of June and December. The report shall indicate the precise nature and concentrations of the regulated pollutants in its discharge to the POTW, the average and maximum daily flow rates of the facility, the methods used by the indirect discharger to sample and analyze the data, and a certification that these methods conformed to those methods outlined in the regulations. See 40 CFR 403.12(e).

4.3.7 Notice of Slug Loading

Section 403.12(f) requires industrial users to notify the POTW immediately of any slug loading of any pollutant, including oxygen demanding pollutants (BOD, etc.) released to the POTW system at a flow rate and/or pollutant concentration which will cause interference with the POTW.

4.3.8 Monitoring and Analysis to Demonstrate Continued Compliance

Section 403.12(g) states that the frequency of monitoring to demonstrate continued compliance shall be prescribed in the applicable Pretreatment Standard. The Pulp, Paper, and Paperboard Pretreatment Standards do not establish any monitoring frequency. Therefore, the appropriate Control Authority must establish the monitoring frequency to adequately demonstrate that indirect dischargers subject to these pretreatment standards are in compliance with the applicable standards. Unless otherwise noted in the appropriate paragraph of Section 403.12, the monitoring frequency established by the Control Authority shall be used in the baseline monitoring report (403.12(b)(5)), the report on compliance with categorical pretreatment standard deadline (403.12(d)), and the periodic reports on continued compliance (403.12(e)).

Sampling and analysis shall be in accordance with the procedures established in 40 CFR Part 136 and any amendments to it or shall be approved by EPA. When Part 136 techniques are not available or are inappropriate for any pollutant, then sampling and analysis shall be conducted in accordance with procedures established by the POTW or using any validated procedure. However,

all procedures for sampling and analysis not included in Part 136 must be approved by EPA.

4.3.9 Signatory Requirements for Industrial User Reports

All reports submitted by industrial users (BMR, Initial Report on Compliance, and Periodic Reports, etc.) must be signed by an authorized representative in accordance with Section 403.12(k).

4.3.10 Recordkeeping Requirements

Any industrial user subject to the reporting requirements of the General Pretreatment Regulations shall maintain records of all information resulting from any monitoring activities required by 403.12 for a minimum of three years [403.12(n)]. These records shall be available for inspection and copying by the Control Authority.

4.4 THE COMBINED WASTESTREAM FORMULA

One provision of the General Pretreatment Regulations that will often be necessary for POTWs and industries to properly monitor and report on compliance with Categorical Pretreatment Standards is the Combined Wastestream Formula (CWF) [40 CFR 403.6(e)]. The CWF is a mechanism for calculating appropriate limitations specified in applicable regulations to a wastewater in which process wastestreams are mixed with regulated, unregulated or dilution streams, thereby resulting in a mixed effluent. The CWF is applied to the mixed effluent to account for the presence of the additional wastestreams.

The following definitions and conditions are important to the proper use of the CWF.

Definitions

- Regulated Process Wastestream - an industrial process wastestream regulated by National Categorical Pretreatment Standards.
- Unregulated Process Wastestream - an industrial process wastestream that is not regulated by a categorical standard.

Note: Definitions apply to individual pollutants. A wastestream from a process may be "regulated" for one pollutant and "unregulated" for another.

- Dilute Wastestream - Boiler blowdown, sanitary wastewater, noncontact cooling water or blowdown, and Paragraph 8 excluded wastestreams containing none of the regulated pollutant or only trace amounts of it.

- Concentration-based Limit - a limit based on the relative strength of a pollutant in a wastestream, usually expressed in mg/l (lb/gal).

- Mass-based Limit - a limitation based on the actual quantity of a pollutant in a wastestream, usually expressed in kg/some unit of production for a given operation such as kg of pollutant per kkg of product.

CWF Conditions

To ensure proper application of the CWF, the following conditions must be met by a municipality and its industries [40 CFR 403.6(e)]:

- Alternative discharge limits that are calculated in place of a Categorical Pretreatment Standard must be enforceable as Categorical Standards.

- Calculation of alternative limits must be performed by the Control Authority (POTW) or by the industrial user with written permission from the POTW.

- Alternative limits must be established for all regulated pollutants in each of the regulated processes.

- The Control Authority and/or the industrial user may use mass-based limitations in place of the concentration-based limitations, when they are provided for by given Categorical Pretreatment Standards such as the pulp, paper, and paperboard standards, as long as a prior agreement exists between the regulated industrial user and the municipality that is receiving these wastes.

- Both daily maximum and long-term average (usually monthly) alternative limits must be calculated for each regulated pollutant.

- If process changes at an industry warrant, the Control Authority may recalculate the alternative limits at its discretion or at the request of the industrial user. The new alternative limits must be calculated and become effective within 30 days of the process change.

- The Control Authority may impose stricter alternative limits, but may not impose alternative limits that are less stringent than the calculated limits.

- A calculated alternative limit cannot be used if it is below the analytical detection limit for that pollutant. If a calculated limit is below the detection limit, the IU must either: 1) not combine the

dilute streams before they reach the combined treatment facility, or 2) segregate all wastestreams entirely.

- The categorical standards of the regulated wastestreams which are applied to the CWF must be consistent in terms of the number of samples the standard is based on.

Monitoring Requirements For Industrial Users Using the CWF

Self-monitoring requirements by an industrial user are necessary to ensure compliance with the alternative categorical limit. Because the Pulp, Paper, and Paperboard Pretreatment Standards do not include self-monitoring requirements, the Control Authority will establish minimum self-monitoring requirements.

Application of the CWF

The actual combined wastestream formulas are presented in Table 4.1. Table 4.2 presents examples of how the CWF is applied to specific pulp, paper, and paperboard industry situations.

4.5 REMOVAL CREDITS

A removal credit allows a POTW to provide categorical industrial users of its system with a credit (in the form of adjusted categorical pretreatment standards) for removal of pollutants by the POTW. Industrial users receiving such a credit are allowed to discharge to the POTW greater quantities of regulated pollutants than otherwise permitted by applicable categorical standards. Whether or not to seek authority to grant removal credits is completely at the discretion of the POTW. Section 403.7 of the General Pretreatment Regulations establishes the conditions under which a POTW would obtain approval to grant removal credits and specifies the means by which these removal credits are to be determined.

In 1977, Congress amended section 307(b) of the Clean Water Act to provide for removal credits. EPA originally implemented that provision and established the conditions under which POTWs could obtain authorization to grant removal credits in the June 26, 1978 General Pretreatment Regulations. On January 28, 1981, the removal credits provision, as well as many other portions of the pretreatment regulations, were amended. On August 3, 1984

TABLE 4.1

COMBINED WASTESTREAM FORMULAS

Alternative Concentration Limit Formula:

$$C_t = \left(\frac{\sum_{i=1}^{N} C_i F_i}{\sum_{i=1}^{N} F_i} \right) X \left(\frac{F_t - F_d}{F_t} \right)$$

C_t - alternative concentration limit for the pollutant

C_i - Categorical Pretreatment Standard concentration limit for the pollutant in regulated stream i

F_i - average daily flow (at least 30 day average) of regulated stream i

F_d - average daily flow (at least 30 day average) of dilute wastestream(s)

F_t - average daily flow (at least 30 day average) through the combined treatment facility (including regulated, unregulated and dilute wastestreams)

N - total number of regulated streams

Alternate Mass Limit Formula

$$M_t = \left(\sum_{i=1}^{N} M_i \right) X \left(\frac{F_t - F_d}{\sum_{i=1}^{N} F_i} \right)$$

M_t - alternative mass limit for the pollutant

M_i - Categorical Pretreatment Standard mass limit for the pollutant in regulated stream i

F_i - average daily flow (at least 30 day average) of regulated stream i

F_d - average daily flow (at least 30 day average) of dilute wastestream(s)

F_t - average daily flow (at least 30 day average) through the combined treatment facility (including regulated, unregulated and dilute wastestreams)

N - total number of regulated streams.

TABLE 4.2

COMBINED WASTESTREAM FORMULA EXAMPLE CALCULATIONS

The following examples provide calculations for determining alternate discharge limits for pentachlorophenol (PCP) using the combined wastestream formula. Trichlorophenol and zinc limits would also be calculated in the same manner but examples of these limits will not be repeated here. The limits for PCP are based on the compliance date of July 1, 1984. The following calculations assume combinations of various regulated and unregulated wastestreams with the following characteristics:

Subcategory or Wastestream	Wastestream Type	Flow Q (mgd)	PSES Daily Maximum PCP Limit Concentration-based (mg/l)	PSES Daily Maximum PCP Limit Production-based kg/kkg or lb/1000 lbs	Production Tons of Product Per Day
Groundwood-Fine Papers	Regulated	11.0	(0.011)(21.9)/Y*	0.0010	650.0
Deink-Fine Papers	Regulated	3.6	(0.032)(24.4)/Y*	0.0033	300.0
Paperboard from Waste-paper	Regulated	0.9	(0.032)(7.2)/Y*	0.00096	500.0
Builders' Paper and Roofing Felt	Regulated	2.0	(0.032)(14.4)/Y*	0.0019	100.0
Nonintegrated-Fine Papers (Wood Fiber Furnish)	Regulated	2.6	(0.032)(15.2)/Y*	0.0020	200.00
Groundwood-Chemi-Mechanical	Unregulated	2.0	N/A	N/A	150.0
Sanitary Waste	Dilution	0.05	N/A	N/A	N/A
Boiler Blowdown	Dilution	1.0	N/A	N/A	N/A

*Y = mill wastewater discharged in kgal per ton of product

TABLE 4.2 (Continued)

COMBINED WASTESTREAM FORMULA EXAMPLE CALCULATIONS

EXAMPLE A

Alternative discharge limit for a groundwood-fine papers facility using chlorophenolic-containing biocides which also discharges sanitary waste and boiler blowdown. The PCP concentration-based limit must be calculated as follows:

PCP limit in mg/l = (0.011)(21.9)/Y

Y = mill wastewater discharged in kgal per ton of product

$$Y = \frac{11.0 \text{ mgd}}{650.0 \text{ tons of product per day}} = 16.9 \frac{\text{kgal}}{\text{ton}}$$

PCP limit in mg/l = (0.011)(21.9)/(16.9) = 0.014 mg/l

Groundwood-Fine Papers	Sanitary Waste	Boiler Blowdown
Q = 11 mgd	Q = 0.05 mgd	Q = 1.0 mgd
PCP = 0.014 mg/l	PCP = N/A	PCP = N/A

$$PCP_{cwf} = \frac{0.014 \text{ mg/l} \times 11.0 \text{ mgd}}{11.0 \text{ mgd}} \times \frac{(11.0 \text{ mgd} + 0.05 \text{ mgd} + 1.0 \text{ mgd}) - (0.05 \text{ mgd} + 1.0 \text{ mgd})}{11.0 \text{ mgd} + 0.05 \text{ mgd} + 1.0 \text{ mgd}}$$

$$PCP_{cwf} = 0.014 \times 0.913$$

$$PCP_{cwf} = 0.013 \text{ mg/l}$$

TABLE 4.2 (Continued)

COMBINED WASTESTREAM FORMULA EXAMPLE CALCULATIONS

EXAMPLE B

Alternative discharge limit for a secondary fiber "miscellaneous" facility using chlorophenolic-containing biocides and producing fine papers from deinked pulp and from purchased pulp. The facility also discharges sanitary wastes. The PCP limits are calculated using the limits for the deink-fine papers and the nonintegrated-fine papers subcategories as follows:

deink-fine papers

PCP limit in mg/l = (0.032)(24.4)/Y

Y = mill wastewater discharged in kgal per ton of product

$$Y = \frac{3.6 \text{ mgd}}{300.0 \text{ tons product per day}} = \frac{3600 \text{ kgal}}{300 \text{ tons}}$$

Y = 12.0

PCP limit in mg/l = (0.032)(24.4)/12.0

= 0.065 mg/l

nonintegrated-fine papers

PCP limit in mg/l = (0.032)(15.2)/Y

$$Y = \frac{2.6 \text{ mgd}}{200.0 \text{ tons product per day}} = \frac{2600 \text{ kgal}}{200 \text{ tons}}$$

Y = 13.0

PCP limit in mg/l = (0.032)(15.2)/(13.0)

= 0.037 mg/l

Deink-fine Papers	Nonintegrated-fine Papers	Sanitary Waste
Q = 3.6 mgd	Q = 2.6 mgd	Q = 0.05 mgd
PCP = 0.065 mg/l	PCP = 0.037 mg/l	PCP = N/A

$$PCP_{cwf} = \frac{(0.065 \text{ mg/l} \times 3.6 \text{ mgd}) + (0.037 \text{ mg/l} \times 2.6 \text{ mgd})}{3.6 \text{ mgd} + 2.6 \text{ mgd}} \times \frac{3.6 \text{ mgd} + 2.6 \text{ mgd} + 0.05 \text{ mgd} - 0.05 \text{ mgd})}{3.6 \text{ mgd} + 2.6 \text{ mgd} + 0.05 \text{ mgd}}$$

$$PCP_{cwf} = \frac{0.23 + 0.096}{6.2} \times (0.99)$$

$$PCP_{cwf} = 0.053 \times 0.99$$

$$PCP_{cwf} = 0.052 \text{ mg/l}$$

TABLE 4.2 (Continued)

COMBINED WASTESTREAM FORMULA EXAMPLE CALCULATIONS

EXAMPLE C

Alternative discharge limit for a secondary fibers "miscellaneous" facility using chlorophenolic-containing biocides and producing builders' paper and roofing felt and paperboard from wastepaper. The facility also discharges sanitary wastes and boiler blowdown. The PCP limit is calculated as follows.

builders' paper and roofing felt

PCP limit in mg/l = (0.032)(14.4)/Y

Y = mill wastewater discharged in kgal per ton of product

$$Y = \frac{2.0 \text{ mgd}}{100.0 \text{ tons product per day}} = 20.0 \frac{\text{kgal}}{\text{tons}}$$

PCP limit in mg/l = (0.032)(14.4)/20.0

= 0.023 mg/l

paperboard from wastepapers

PCP limit in mg/l = (0.032)(7.2)/Y

$$Y = \frac{0.9 \text{ mgd}}{500.0 \text{ tons product per day}}$$

Y = 1.8 kgal/ton

PCP limit in mg/l = (0.032)(7.2)/(1.8)

= 0.13 mg/l

Builders' Paper and Roofing Felt	Paperboard from Wastepaper	Sanitary Waste	Boiler Blowdown
Q = 0.6 mgd	Q = 0.9 mgd	Q = 0.05 mgd	Q = 1.0 mgd
PCP = 0.023 mg/l	PCP = 0.13 mg/l	PCP = N/A	PCP = N/A

$$PCP_{cwf} = \frac{(0.023 \text{ mg/l} \times 0.6 \text{ mgd}) + (0.13 \text{ mg/l} \times 0.9 \text{ mgd})}{0.6 \text{ mgd} + 0.9 \text{ mgd}} \times \frac{(0.6 \text{ mgd} + 0.9 \text{ mgd} + 0.05 \text{ mgd} + 1.0 \text{ mgd} - 0.05 \text{ mgd} - 1.0 \text{ mgd})}{0.6 \text{ mgd} + 0.9 \text{ mgd} + 0.05 \text{ mgd} + 1.0 \text{ mgd}}$$

$$PCP_{cwf} = \frac{0.014 + 0.12}{1.5} \times \frac{1.5}{2.55}$$

$$PCP_{cwf} = 0.089 \times 0.59$$

$$PCP_{cwf} = 0.053 \text{ mg/l}$$

TABLE 4.2 (Continued)

COMBINED WASTESTREAM FORMULA EXAMPLE CALCULATIONS

EXAMPLE D

Alternative discharge limit for an integrated miscellaneous facility using chlorophenolic-containing biocides and producing groundwood-fine papers and groundwood-chemi-mechanical pulp. The facility also discharges a boiler blowdown. The limit is calculated as follows (note that no PSES limitations for PCP are promulgated for the groundwood-chemi-mechanical subcategory):

PCP limit for groundwood-fine papers subcategory from Table 4.2 (Example A) = 0.014 mg/l

Groundwood-Fine Papers	Groundwood-Chemi-Mechanical	Boiler Blowdown
Q = 11.0 mgd	Q = 20.0 mgd	Q = 1.0 mgd
PCP = 0.014 mg/l	PCP = *	PCP = N/A

$$PCP_{cwf} = \frac{0.014 \text{ mg/l} \times 11.0 \text{ mgd}}{11.0 \text{ mgd}} \times \frac{(11.0 \text{ mgd} + 20.0 \text{ mgd} + 1.0 \text{ mgd} - 1.0 \text{ mgd})}{(11.0 \text{ mgd} + 20.0 \text{ mgd} + 1.0 \text{ mgd})}$$

$$PCP_{cwf} = (0.014 \text{ mg/l}) \times \frac{31.0}{32.0}$$

$$PCP_{cwf} = 0.014 \times 0.969$$

$$PCP_{cwf} = 0.014 \text{ mg/l}$$

Note: *The groundwood-chemi-mechanical wastestream is unregulated but it is not considered the same as a dilute wastestream (e.g., boiler blowdown). Only dilute wastestreams are subtracted from total flow in the numerator of the second term in the combined wastestream formula. If the control authority determines that chlorophenolic containing biocides are used in the groundwood-chemi-mechanical portion of the operations, a PCP allowance may be included based upon actual measurements. However, if it is determined that these types of biocides are not used, then this stream should be treated as a dilution stream.

TABLE 4.2 (Continued)

COMBINED WASTESTREAM FORMULA EXAMPLE CALCULATIONS

EXAMPLE E

In some cases, permit writers may wish to utilize mass limitations. This example shows the calculation of an alternative limit for a facility which uses chlorophenolic-containing compounds and produces nonintegrated-fine papers and deink-fine papers. Sanitary wastes and boiler blowdown are also discharged. The mass limits are calculated as follows:

nonintegrated-fine paper
PCP limit = 0.0020 lbs/1000 lbs product

$$\text{long-term average production} = \frac{200 \text{ tons product}}{\text{day}} = \frac{400{,}000 \text{ lbs product}}{\text{day}}$$

$$\text{PCP limit} = \frac{0.0020 \text{ lbs}}{1000 \text{ lbs product}} \times \frac{400{,}000 \text{ lbs product}}{\text{day}}$$

$$\text{PCP limit} = 0.80 \text{ lbs/day}$$

deink-fine papers
PCP limit = 0.0033 lbs/1000 lbs product

$$\text{long-term average production} = \frac{300 \text{ tons product}}{\text{day}} = \frac{600{,}000 \text{ lbs product}}{\text{day}}$$

$$\text{PCP limit} = \frac{0.0033 \text{ lbs}}{1000 \text{ lbs product}} \times \frac{600{,}000 \text{ lbs product}}{\text{day}}$$

$$\text{PCP limit} = 1.98 \text{ lbs/day}$$

Nonintegrated-fine Paper	Deink-fine Paper	Sanitary Waste	Boiler Blowdown
Q = 2.6 mgd	Q = 3.6 mgd	Q = 0.05 mgd	Q = 1.0 mgd
PCP = 0.8 lbs/day	PCP = 1.98 lbs/day	PCP = N/A	PCP = N/A

$$PCP_{cwf} = \frac{0.80 \text{ lbs}}{\text{day}} + \frac{1.98 \text{ lbs}}{\text{day}} \times \frac{2.6 \text{ mgd} + 3.6 \text{ mgd} + 0.05 \text{ mgd} + 1.0 \text{ mgd} - 0.05 \text{ mgd} - 1 \text{ mgd}}{2.6 \text{ mgd} + 3.6 \text{ mgd}}$$

$$PCP_{cwf} = 2.8 \text{ lbs/day}$$

(49 Fed. Reg. 31212) the removal credits provision was again amended. Under the current provision, any POTW seeking removal credit authority is required to demonstrate its removal performance by sampling its influent and effluent and calculating its removal rates based on this data. Removal capability of each POTW, therefore, is to be determined on a case-by-case basis. In addition to the sampling requirements, the provision specified the other prerequisites for obtaining removal credit authority. Only the Approval Authority (either EPA or the State) can grant removal credit authority to a POTW.

4.6 FUNDAMENTALLY DIFFERENT FACTORS VARIANCE

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

This section was the subject of a recent court decision (U.S. Court of Appeals for the Third Circuit) in September of 1983. The Court held that the EPA lacks authority to issue variances to indirect dischargers for toxic pollutants. As a result of the Court's decision, FDF variances can only be granted for non-toxic pollutants. Since the pulp, paper, and paperboard categorical standards contain limits only for toxics, no variance is available for this industry.

4.7 LOCAL LIMITS

Local limits are numerical pollutant concentration or mass-based values that are developed by a POTW for controlling the discharge of conventional, non-conventional or toxic pollutants from indirect sources. They differ from National Categorical Pretreatment Standards in that Categorical Pretreatment Standards are developed by EPA and are based upon the demonstrated performance

of available pollutant control technologies (for specific categorical industries). These national technology-based categorical standards do not consider local environmental criteria or conditions, and are only developed to assure that each industry within a specified category meets a minimum discharge standard which is consistent across the United States for all POTWs. Local limits, on the other hand, are developed to address specific localized impacts on POTWs and their receiving waters. Local limitations are typically designed to protect the POTW from:

- The introduction of pollutants into the POTW which could interfere with its operation
- Pass-through of inadequately treated pollutants which could violate a POTW's NPDES permit or applicable water quality standards
- The contamination of a POTW's sludge which would limit sludge uses or disposal practices.

Local limits, as the name implies, take into consideration the factors that are unique to a specific POTW, whereas categorical pretreatment standards are developed only for a general class of industrial dischargers. Local limits are required under 40 CFR 403.5 and must be developed when it is determined that Categorical Pretreatment Standards are not sufficient to enable the POTW to meet the above three Pretreatment Program objectives.

To assist municipalities in developing defensible and technically sound numerical effluent limitations, EPA has prepared some general guidelines on limit development in its document "Guidance Manual for POTW Pretreatment Program Development." Appendix L of this document lists the general methodology, required formulas and typical environmental criteria used to develop local limits. This manual is available from EPA Regional offices and NPDES States and should be carefully followed when developing local limits. Although a detailed discussion of local limit development is beyond the scope of this document, the general methodology includes the following four steps:

Step 1 - Determine the maximum headworks loading (for each specific pollutant) that will assure that the three fundamental objectives of the pretreatment program are met.

Step 2 - Calculate the allowable loading to the POTW by subtracting the uncontrollable portion of pollutant discharge to the POTW (from domestic, commercial and infiltration/inflow sources) from the total headwork loading value.

Step 3 - Distribute the controllable loading to industrial users through an allocation process.

Step 4 - Derive specific local limits from the allocation results.

The above four step process must be performed for each pollutant which the POTW determines may need a specific local limitation. As a general rule, the limit setting analysis should be performed for all pollutants which are discharged to the POTW in significant quantities. The POTW should identify pollutants of concern through an evaluation of the POTW's industrial waste survey. A procedure for evaluating industrial waste survey results is included in the EPA guidance manual mentioned earlier.

To assist POTWs with the development of local limits EPA has developed a computer program that incorporates the general methodology required to develop local limits and alleviates a substantial amount of the tedious calculations required to develop these limits. This computer program has the following capabilities to aid the POTW in limit development:

- Performs the four-step limit setting analysis on microcomputer or mainframe
- Screens input data provided by the POTW
- Supplements POTW data with "built-in" files containing data on Industrial/Municipal wastewater characteristics, POTW removal rates, and POTW inhibition values
- Allocates controllable pollutant loads using several different methodologies
- Compares calculated local limits to EPA Categorical Standards.

POTWs may obtain information on this computer program by contacting any of the ten EPA Regional offices. Instructions will be provided on how to use the computer program as well as how to access a computer system which supports it.

REFERENCES

PULP, PAPER, AND PAPERBOARD REGULATIONS	Federal Register Notice	
Proposed Regulations	1/06/81	46 FR 1430
Final Regulations Promulgated	11/18/82	47 FR 52006
General Pretreatment Regulations		
40 CFR Part 403	01/28/81	46 FR 9404

Documents		Document No.	
		EPA	NTIS
Guidance Manual for POTW Pretreatment Program Development	October 1983	---	---
Procedures Manual for Reviewing a POTW Pretreatment Program Submission	October 1983	---	---
Final Development Document	October 1982	EPA 440/1-82/025	PB 83-163949

Copies of the technical and economic documents may be obtained from the National Technical Information Services, Springfield, VA. 22161 (703/487-4650). Pretreament Program Manuals may be obtained from U.S. EPA, Permits Division (EN-336), Washington, D.C. 20460

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