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# Preliminary Report: Pulp, Paper, and Paperboard Detailed Study

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Engineering and Analysis Division  
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## ACRONYMS

2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo- <i>p</i> -dioxin
2,3,7,8-TCDF	2,3,7,8-tetrachlorodibenzofuran
AF&PA	American Forest and Paper Association
AOX	Adsorbable Organic Halides.
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BOD <sub>5</sub>	Five-day Biochemical Oxygen Demand
BPK	Bleached Papergrade Kraft
BPT	Best Practicable Control Technology
CDD	Chlorinated Dibenzo- <i>p</i> -Dioxins
CDF	Chlorinated Dibenzofurans
CFR	Code of Federal Regulations
COD	Chemical Oxygen Demand
CTMP	Chemi-Thermo-Mechanical Pulp
CWA	Clean Water Act
DCN	Document Control Number
DMR	Discharge Monitoring Reports
ECF	Elemental Chlorine-Free
EDS	Effluent Data Statistics
ELGs	Effluent Limitations Guidelines and Standards
EPA	U.S. Environmental Protection Agency
FR	Federal Register
ML	Minimum Level
NAICS	North American Industry Classification System
NCASI	National Council of the Paper Industry for Air and Stream Improvement, Inc.
NESHAP	National Emission Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
PAC	Polycyclic Aromatic Compounds
PAH	Polycyclic Aromatic Hydrocarbons
PCS	Permit Compliance System
pH	Negative logarithm of the effective hydrogen-ion concentration in moles per liter, a measure of acidity
POTW	Publicly Owned Treatment Works
PS	Papergrade Sulfite
PSES	Pretreatment Standards for Existing Sources
PSNS	Pretreatment Standards for New Sources
SIC	Standard Industrial Classification
TCF	Totally Chlorine-Free
TMP	Thermo-Mechanical Pulp
TRI	Toxics Release Inventory
TWPE	Toxic-Weighted Pound Equivalents
TWFs	Toxic Weighting Factors
VATIP	Voluntary Advanced Technology Incentives Program



## GLOSSARY

**2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) and 2,3,7,8-tetrachlorodibenzofuran (2,3,7,8-TCDF)** - Two CDD and CDF congeners with chlorine substitution of hydrogen atoms at the 2, 3, 7, and 8 positions on the benzene rings. EPA promulgated 1998 Cluster Rules which included ELGs for these two congeners. Because of the ELGs, most pulp and paper mills are typically required to monitor for 2,3,7,8-TCDD and 2,3,7,8-TCDF and these monitoring results are compiled in EPA's Permit Compliance System.

**Adsorbable Organic Halides (AOX)** - A bulk parameter that measures the total mass of chlorinated organic matter in water and wastewater.

**American Forest and Paper Association (AF&PA)** - The national trade association of the forest, pulp, paper, paperboard and wood products industry. AF&PA represent member companies engaged in growing, harvesting and processing wood and wood fiber, manufacturing pulp, paper and paperboard products from both virgin and recycled fiber, and producing engineered and traditional wood products.

**Bleach plant** - All process equipment used for bleaching beginning with the first application of bleaching agents (e.g., chlorine, chlorine dioxide, ozone, sodium or calcium hypochlorite, or peroxide), each subsequent extraction stage, and each subsequent stage where bleaching agents are applied to the pulp. For mills in Subpart E producing specialty grades of pulp, the bleach plant includes process equipment used for the hydrolysis or extraction stages prior to the first application of bleaching agents. Process equipment used for oxygen delignification prior to the application of bleaching agents is not part of the bleach plant.

**Bleach plant effluent** - The total discharge of process wastewaters from the bleach plant from each physical bleach line operated at the mill, comprising separate acid and alkaline filtrates or the combination thereof.

**Bleached pulp** - Pulp that has been purified or whitened by chemical treatment to alter or remove coloring matter and has taken on a higher brightness characteristic.

**Bleaching** - The process of further delignifying and whitening pulp by chemically treating it to alter the coloring matter and to impart a higher brightness.

**Bleaching chemicals** - A variety of chemicals used in the bleaching of pulp such as chlorine ( $\text{Cl}_2$ ), sodium hypochlorite ( $\text{NaOCl}$ ), calcium hypochlorite ( $\text{Ca}(\text{OCl})_2$ ), chlorine dioxide ( $\text{ClO}_2$ ), peroxide ( $\text{H}_2\text{O}_2$ ), oxygen ( $\text{O}_2$ ), ozone ( $\text{O}_3$ ), and others. Also referred to as bleaching chemical.

**Conventional pollutants** - The pollutants identified in Section 304(a)(4) of the CWA and the regulations thereunder (biochemical oxygen demand ( $\text{BOD}_5$ ), total suspended solids (TSS), oil and grease, fecal coliform, and pH).

**Cluster Rules** - The Cluster Rules apply to mills with operations subject to 40 CFR Part 430 Subpart B, Bleached Papergrade Kraft and Soda, and Subpart E, Papergrade Sulfite. The Cluster

## GLOSSARY (Continued)

Rules regulate toxic and nonconventional pollutants that are characteristic of mills that bleach chemical pulp with chlorine-containing compounds. These pollutants include adsorbable organic halides (AOX), chloroform, TCDD, TCDF, and 12 chlorinated phenolic compounds.

**Deinked Pulp** - Fiber reclaimed from wastepaper by removing ink, coloring materials, and fillers.

**Dioxin and Dioxin-like Compounds** - The 17 CDDs and CDFs compounds (called congeners) which include chlorine substitution of hydrogen atoms at the 2, 3, 7, and 8 positions on the benzene rings. The 17 congeners are referred to as 'dioxin-like,' because of the similar chemical structure, similar physical-chemical properties, and invoke a common battery of toxic responses, though the toxicity of the congeners varies greatly. The TRI method of reporting requires that facilities report the total mass of all 17 congeners.

**Direct discharger** - A facility that discharges or may discharge treated or untreated process wastewaters, non-contact cooling waters, or non-process wastewaters (including stormwater runoff) into waters of the United States.

**Discharge Monitoring Reports (DMRs)** - Compliance reports required by NPDES permits. Facilities with major discharges are required to monitor their discharges and submit monitoring reports to their permitting authority at a frequency specified by the permit.

**Effluent Data Statistics (EDS)** - An EPA mainframe computer program that calculates facility annual pollutant loads (kg/year) using compliance monitoring data reported in PCS.

**Effluent limitation** - Any restriction, including schedules of compliance, established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean.

**Effluent limitations guidelines and standards (ELGs)** - Categorical regulations developed by EPA as required by the Clean Water Act.

**Elemental chlorine-free (ECF)** - Any process for bleaching pulps in the absence of elemental chlorine and hypochlorite that uses chlorine dioxide as the only chlorine-containing bleaching agent.

**Fiber line** - A series of operations employed to convert wood or other fibrous raw material into pulp. If the final product is bleached pulp, the fiber line encompasses pulping, de-knotting, brownstock washing, pulp screening, centrifugal cleaning, and multiple bleaching and washing stages.

**Final effluent** - Pulp or paper mill wastewater discharges to receiving waters including streams, lakes, and other waters of the U.S.

## GLOSSARY (Continued)

**Indirect discharger** - A facility that discharges or may discharge wastewaters into a publicly owned treatment works or a treatment works not owned by the discharging facility.

**Integrated mill** - A mill that produces pulp and may use none, some, or all of that pulp (often in combination with purchased pulp) to produce paper or paperboard products.

**Kraft process** - Sulfate chemical pulping process.

**Mechanical pulp** - Pulp produced by reducing pulpwood logs and chips into their fiber components by the use of mechanical energy (at CMP or CTMP mills, also with the use of chemicals or heat), via grinding stones or refiners.

**Minimum level (ML)** - The level at which the analytical system gives recognizable signals and an acceptable calibration point. The MLs for pollutants regulated by the Cluster Rules are specified in 40 CFR 430.01(i).

**North American Industry Classification System (NAICS)** - A system for classifying economic activity developed jointly by the U.S., Canada, and Mexico.

**National Council of the Paper Industry for Air and Stream Improvement, Inc (NCASI)** - An independent, non-profit research institute that focuses on environmental topics of interest to the forest products industry. NCASI is a source of data on environmental issues affecting this industry, and has more than 75 member companies throughout the US and Canada.

**Nonconventional pollutants** - Pollutants that are neither conventional pollutants nor priority pollutants (see 40 CFR Section 401.15 and Part 423, Appendix A).

**National Pollutant Discharge Elimination System (NPDES)** - The NPDES program is authorized by the Clean Water Act and requires permits for the discharge of pollutants from any point source into waters of the United States.

**Outfall** - The mouth of conduit drains and other conduits from which a mill effluent discharges into receiving waters.

**Picograms (pg)** - one trillionth ( $10^{-12}$ ) of a gram. One pg/liter is equivalent to one part per quadrillion (ppq).

**Polycyclic Aromatic Compounds (PAC)** - Sometimes known as polycyclic aromatic hydrocarbons (PAHs), are a class of organic compounds consisting of two or more fused aromatic rings.

**PCSLoads2002** - A Microsoft Access™ database in which EPA has compiled data taken from PCS, the calculated TWPE, and the relationship between SIC codes and regulatory categories.

## GLOSSARY (Continued)

**Permit Compliance System (PCS)** - An EPA mainframe database created by EPA to track permit, compliance, and enforcement status of facilities regulated by the National Pollutant Discharge Elimination System (NPDES) program under the CWA.

**Peroxide** - A short name for hydrogen peroxide ( $H_2O_2$ ) or sodium peroxide ( $Na_2O_2$ ).

**Polychlorinated dibenzo-p-dioxins (CDDs) and polychlorinated dibenzofurans (CDFs)** - CDDs and CDFs constitute a group of persistent, bioaccumulative, and toxic chemicals. Facilities are required to report to EPA's TRI the total mass of 17 of these CDDs and CDFs released to the environment every year. The 17 compounds (called congeners) are referred to as 'dioxin-like,' because they have similar chemical structure, similar physical-chemical properties, and invoke a common battery of toxic responses, though the toxicity of the congeners varies greatly.

**Pretreatment standard** - A regulation addressing industrial wastewater effluent quality required for discharge to a POTW.

**Process wastewater** - For the effluent guidelines for Subparts B and E of the Pulp, Paper, and Paperboard Category (40 CFR Part 430), process water is any water that, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. For purposes of Subparts B and E, process wastewater includes boiler blowdown; wastewaters from water treatment and other utility operations; blowdowns from high rate (e.g., greater than 98 percent) recycled non-contact cooling water systems to the extent they are mixed and co-treated with other process wastewaters; wastewater, including leachates, from landfills owned by pulp and paper mills subject to Subparts B or E if the wastewater is commingled with wastewater from the mill's manufacturing or processing facility; and storm waters from the immediate process areas to the extent they are mixed and co-treated with other process wastewaters. Contaminated groundwaters from on-site or off-site groundwater remediation projects are not process wastewater.

**Process water** - Water used to dilute, wash, or carry raw materials, pulp, and any other materials used in the manufacturing process.

**Pretreatment Standards for Existing Sources (PSES)** - categorical regulations for indirect dischargers designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs, including sludge disposal methods at POTWs.

**Pulp and Paper Category, Phase I** - When EPA revised 40 CFR Part 430 in 1998, it reorganized the category into 12 subcategories and promulgated new ELGs for two subcategories, Subpart B (Bleached Papergrade Kraft and Soda) and Subpart E (Papergrade Sulfite). Subparts B and E became known as Phase I; EPA promulgated revised ELGs for these subparts April 15, 1998 (63 FR 18504; April 15, 1998).

## GLOSSARY (Continued)

**Pulp and Paper Category, Phase II** - EPA planned to promulgate ELGs for the Phase II subcategories (Subparts C and F through L) after promulgating the final rules for the Phase I subcategories.

**Pulp and Paper Category, Phase III** - The two dissolving pulp subcategories (Subpart A, Dissolving Kraft, and Subpart D, Dissolving Sulfite).

**Pulp bleaching** - The process of further delignifying and whitening pulp by chemically treating it to alter the coloring matter and to impart a higher brightness.

**Secondary fiber** - Furnish consisting of recovered material. Secondary fiber includes recycled paper or paperboard known commonly as "post-consumer" recycled material. The term secondary fiber is used both for the raw material (wastepaper, old corrugated containers, etc.) and the pulp produced from the wastepaper and board.

**Standard Industrial Classification (SIC)** - A system for classifying economic activity developed by the Office of Management and Budget and used by other government agencies, including EPA, to promote data comparability. In the SIC system, each establishment is classified according to its primary economic activity, which is determined by its principal product or group of products. An establishment may have activities in more than one SIC code.

**Soda process** - A chemical pulping process that consists of the reduction of chips to their individual fiber components by use of cooking liquor made up of caustic soda (NaOH) solution, the recovery and preparation of this liquor, or the treatment of pulp and paper produced from it.

**Sulfite process** - An acid pulp manufacturing process in which chips are reduced to their component parts by cooking (digesting) in a pressurized vessel using a liquor of calcium, sodium, magnesium or ammonia salts of sulfurous acid.

**Totally chlorine-free (TCF) bleaching** - Pulp bleaching operations that are performed without the use of chlorine, sodium hypochlorite, calcium hypochlorite, chlorine dioxide, chlorine monoxide, or any other chlorine-containing compound.

**Toxics Release Inventory (TRI)** - TRI is the common name for Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA). Each year, facilities that meet certain thresholds must report their releases and other waste management activities for listed toxic chemicals. That is, facilities must report the quantities of toxic chemicals recycled, collected and combusted for energy recovery, treated for destruction, or disposed of. A separate report must be filed for each chemical that exceeds the reporting threshold. EPA compiles the reported information into a publicly-available database known as the Toxics Release Inventory.

**Toxic-weighted pound equivalents (TWPE)** - Multiplying the pounds of pollutants discharged by chemical-specific toxic weighting factors results in an estimate of toxic-weighted pound equivalents (TWPE).

## GLOSSARY (Continued)

**Toxic weighting factors (TWFs)** - Weighting factors that reflect both aquatic life and human health effects and were developed by Office of Water/Engineering and Analysis Division (EAD) for use in regulatory development.

**TRIRelases2002** - A Microsoft Access™ database in which EPA has compiled data taken from TRI, the adjusted releases from POTWs to surface waters, the calculated TWPE, and the relationship between SIC codes and regulatory categories.

**Unbleached pulp** - Pulp that has not been treated in a bleaching process.

**Voluntary Advanced Technology Incentives Program (VATIP)** - The program established under 40 CFR Part 430.24(b) (for existing direct dischargers) and 40 CFR Part 430.25(c) (for new direct dischargers) whereby participating mills agree to accept enforceable effluent limitations and conditions in their NPDES permits that are more stringent than the “baseline BAT limitations or NSPS” that would otherwise apply, in exchange for regulatory- and enforcement-related rewards and incentives.

**Wastewater** - Water carrying waste materials from a facility. It is a mixture of water, and dissolved and suspended pollutants.

## 1.0 INTRODUCTION

Section 304(b) of the Clean Water Act requires EPA to annually review and, if appropriate, revise its technology-based regulations, called “effluent limitations guidelines and standards” or “effluent guidelines.” These guidelines limit the discharge of pollutants to waters of the United States from various categories of industrial facilities. Every other year, Section 304(m) of the Clean Water Act requires EPA to publish a plan establishing a schedule for the annual review and revision of effluent guidelines required by Section 304(b). EPA last published an Effluent Guidelines Program Plan in 2004 (64 FR; 53705; September 2, 2004).

During its 2005 screening-level analysis of discharges from categories with existing regulations, EPA determined that the Pulp, Paper, and Paperboard Point Source Category ranked higher than any other category in discharges of toxic and nonconventional pollutants<sup>1</sup>. For more information on the development of the category ranking see the *2005 Screening-Level Analysis Report* [1]. Because of these findings, EPA is conducting a more detailed study of this category. During this study, EPA will first verify that the pollutant discharges reported to PCS and TRI for 2002 accurately reflect the current discharges of the industry. EPA will also perform an in-depth analysis of the reported pollutant discharges, and as appropriate, will review technology innovation and process changes including a preliminary assessment of technology cost and affordability. Additionally, EPA will consider whether there are industrial sectors not currently subject to effluent guidelines or pretreatment standards that should be considered potential new subcategories of this category. The purpose of the detailed study is to determine whether it would be appropriate for EPA to revise the existing effluent guidelines. EPA’s decision to conduct a detailed study on this category does not mean that EPA is required to revise its regulations for this category. EPA will make such a decision as part of the final 2006 Effluent Guidelines Program Plan.

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<sup>1</sup>One mill accounted for more than 99% of 2,3,7,8-tetrachlorodibenzo-p-dioxin discharges tallied in EPA’s Permit Compliance System (PCS) for this industrial category in 2002. With or without these discharges from this one mill, this category ranks higher than any other category in terms of the estimated combined 2002 toxic discharges from EPA’s Toxic Release Inventory (TRI) and PCS databases. See Section 3.3 for more discussion of this mill’s discharges.

## 1.1 Industry Description

Mills that manufacture pulp, paper, or paperboard are generally classified under three Standard Industrial Classification (SIC) codes that identify their principal product or group of products. The three SIC codes assigned to the Pulp, Paper, and Paperboard Point Source Category (hereafter, the Pulp and Paper Category) are:

- SIC Code 2611 - Pulp Mills: Establishments primarily engaged in manufacturing pulp from wood or from other materials, such as rags, linters, wastepaper, and straw.
- SIC Code 2621 - Paper Mills: Establishments primarily engaged in manufacturing paper from wood pulp and other fiber pulp, and which may also manufacture converted paper products.
- SIC Code 2631 - Paperboard Mills: Establishments primarily engaged in manufacturing paperboard, including paperboard coated on the paperboard machine, from wood pulp and other fiber pulp; and which may also manufacture converted paperboard products.

A mill may have activities in one or more SIC code. For example, integrated mills make pulp from wood or other raw materials (SIC code 2611). They then use this pulp to make paper (SIC code 2621) and/or paperboard (SIC code 2631). Thus, an integrated mill's primary product may be paper, but it also manufactures pulp. The pulp manufacturing operations are likely to be the major source of wastewater pollutants. A non-integrated mill does not make pulp, but purchases pulp to make paper or paperboard.

Table 1-1 lists the three SIC codes assigned to the Pulp and Paper Category and eight SIC codes for facilities that make products from paper or paperboard. EPA is considering including operations of these eight additional SIC codes as potential new subcategories of the Pulp and Paper Category. See Section 5.3 of the *2005 Screening-Level Analysis Report* [1].

Table 1-1 also lists the North American Industrial Classification System (NAICS) codes that apply to the pulp and paper industry. The U.S. Economic Census reports data by the NAICS code. However, the wastewater discharge information in EPA's TRI and PCS databases



is organized by SIC code. For this reason, to compare the number of facilities enumerated by the census to the number of facilities in the EPA databases, the NAICS data in Table 1-1 have been converted to the equivalent SIC code. Note that SIC codes 2621, 2671, and 2679 do not translate directly to individual NAICS codes.

**Table 1-1. Number of Pulp and Paper Facilities**

SIC Code	NAICS Code	Point Source Category	2002 U.S. Economic Census	2002 TRI <sup>1</sup>	2002 PCS <sup>2</sup>	
					Major	Minor
2611	3221-10	Pulp Mills	32	76	88	9
2621	3221-21, 3221-22	Paper Mills	329	151	120	21
2631	3221-30	Paperboard Mills	199	101	44	10
			<b>560</b>	<b>328</b>	<b>252</b>	<b>40</b>
<b>Potential New Subcategories</b>						
2653	3222-11	Corrugated and Solid Fiber Boxes	1,719	16		6
2655	3222-14	Fiber Cans, Tubes, Drums, and Similar Products	261	2		
2656	3222-15	Sanitary Food Containers, Except Folding	72	4		4
2657	3222-12	Folding Paperboard Boxes, Including Sanitary	490	7		1
2671	3222-21, 326112	Packaging Paper and Plastics Film, Coated and Laminated	391	50		10
2672	3222-22	Coated and Laminated Paper, Not Elsewhere Classified	541	90		2
2674	3222-24	Uncoated Paper and Multiwall Bags	123	1		
2679	3222-31, 3222-99	Converted Paper and Paperboard Products, Not Elsewhere Classified	869	11		4
			<b>4,466</b>	<b>181</b>	<b>0</b>	<b>27</b>

Source: U.S. Economic Census, 2002; *TRIReleases2002*; *PCSLoads2002*.

<sup>1</sup>Releases to any media.

<sup>2</sup>PCS is divided into major and minor dischargers.

As shown in Table 1-1, more facilities are identified as SIC code 2611 (pulp mills) in EPA's TRI and PCS databases than are counted in the census as establishments primarily engaged in manufacturing pulp. For the census, facilities are assigned to an SIC code based on the revenues from products sold. For TRI, facilities identify the SIC codes that are the

source of their toxic releases. For PCS, permitting authorities identify the SIC code that is the sources of wastewater discharges. Many mills manufacture pulp but use it on site to make paper instead of selling it on the market. Also, pulping operations generate more pollutant loads than paper and paperboard manufacturing operations. For these reasons, the number of facilities identified as pulp mills in EPA's databases is greater than the number of pulp mills counted by the census .

Table 1-1 also shows that EPA's databases have information for more facilities in the three SIC codes assigned to the Pulp and Paper Category than they do for the eight SIC codes that are potential new subcategories. More than 50% of the facilities counted by the census for the three SIC codes assigned to the Pulp and Paper Category have data in EPA's databases compared to less than 5% of facilities in the eight SIC codes that are potential new subcategories.

## **1.2 Regulatory Background**

Between 1974 and 1986, EPA promulgated effluent limitations guidelines and standards (ELGs) for the Pulp and Paper Category. For these regulations, EPA divided the industry into 25 subcategories, based on the products made and processes used at the mills.

A 1988 legal suit obligated EPA to address discharges of polychlorinated dibenzo-(p)-dioxins and polychlorinated dibenzofurans<sup>2</sup> from 104 bleaching pulp mills, including nine dissolving pulp mills. While meeting that obligation, EPA also reviewed ELGs for the entire Pulp and Paper Category. As part of that review, EPA reorganized the category into 12 subcategories. Although the Pulp and Paper Category regulations apply to all facilities in SIC codes 2611, 2621, and 2631, the 12 subcategories are organized by process used and product produced and do not correspond to SIC codes.

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<sup>2</sup>Polychlorinated dibenzo-p-dioxins (CDDs) and polychlorinated dibenzofurans (CDFs) constitute a group of persistent, bioaccumulative, and toxic chemicals. Facilities are required to report to EPA's TRI the total mass of 17 of these CDDs and CDFs released to the environment every year. In this report, EPA uses the term "dioxins" to refer to the total mass of the 17 CDDs and CDFs, as reported to TRI.

For discharges from certain mills in the Pulp and Paper Category, EPA promulgated ELGs for two specific dioxins: 2,3,7,8-tetrachlorodibenzo-p-dioxin and 2,3,7,8-tetrachlorodibenzofuran. In this report, these compounds are referred to as TCDD and TCDF, respectively. See Section 3.1 of this report for a discussion of dioxins.

During its response to the 1988 legal suit, EPA decided to review and revise the Pulp and Paper Category regulations in three phases. Table 1-2 presents these three phases and the subcategories EPA planned to address in each phase.

**Table 1-2. Relationship Between Pulp and Paper Regulatory Phases and Subcategories**

Phase	Subpart	Subcategory
I	B	Bleached Papergrade Kraft and Soda
I	E	Papergrade Sulfite
II	C	Unbleached Kraft
II	F	Semi-Chemical
II	G	Groundwood, Chemi-Mechanical, and Chemi-Thermo-Mechanical
II	H	Non-Wood Chemical Pulp
II	I	Secondary Fiber Deink
II	J	Secondary Fiber Non-Deink
II	K	Fine and Lightweight Papers from Purchased Pulp
II	L	Tissue, Filter, Non-Woven and Paperboard from Purchased Pulp
III	A	Dissolving Kraft
III	D	Dissolving Sulfite

Note: EPA promulgated revised ELGs for Phase I, known as the Cluster Rules, April 15, 1998. EPA has not promulgated revised ELGs for Phase II or Phase III.

In revising the Pulp and Paper Category regulations, EPA first addressed two subcategories, Subpart B (Bleached Papergrade Kraft and Soda) and Subpart E (Papergrade Sulfite), because these subparts applied to the majority of the 104 mills identified in the 1988 suit. Subparts B and E became known as Phase I; EPA promulgated revised ELGs for these subparts April 15, 1998 (63 FR 18504; April 15, 1998). EPA promulgated the Phase I ELGs at the same time it promulgated National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for kraft and sulfite pulp mills. Because these water and air regulations were developed, analyzed, and promulgated jointly, they are called the Cluster Rules.

Eight subcategories are known as Phase II and are listed in Table 1-2. EPA has not revised the ELGs for these subcategories which were promulgated between 1974 and 1986.

Phase III affected the two dissolving pulp subcategories (Subpart A, Dissolving Kraft, and Subpart D, Dissolving Sulfite). EPA did not promulgate revised ELGs addressing TCDD and TCDF for Phase III in 1998, because the affected companies were undertaking a multiyear laboratory study and mill trial to develop alternative bleaching technologies. EPA anticipated that final ELGs would be based on different technologies than those that served as the basis for the Phase I regulations. As of August 2004, there were only four operating mills in these two subcategories. As part of its 2004 Effluent Guidelines Program Plan, EPA determined that rather than promulgate revised ELGs for Phase III mills, EPA would support NPDES permit writers individually in developing permit-specific effluent limitations to control TCDD and TCDF releases from these four mills.

### **1.3 Detailed Study Scope**

EPA decided to conduct a detailed study of the Pulp and Paper Category because it ranked highest among all point source categories for toxic and nonconventional pollutant discharges in the *2005 Screening-Level Analysis Report* [1]. Only Phase I and Phase II mills are the subject of this study because, as noted above, EPA previously determined that it would not promulgate revised ELGs for Phase III mills.

This study will focus, in part, on determining how the 1998 Cluster Rules have been implemented and their effect on mill discharges. Because the Cluster Rules apply to Phase I mills, but not to Phase II mills, the regulatory implementation part of the detailed study addresses only Phase I mills. As an additional focus, this study will investigate the non-bleaching sources of toxic pollutants discharged from pulp and paper mills. These pollutants include dioxins, polycyclic aromatic compounds (PACs), metals, ammonia, and possibly others, that are discharged from Phase I and Phase II mills.

EPA's detailed study plan identified key questions the detailed study will seek to answer [2]. These questions include:

- Have the Cluster Rules been incorporated into NPDES permits for Phase I mills?

- Are Phase I mills in compliance with the Cluster Rules?
- Are TCDD and TCDF present in bleach plant effluents? Are TCDD, TCDF, or other dioxin congeners discharged from non-bleaching pulp and paper mills? If so, what is the source of these discharges?
- What are the sources of other toxic pollutants (PACs, metals, ammonia, and possibly others) discharged from pulp and paper mills?
- To what extent are facilities reporting wastewater discharges of toxic chemicals to TRI? How are mills estimating their TRI-reported discharges?

#### **1.4 Detailed Study Status**

This report describes the status of EPA's detailed study of the Pulp and Paper Category (hereafter, pulp and paper detailed study) as of July 2005. EPA has made progress in verifying TRI- and PCS-reported discharges and has collected Phase I mill NPDES permits with the help of the trade association and industry. EPA is in the process of verifying that Cluster Rules guidelines have been incorporated into permits and that Phase I mills are in compliance with their Cluster Rules-based permit limits. EPA is continuing to collect information from individual facilities and NPDES permit writers and is beginning to review published technical information to understand potential pollutant sources and control alternatives.

This report presents the preliminary results of EPA's detailed study and details EPA's request for additional information to support its completion of the study. This report is organized in the following sections:

- Section 2.0: Data Sources;
- Section 3.0: Pulp and Paper Category Wastewater Pollutants;
- Section 4.0: Cluster Rule Implementation and Impact;
- Section 5.0: Review of TRI Data; and
- Section 6.0: Next Steps.

## **2.0 DATA SOURCES**

This section describes the data sources used for the pulp and paper detailed study as well as potential data quality limitations. Specific data sources used for this investigation include readily available information from EPA's TRI and PCS databases, pulp and paper mill National Pollutant Discharge Elimination System (NPDES) permits and related fact sheets, and information provided by two industry groups, the American Forest and Paper Association (AF&PA) and the National Council for Air and Stream Improvement (NCASI). AF&PA is the national trade association of the forest, pulp, paper, paperboard, and wood products industry. NCASI is an independent, nonprofit research institute funded by the forest products industry, including pulp and paper companies, many of which are also members of AF&PA.

The data sources used to date by EPA for the detailed study are described in the following subsections:

- Section 2.1: PCS;
- Section 2.2: TRI;
- Section 2.3: NPDES Permits; and
- Section 2.4: Information Provided by Industry and Trade Associations.

### **2.1 PCS**

For its 2005 screening-level analysis, EPA used discharge monitoring data compiled in PCS to evaluate current mill discharges. PCS was created by EPA's Office of Enforcement and Compliance Assurance to track permit, compliance, and enforcement status of facilities regulated by the NPDES program under the Clean Water Act. This system contains only permit-required monitoring data for direct-discharging facilities. As required by their permits, mills file Discharge Monitoring Reports (DMRs) with the state once a month (or at other specified frequencies). Each mill's NPDES permit specifies the pollutants to monitor and at what frequency. Pulp and paper mills that discharge to a publicly owned treatment works (POTW) or that transfer their wastewater to a private waste treater do not submit DMRs;

therefore, their data are not included in PCS. In addition, PCS typically does not include data for mills that states classify as “minor sources.”

EPA used a mainframe computer program, the Effluent Data Statistics (EDS) system, to calculate annual loads from facility DMRs. EPA estimated the toxicity of these calculated annual loads using toxic weighting factors (TWF) to calculate toxic-weighted pound equivalents (TWPE) [3] [4]. EPA multiplied the EDS-calculated annual loads by the chemical-specific TWFs to calculate the TWPE, and compiled the EDS output data, TWFs, and related information into a Microsoft Access™ database called *PCSLoads2002*. For the 2005 analysis, EPA used 2002 discharge data to be consistent with the TRI 2002 discharge data that are also used, the most recent data available from TRI at the start of the 2005 screening-level analyses. The development of the *PCSLoads2002* database and its output are described in EPA’s *2005 Screening-Level Analysis Report* [1]. Section 3.0 of this detailed study report presents the pollutant loads calculated for the Pulp and Paper Category.

The EDS mainframe computer program decision logic translates monitoring results reported as less than a detection limit (e.g., <10 pg/L) to zero lb/yr if the pollutant was never detected at the monitoring location in 2002, or an estimated mass (lb/yr) if the pollutant was detected at least once at the monitoring location in 2002. These annual load results did not provide sufficient detail to determine if Phase I mills are in compliance with their Cluster Rules-based permits. To more accurately quantify periodic monitoring results, EPA retrieved DMR-reported concentration data (after they had been converted to consistent units of measure by EDS) for all Phase I mills for 1998 through 2004.

The following activities supported EPA’s analysis of data reported to PCS:

- NCASI contacted certain facilities to discuss reported discharges and submitted findings to EPA; and
- EPA determined the operating status and rulemaking phase of facilities with data in PCS.

### *Utility and Limitations of PCS Data*

The data collected in PCS are particularly useful for the pulp and paper detailed study for the following reasons:

- PCS is national in scope, including data from all 50 states and U.S. territories; and
- Discharge reports included in PCS are based on metered flows and effluent chemical analyses and indicate if the monitored pollutants were present in concentrations above the method detection limits.

Limitations of the pulp and paper data collected in PCS include the following:

- Some states do not submit all DMR data to PCS, or do not submit the data in a timely fashion. For example, Washington State receives internal monitoring data from mills and examines the data for compliance, but does not submit the data to PCS.
- Because of the structure of the PCS database, EPA could not always identify which monitoring points represent bleach plant effluent, final effluent, or other types of discharges

Despite these limitations, EPA determined that the data summarized in *PCSLoads2002* and the PCS monthly data were usable for the detailed study review of the Pulp and Paper Category.

## **2.2 TRI**

EPA used data reported to TRI to estimate the mass of pollutants discharged by industry categories. Using the same methodology used with calculated PCS loads, EPA estimated the toxicity of these discharges using TWFs to calculate TWPE, and compiled the TRI data, TWFs, and related information into a Microsoft Access™ database called *TRIReleases2002*. For the 2005 analysis, EPA used 2002 discharge data, because they were the most recent data available from TRI when the analysis began. The development of this database



and its output are described in EPA's *2005 Screening-Level Analysis Report* [1]. Section 3.0 of this detailed study report presents the pollutant loads calculated for the Pulp and Paper Category.

As part of this detailed study, EPA verified TRI data, particularly for those facilities and pollutants with high TWPE. Facilities may estimate releases in a number of ways when reporting to TRI. If a chemical is not detected in the effluent, facilities may estimate the discharge by using one-half of the detection limit.

To verify the data reported to TRI, EPA:

- Contacted certain facilities to discuss reported discharges;
- Reviewed data submitted by NCASI; and
- Identified the operating status and rulemaking phase of facilities reporting to TRI.

#### *Utility and Limitations of TRI Data*

The data collected in TRI are particularly useful as a starting point for the detailed study for the following reasons:

- TRI includes data from all 50 states and U.S. territories;
- TRI includes releases to POTWs, not just direct discharges; and
- TRI includes releases of many chemicals, not just those limited in mill discharge permits.

Limitations of the data collected in TRI include the following:

- Small establishments (less than 10 employees) are not required to report, nor are facilities that don't meet the reporting thresholds. EPA expects that pulp and paper mills in all three regulatory phases meet the facility size reporting threshold.

- Release reports are, in part, based on estimates, not measurements, and, due to TRI guidance, may overstate releases.
- Certain chemicals (PACs, dioxin and dioxin-like compounds, metal compounds) are reported as a class, not as individual compounds. Because the individual compounds in the class have widely varying toxic effects, the potential toxicity of chemical releases can be inaccurately estimated.

Despite these limitations, EPA determined that the data summarized in *TRIReleases2002* were useful for identifying pollutants of concern to examine further in the pulp and paper detailed study.

### **2.3            NPDES Permits**

One of the purposes of this detailed study is to evaluate how well the Cluster Rules have been incorporated into permits issued after 1998. EPA collected permits for currently operating Phase I mills and selected POTWs. POTWs receiving wastewater from Phase I mills may include effluent discharge limits that are similar to mill limits. Table 2-1 shows the number of permits collected.

**Table 2-1. Phase I Mill NPDES Permits Collected**

	<b>Phase I Bleached Papergrade Kraft Mills</b>	<b>Phase I Papergrade Sulfite Mills</b>	<b>POTWs Receiving Phase I Mill Wastewater</b>
<b>Number of Mills</b>			
At promulgation (1998)	84	11	10
Idle or no longer in Phase I, as of 2004	12	5	5
Operational in 2004	72	6	5
<b>Number of Permits Collected</b>			
Industry provided	48 <sup>a</sup>	3 <sup>b</sup>	0
EPA collected	16	3	4 <sup>c</sup>
Total collected	64	6	4 <sup>c</sup>
Missing as of July 2005	7 <sup>d</sup>	0	1

<sup>a</sup>Includes two permits that cover two mills: two Parsons & Whittemore mills (Alabama Pine Pulp and Alabama River Pulp) in Claiborne, AL, both bleached papergrade kraft mills, share a single permit; and two Domtar mills (Nekoosa - a bleached papergrade kraft mill and Port Edwards - a papergrade sulfite mill) share a permit. Includes one other permit shared by the Boise Cascade mill and the City of St. Helens POTW.

<sup>b</sup>Includes a permit shared by two Domtar mills (Nekoosa - a bleached papergrade kraft mill and Port Edwards - a papergrade sulfite mill).

<sup>c</sup>Includes one permit that both the Boise Cascade mill and the City of St. Helens POTW share.

<sup>d</sup>EPA identified a total of 71 (64 + 71) permits for 72 bleached kraft mills, because the Alabama Pine Pulp and Alabama River Pulp mills in Claiborne, share a single permit. EPA received 5 of the 7 missing permits in July 2005. Because of the late arrival of these permits, EPA did not include their analysis in this report.

AF&PA and its member companies provided the majority of the permits. EPA contacted state permitting authorities to obtain permits not readily available on the Internet and not provided by AF&PA. As of July 2005, EPA had requested, but not received, permits for seven mills and one POTW, listed in Table 2-2. After July 2005, EPA received an additional five permits. EPA's analysis of these additional permits is not included in this preliminary report, but will be included in the final report of this study.

**Table 2-2. NPDES Permits Requested, But Not Received by July 2005**

Mill	Permit NPDES Number	POTW Receiving Phase I Mill Wastewater	POTW Permit NPDES
Fraser Paper, Berlin <sup>a</sup>	NH0000655	-	-
Tembec, St. Francisville <sup>a</sup>	LA0003468	-	-
S.D. Warren (SAPPI), Muskegon <sup>a</sup>	MI0001210	Muskegon County Wastewater Management System	MI0027391
Lincoln Pulp & Paper Co., Lincoln,	ME0002003	-	-
Koch Industries, New Augusta <sup>a</sup>	MS0031704	-	-
Weyerhaeuser Co., Hawesville <sup>a</sup>	KY0001716	-	-
Container Corp. of America, Brewton	AL0002682	-	-
POTW Name	Permit NPDES	Mill Discharging to the POTW	Mill NPDES
Bay County Wastewater Treatment Plant, Panama City	FL0002631	Smurfit Stone Container	FLR05B551

<sup>a</sup>Collected after July 2005; will be evaluated for the 2006 Plan.

## 2.4 Information Provided by Industry and Trade Associations

EPA met with representatives from AF&PA and NCASI on April 5, 2005. Prior to the meeting, EPA sent both parties the results from its preliminary screening-level analysis of 2002 discharge data (*PCSLoads2002* and *TRIRelases2002*) and a list of questions concerning mill operating status, the incorporation of 1998 effluent guidelines, data estimation techniques, and pollutant sources. Questions and topics discussed during the meeting included explanations of screening-level review of discharge data [5].

EPA asked AF&PA and NCASI to provide information supporting the TRI-reported PACs and dioxins releases. NCASI contacted representatives from 19 mills to discuss their basis for TRI reporting, and provided this information to EPA. NCASI also provided information on nine mills reporting to PCS. In addition, NCASI also provided EPA with excerpts from a guidance document available to its members, its *Handbook of Chemical-Specific Information for SARA Section 313 Form R Reporting* [6].

### 3.0 PULP AND PAPER CATEGORY WASTEWATER POLLUTANTS

As discussed in Sections 2.1 and 2.2, EPA used its *TRIRelases2002* and *PCSLoads2002* databases to conduct a screening-level analysis of industry discharge data [1]. As it began the screening-level analysis, EPA found that the toxic and nonconventional pollutant loadings were driven by two groups of pollutants: dioxins and polycyclic aromatic compounds (PACs).

This section discusses EPA's findings on the Pulp and Paper Category in the following subsections:

- Section 3.1: Dioxins;
- Section 3.2: PACs;
- Section 3.3: *PCSLoads2002* Results; and
- Section 3.4: *TRIRelases2002* Results.

#### 3.1 Dioxins

The following discussion is excerpted from EPA's *Guidance for Reporting Toxic Chemicals within the Dioxin and Dioxin-like Compounds Category* [7], which can be found on EPA's TRI website ([http://www.epa.gov/tri/guide\\_docs/](http://www.epa.gov/tri/guide_docs/)). The term 'dioxins' refers to polychlorinated dibenzo-p-dioxins (CDDs) and polychlorinated dibenzofurans (CDFs), which constitute a group of persistent, bioaccumulative, and toxic chemicals. There are 17 CDDs and CDFs compounds which include chlorine substitution of hydrogen atoms at the 2, 3, 7, and 8 positions on the benzene rings. For 15 of these congeners, other positions are also chlorinated. The most toxic of the 17 is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Table 3-1 lists these 17 compounds, their chemical name, common abbreviated name, and EAD's toxic weighting factor (TWF) for each compound. The 17 compounds (called congeners) are referred to as 'dioxin-like,' because they have similar chemical structure, similar physical-chemical properties, and invoke a common battery of toxic responses, though the toxicity of the congeners varies greatly. For additional discussion on toxic response, see Section 4 of the *Technical Support Document for the 2004 Effluent Guidelines Program Plan* [8].

**Table 3-1. Dioxins and Their Toxic Weighting Factors**

CAS Number	Chemical Name	Abbreviated Name	Toxic Weighting Factor <sup>1</sup>
<b>CDDs</b>			
1746-01-6	2,3,7,8-tetrachlorodibenzo-p-dioxin	2,3,7,8-TCDD	421,600,000
40321-76-4	1,2,3,7,8-pentachlorodibenzo-p-dioxin	1,2,3,7,8-PeCDD	215,384,615
39227-28-6	1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	1,2,3,4,7,8-HxCDD	43,076,923
57653-85-7	1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	1,2,3,6,7,8-HxCDD	41,791,045
19408-74-3	1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	1,2,3,7,8,9-HxCDD	43,076,923
35822-46-9	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	1,2,3,4,6,7,8-HpCDD	4,179,104
3268-87-9	1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin	1,2,3,4,6,7,8,9-OCDD	423,510
<b>CDFs</b>			
51207-31-9	2,3,7,8-tetrachlorodibenzofuran	2,3,7,8-TCDF	6,696,140
57117-41-6	1,2,3,7,8-pentachlorodibenzofuran	1,2,3,7,8-PeCDF	3,294,118
57117-31-4	2,3,4,7,8-pentachlorodibenzofuran	2,3,4,7,8-PeCDF	32,941,176
70648-26-9	1,2,3,4,7,8-hexachlorodibenzofuran	1,2,3,4,7,8-HxCDF	6,658,740
57117-44-9	1,2,3,6,7,8-hexachlorodibenzofuran	1,2,3,6,7,8-HxCDF	6,666,667
72918-21-9	1,2,3,7,8,9-hexachlorodibenzofuran	1,2,3,7,8,9-HxCDF	6,666,667
60851-34-5	2,3,4,6,7,8-hexachlorodibenzofuran	2,3,4,6,7,8-HxCDF	6,658,740
67562-39-4	1,2,3,4,6,7,8-heptachlorodibenzofuran	1,2,3,4,6,7,8-HpCDF	665,874
55673-89-7	1,2,3,4,7,8,9-heptachlorodibenzofuran	1,2,3,4,7,8,9-HpCDF	666,667
39001-02-0	1,2,3,4,6,7,8,9-octachlorodibenzofuran	1,2,3,4,6,7,8,9-OCDF	67,367

<sup>1</sup>From 2005 Screening-Level Analysis Report [1].

Beginning with reporting year 2000, facilities (including pulp and paper mills) meeting certain reporting criteria were required to report to TRI the total mass of the 17 dioxin and dioxin-like compounds released to the environment every year. (In this report, EPA uses the term “dioxins” to refer to all 17 of the 2,3,7,8-substituted CDDs and CDFs, as reported to TRI.) The TRI method of reporting the total mass of all congeners does not account for the relative toxicities of the 17 compounds. However, reporting facilities are given the opportunity to report a facility-specific congener distribution. As discussed in the 2005 Screening-Level Analysis Report [1], EPA calculated dioxins TWPE using the TRI-reported congener distribution to estimate the mass of each congener in the facility’s reported releases to surface waters or transfers to POTWs.

If a facility did not report a congener distribution, EPA used an industry-average distribution to calculate the mass of each congener released. For the Pulp and Paper Category, EPA developed regulatory phases to prioritize mills that bleach. Because the congener distribution is more related to the bleaching process than to the product, EPA calculated the average dioxins distribution for each regulatory phase.

The Cluster Rules established ELGs for 2,3,7,8-TCDD and 2,3,7,8-TCDF, referred to as TCDD and TCDF, respectively, in this report. EPA's analytical method (Method 1613B) establishes the minimum concentration at which these compounds can be reliably quantified. The minimum level (ML) is the level at which the analytical system gives recognizable signals and an acceptable calibration point, for Method 1613B and TCDD and TCDF that level is 10 pg/L. The ELGs in the Cluster Rules for TCDD are <ML, meaning <10 pg/L. For the Bleached Papergrade Kraft and Soda Subcategory, the limitations guideline for TCDF is 31.9 pg/L.

Because of the 1998 Cluster Rules ELGs, most pulp and paper mills are typically required to monitor and report TCDD and TCDF discharges. Thus, EPA was able to identify specific congeners in PCS and use the congener-specific TWF to calculate the TWPE of the mill discharges. EPA did not need to calculate an average congener distribution for PCS discharges.

### **3.2**            **PACs**

PACs, sometimes known as polycyclic aromatic hydrocarbons (PAHs), are a class of organic compounds consisting of two or more fused aromatic rings. Table 3-2 lists the 21 individual compounds in the PAC category for TRI reporting, Chemical Abstract Service (CAS) number, and EPA TWF. EPA has developed TWFs for only eight of the 21 PACs.

**Table 3-2. Definition of PACs**

<b>PAC Compound</b>	<b>CAS Number</b>	<b>Toxic Weighting Factor</b>
Benzo(a)anthracene	56-55-3	36.2600
Benzo(a)phenanthrene (chrysene)	218-01-9	31.0100
Benzo(a)pyrene	50-32-8	100.6600
Benzo(b)fluoranthene	205-99-2	30.6600
Benzo(j)fluoranthene	205-82-3	
Benzo(k)fluoranthene	207-08-9	30.6600
Benzo(j,k)fluorene (fluoranthene)	206-44-0	0.8290
Benzo(r,s,t)pentaphene	189-55-9	
Dibenz(a,h)acridine	226-36-8	
Dibenz(a,j)acridine	224-42-0	
Dibenzo(a,h)anthracene	53-70-3	30.6600
Dibenzo(a,e)fluoranthene	5385-75-1	
Dibenzo(a,e)pyrene	192-65-4	
Dibenzo(a,h)pyrene	189-64-0	
Dibenzo(a,l)pyrene	191-30-0	
7H-Dibenzo(e,g)carbazole	194-59-2	
7,12-Dimethylbenz(a)anthracene	57-97-6	
Indeno(1,2,3-cd)pyrene	193-39-5	30.6600
3-Methylcholanthrene	56-49-5	
5-Methylchrysene	3697-24-3	
1-Nitropyrene	5522-43-0	

PACs are likely present in petroleum products and form as the result of incomplete combustion of organic compounds. PACs and closely related compounds are major constituents of creosote, a commonly used wood preservative.

For TRI, facilities must report the combined mass of PACs released; they do not report releases of individual compounds. In the preliminary screening-level review of the 2002 TRI database, EPA assumed that all of the PACs reported released by pulp and paper mills were benzo(a)pyrene. Because benzo(a)pyrene has the highest TWF (100.66) of the PACs, this was a “worst case” assumption.



As discussed in Section 3.4.3 of the *2005 Screening-Level Analysis Report* [1], after its preliminary analysis, EPA used a different approach to estimate the TWF of PACs discharged from the Pulp and Paper Category. NCASI's TRI-reporting guidance [6] includes a table listing the concentrations of PAC compounds found in wastewaters for several types of pulping (kraft, bisulfite, chemi-thermo-mechanical, thermo-mechanical). EPA calculated the percentage of each PAC present in pulp mill wastewater based on the information provided by NCASI. EPA used this distribution to calculate an adjusted TWF for Pulp and Paper Category PACs by summing the product of each chemical's TWF and its percentage relative to the total PACs in pulp mill wastewaters. The new pulp and paper industry PAC TWF is 34.21. For more information on revisions to TWFs, see the *2005 Screening-Level Analysis Report* [1].

### **3.3 PCSLoads2002 Results**

Table 3-3 lists the 10 pollutants with the highest TWPE of PCS-reported discharges for 2002, in order of descending TWPE. The largest contributor to the category TWPE is TCDD. The table also shows the number of mills that reported discharges to PCS and, for each pollutant, the TWF, the number of mills that reported discharges, the total pounds discharged to surface waters, and the total category TWPE. The two subcategories of Phase I, Bleached Papergrade Kraft and Soda (BPK) and Papergrade Sulfite (PS), are presented separately. Phase III, although not part of this detailed study, is included to provide a perspective on the total TWPE discharged by the Pulp and Paper Category. Table 3-3 does not include pollutants for which EPA has not developed TWFs, such as BOD<sub>5</sub>, total suspended solids, color, and adsorbable organic halides (AOX). The 1998 Cluster Rules established ELGs for AOX, a bulk parameter which measures the total mass of chlorinated organic compounds. EPA has not developed a TWF for AOX because it represents a group of diverse chemicals, not a single compound.

**Table 3-3. Top 10 Pollutants in PCSLoads2002, Discharges by Pulp Regulatory Phase**

Number of PCS-Reporting Facilities		Phase I				Phase II		Phase III <sup>a</sup>		Total Category
		BPK ( 72 mills)		PS ( 7 mills )		171 mills		5 mills		255 mills
Pollutants	TWF	Mills <sup>b</sup>	Discharged (lbs)	Mills <sup>b</sup>	Discharged (lbs)	Mills <sup>b</sup>	Discharged (lbs)	Mills <sup>b</sup>	Discharged (lbs)	TWPE
TCDD	703,584,000	71	0.00194	NR	NR	4	0	2	0	1,366,677
Aluminum	0.06469	11	932,998	3	15,640	26	243,967	1	17,160	78,261
Chlorine <sup>c</sup>	0.50916	20	9,741	NR	NR	43	37,364	NR	NR	23,984
Sulfide	2.80	1	2,442	NR	NR	NR	NR	NR	NR	6,841
Mercury	117	8	15	1	0	12	40	NR	NR	6,461
Nitrite Plus Nitrate Total 1Det. (As N)	0.00560	3	17	2	417,048	19	712,322	NR	NR	6,325
Copper	0.63482	8	674	4	2,834	63	3,875	2	134	4,772
Nitrogen, Ammonia	0.00151	29	1,620,046	2	9,819	59	595,331	2	750,867	4,480
TCDF	43,819,554	46	0.00010	NR	NR	4	0	NR	NR	4,395
Arsenic	4.04	4	118	NR	NR	6	771	NR	NR	3,594
<b>Total</b>										<b>1,520,479</b>

Source: PCSLoads2002 (these loads include the corrections to the 2002 PCS data described in Table 3-4).

BPK - Bleached Papergrade Kraft. PS - Papergrade Sulfite. NR - No mills reported discharging this parameter.

<sup>a</sup>Phase III is not in the scope of the detailed study, but discharge loads are presented to provide total category perspective.

<sup>b</sup>Number of mills monitoring the discharge of the parameter. Includes mills that never detected the parameter.

<sup>c</sup>Total Residual Chlorine.

The final effluent discharge from one mill (Bowater, Catawba SC) is responsible for all of the pulp and paper TCDD discharge. In 2002, this mill discharged 0.88 grams of TCDD, which equates to 1.37 million TWPE, or 90% of the Pulp and Paper Category's 1.52 million TWPE. Bowater reports that, since that date, neither TCDD nor TCDF has been measured in mill wastewaters above the method detection limit. The mill is enrolled in Tier 1 of EPA's VATIP and as such was provided with a six-year schedule for compliance with Cluster Rules requirements. After 2002, the Bowater Catawba mill converted to 100% chlorine dioxide bleaching and started up an advanced fiber line. See Section 4.3.1 for a more detailed description of Bowater, Catawba SC mill operations.

The preliminary results of EPA's 2005 screening-level analysis indicated that nine Phase I mills reported TCDD or TCDF discharges during 2002. As discussed in Section 2.4, NCASI contacted each of the nine mills reporting discharges, confirming for three mills that concentrations measured above analytical detection limits in 2002 were correct. NCASI identified errors for six mills in the data stored in PCS. These mills provided copies of Discharge Monitoring Reports (DMRs) and/or laboratory analytical results documenting these errors [9]. Table 3-4 summarizes EPA's review of the mill-submitted documentation. EPA changed the TCDD load for five mills in its *PCSLoads2002* database to zero pounds. EPA also changed the TCDF load for one mill to zero pounds.

**Table 3-4. Results of Review of Mill-Provided PCS Corrections**

Facility	NPDES Permit Number	Findings from Review	Changes to <i>PCSLoads2002</i>
Pope & Talbot Inc, Halsey	OR0001074	The mill provided discharge monitoring data for final effluent. Data in DMRs submitted in 2002 were below detection limit, but not labeled with "less than" or a "non-detect."	Changed TCDD load to zero pounds discharged.
Weyerhaeuser, Johnsonburg	PA0002143	The mill provided discharge monitoring data documenting discharges below detection for the entire year.	Changed TCDD load to zero pounds discharged.
Upper Potomac River Comm STP, Westernport	MD0021687	The POTW expressed that the "less than" sign was omitted from the DMR. A corrected DMR has been resubmitted to the state.	Changed TCDD load to zero pounds discharged.
Bowater Inc Southern Division, Calhoun	TN0002356	The mill provided lab reports for 2002. Each dioxin and furan congener concentration reported by the lab was either not detected or estimated because it was below the calibration curve.	Changed TCDD load to zero pounds discharged.

**Table 3-4 (Continued)**

Facility	NPDES Permit Number	Findings from Review	Changes to PCSLoads2002
Fort James Operating Co, Wauna	OR0000795	The mill explained that the measurements reported on the DMR for October and March of 2002 were below the Cluster Rule-established minimum levels.	Changed TCDD load to zero pounds discharged.
Weyerhaeuser Co, Port Wentworth Mill, Savannah	GA0002798	The mill explained that the laboratory reported TCDF concentrations as “laboratory estimated maximum” three times in 2002. All reported concentrations were less than Method 1613B ML (10 pg/L).	Changed TCDF load to zero pounds discharged.
Bowater Inc, Catawba	SC0001015	The mill explained that the TCDD discharge was the result of a single unexplained 83.6 pg/L spike on May 13, 2002 in the final effluent. Since that date no samples have been collected above the method 1613B detection limit (10 pg/L).	No change to TCDD pounds discharged.
Boise Cascade Corp., Jackson	AL0002755	The mill explained that on October 31, 2002 a TCDF concentration of 11.3 pg/L was measured in the bleach plant effluent. The measurement was below the 31.9 pg/L facility permit limit.	No change to TCDF pounds discharged.
Alabama River Pulp, Purdue Hill	AL0025968	The mill explained that on December 1, 2002 a TCDF concentration of 19 pg/L was measured in the bleach plant effluent. The measurement was below the 31.9 pg/L facility permit limit.	No change to TCDF pounds discharged.

Table 3-5 shows the total TWPE for each rulemaking phase. Mills with operations in the Bleached Papergrade Kraft and Soda Subcategory are responsible for the majority (95.7%) of the category TWPE. EPA recalculated the TWPE excluding the TCDD discharges from the Bowater Catawba mill. With this data exclusion, the relative contribution of the Phase II mills increases. There are more than twice as many Phase II mills as Phase I mills in the PCS database, but Phase I mill discharges contribute 58% of the category TWPE.

**Table 3-5. PCSLoads2002 TWPE by Phase, With and Without Bowater Catawba Mill TCDD Discharges**

Number of PCS-Reporting Facilities	Phase I				Phase II		Phase III		Total Category
	BPK ( 72 mills)		PS ( 7 mills )		171 mills		5 mills		255 mills
	Total TWPE	% of Category	Total TWPE	% of Category	Total TWPE	% of Category	Total TWPE	% of Category	TWPE
TWPE	1,455,574	95.7	6,628	0.4	55,232	3.6	3,045	0.2	1,520,479
TWPE excluding Bowater Catawba TCDD	88,897	57.8	6,628	4.3	55,232	35.9	3,045	2.0	153,802

Source: PCSLoads2002.

BPK - Bleached Papergrade Kraft. PS - Papergrade Sulfite

EPA’s classification of each Phase I mill’s outfalls is presented in Appendix A of this report. Because of the difficulty in identifying which outfall data in PCS represent bleach plant effluent and which represent final effluent, a portion of the TWPE presented in Table 3-5 for the Phase I mills may represent bleach plant loads. In its Federal Register Notice of the Preliminary 2006 Effluent Guidelines Program Plan, EPA will request that operators of the mills listed in Appendix A confirm EPA’s classification of its outfalls. See Section 4.3 for additional information on compliance monitoring locations.

### **3.4 TRIRelases2002 Results**

Table 3-6 lists the 10 pollutants with the highest TWPE of TRI-reported discharges for 2002, in order of descending TWPE. The largest contributor to the category TWPE is dioxins. Table 3-6 lists the number of mills that reported pollutant discharges to TRI and, for each pollutant, the TWF, the number of mills that reported discharges, the pounds discharged, and total category TWPE. Discharges include direct discharges to surface waters and transfers to POTWs. POTW transfers are included in the total discharges after POTW removals are taken into account. The two subcategories of Phase I are presented separately. Phase III, although not part of this detailed study, is included to provide a perspective on the total TWPE discharged by the Pulp and Paper Category. In addition, 21,253 TWPE was discharged by facilities in SIC codes EPA identified as “potential new subcategories.” Table 3-6

does not include releases from potential new subcategories. See Section 5 of the 2005 Screening-Level Analysis Report [1].

**Table 3-6. Top 10 Pollutants in TRIRelases2002, Releases by Regulatory Phase<sup>a</sup>**

Number of TRI-reporting Facilities		Phase I				Phase II		Phase III <sup>b</sup>		Total Category <sup>c</sup>
		BPK ( 79 mills)		PS ( 8 mills )		169 mills		5 mills		261 mills
Pollutants	TWF	Mills	Released (lbs)	Mills	Released (lbs)	Mills	Released (lbs)	Mills	Released (lbs)	TWPE
Dioxins	<sup>d</sup>	44	0.115	3	0.0185	14	0.013	4	0.005	2,854,324
Manganese and Manganese Compounds	0.0144	70	3,403,539	2	32,832	39	857,936	4	187,780	64,690
PACs	34 <sup>e</sup>	50	863	1	20.9	27	440	4	119	49,355
Lead and Lead Compounds	2.24	65	11,876	6	841	114	16,694	4	735	67,528
Chlorine	0.509	4	22,682	1	3,700	7	21,357			24,307
Zinc and Zinc Compounds	0.0469	46	228,492	1	5,751	24	73,751	2	73,000	14,783
Potassium Dimethyldithiocarbamate	0.933	NR	NR	NR	NR	1	12,341	NR	NR	11,519
Mercury and Mercury Compounds	117	31	35	1	1.7	41	24	NR	NR	7,087
Copper and Copper Compounds	0.6348	2	418	3	2,121	5	1,424	NR	NR	2,516
Vanadium and Vanadium Compounds	0.035	24	42,503	1	750	9	8,447	3	2,820	1,908
<b>Total for All Pollutants</b>										<b>3,107,425</b>

Source: TRIRelases2002.

BPK - Bleached Papergrade Kraft. PS - Papergrade Sulfite. NR - None Reported

<sup>a</sup> Releases reported include both direct and indirect discharges (transfers to POTWs). Indirect discharges account for POTW removals.

<sup>b</sup> Phase III is not in the scope of the detailed study, but discharge loads are presented to provide total category perspective.

<sup>c</sup> Category total includes 21,253 TWPE discharged by facilities in SIC codes EPA identified as “potential new subcategories.” See Section 5 of the 2005 Screening-Level Analysis Report [1].

<sup>d</sup> Dioxin TWF calculated for each mill, based on reported congener distribution.

<sup>e</sup> EPA-calculated PAC TWF based on industry-submitted data [6].

Facilities in the Pulp and Paper Category reported discharges of 68.6 grams of “dioxin and dioxin-like compounds” to TRI in 2002, totaling 2.85 million TWPE. (In comparison, TCDD and TCDF discharges in PCS totaled 0.93 grams). Phase I and Phase II mills reported more than 98% of the TRI-reported discharges (2.81 million TWPE, 66.4 grams) of “dioxin and dioxin-like compounds.” Dioxins discharges account for 91% of the category TWPE. No single mill accounted for a majority of the TRI TWPE. In 2002, Bowater Catawba

reported a TRI dioxins release of 3.6 grams, which is less than 6% of the Pulp and Paper Category's total dioxins releases. (In comparison, using the TCDD discharge Bowater Catawba reported on its DMR, EPA calculated that the mill discharged 0.88 grams of TCDD in 2002, which accounted for 90% of the Pulp and Paper Category's PCS TWPE.)

For the total category, manganese and manganese compounds ranked second highest in terms of TWPE. At this time, EPA has little information on how pulp and paper mills estimate manganese releases. In its Federal Register Notice of the Preliminary 2006 Effluent Guidelines Program Plan, EPA will request additional details of methods used to estimate releases of toxic pollutant discharges reported to TRI, in particular those methods used by Phase II mills (mills without bleached papergrade kraft or papergrade sulfite operations). EPA also requests information about non-bleaching sources of toxic wastewater pollutants, such as metals and metal compounds, including manganese, lead, zinc, and mercury. EPA will continue to evaluate releases, in particular metals (manganese, lead, zinc, mercury), as it completes this detailed study.

There is some pollutant overlap between the TRI and PCS data sources. Four pollutants (dioxins, chlorine, mercury, and copper) are identified in the top 10 pollutants of concern in both databases. "Lead and lead compounds" is the only pollutant for which Phase II mill discharges exceed Phase I mill discharges.

Of the TRI-reported chemical discharges, PACs account for the third highest TWPE, comprising 1.6% of the total Pulp and Paper Category TWPE. This is a significant change from the April 5, 2005 results of EPA's screening-level analysis, which had assumed that all reported PACs were benzo(a)pyrene. Using the TWF for benzo(a)pyrene, EPA calculated that the category discharged over 140,000 TWPE of PACs. Using the TWF calculated based on PACs distribution information provided by NCASI, EPA calculated that the category discharged 49,355 TWPE of PACs, a 65% reduction.

Table 3-7 shows the total TWPE for each Phase. Unlike PCS, one pollutant (dioxins) but no single facility dominated the Pulp and Paper Category TWPE; therefore, EPA

recalculated the total TWPEs excluding dioxins reported by all mills. When dioxins are excluded from the totals, the relative contribution of the Phase II mills increases, though Phase I mills always contribute more than half of the category TWPE.

**Table 3-7. *TRIRelases2002* TWPE by Regulatory Phase, with and without Dioxins**

Number of TRI-reporting facilities	Phase I				Phase II		Phase III		Total Category <sup>a</sup>
	BPK ( 79 mills)		PS ( 8 mills )		171 mills		5 mills		261 mills
	Total TWPE	% of Category	Total TWPE	% of Category	Total TWPE	% of Category	Total TWPE	% of Category	TWPE
TWPE	1,779,702	57.3	1,127,204	36.3	143,581	4.6	56,938	1.8	3,128,678
TWPE excluding dioxins	139,722	55.2	6,995	2.8	97,218	38.4	9,165	3.6	253,101

Source: TRIRelases2002.

<sup>a</sup> Category total includes 21,253 TWPE discharged by facilities in SIC codes EPA identified as “potential new subcategories.” See Section 5 of the 2005 Screening-Level Analysis Report [1].



## **4.0 CLUSTER RULE IMPLEMENTATION AND IMPACT**

One purpose of this detailed study is to evaluate how well the Cluster Rules effluent limitations have been incorporated into NPDES permits issued after 1998. EPA reviewed a total of 72 permits from operating Phase I mills and selected POTWs. Because Phase II and III mills are not subject to the Cluster Rules, EPA did not collect or review permits for these mills and they are not discussed in this section.

This section discusses EPA's analysis of the Cluster Rule ELGs implementation in the following subsections:

- Section 4.1: Detailed Summary of the 1998 ELGs Revisions;
- Section 4.2: Incorporation of Cluster Rules into NPDES Permits; and
- Section 4.3: Analysis of Compliance Monitoring Data.

### **4.1 Detailed Summary of 1998 ELGs Revisions (Cluster Rules)**

The Cluster Rules apply to mills with operations subject to 40 CFR Part 430 Subpart B, Bleached Papergrade Kraft and Soda, and Subpart E, Papergrade Sulfite. The Cluster Rules regulate toxic and nonconventional pollutants that are characteristic of mills that bleach chemical pulp with chlorine-containing compounds. These pollutants include adsorbable organohalides (AOX), chloroform, TCDD, TCDF, and 12 chlorinated phenolic compounds<sup>3</sup>. Permit writers issue permits that limit the discharge of these pollutants, following the Cluster Rules effluent limitations guidelines.

In addition to limiting pollutant discharges, NPDES permits establish monitoring and reporting requirements. Permits specify what discharge points must be monitored, for what pollutants, and with what frequency. Permits also specify how frequently facilities report to their permitting authority. Facility Discharge Monitoring Reports (DMRs) provide the permitting

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<sup>3</sup>4-trichlorosyringol; 3,4,5-trichlorocatechol; 3,4,6-trichlorocatechol; 3,4,5-trichloroguaiacol; 3,4,6-trichloroguaiacol; 4,5,6-trichloroguaiacol; 2,4,5-trichlorophenol; 2,4,6-trichlorophenol; tetrachlorocatechol; tetrachloroguaiacol; 2,3,4,6-tetrachlorophenol; and pentachlorophenol.

authority with the information necessary to evaluate compliance with discharge limits. Table 4-1 summarizes the required compliance points for each pollutant regulated by the Cluster Rules. EPA established less stringent monitoring requirements for mills that employ totally chlorine free (TCF) bleaching.

**Table 4-1. Compliance Points for Cluster Rules Regulated Pollutants**

Pollutant <sup>a</sup>	Subpart B (BPK Mills)		Subpart E (PS Mills)		
	Non-TCF	TCF	Calcium-, Sodium-, Magnesium-Based (Segment A)	Ammonium-Based (Segment B)	Specialty Grade (Segment C)
2,3,7,8-TCDD	Bleach Plant	Not required	Not required	Bleach Plant	Bleach Plant
2,3,7,8-TCDF	Bleach Plant	Not required	Not required	Bleach Plant	Bleach Plant
Chloroform	Bleach Plant	Not required	Not required	Reserved	Reserved
12 chlorinated phenolic pollutants	Bleach Plant	Not required	Not required	Bleach Plant	Bleach Plant
AOX	Final Effluent (Directs) Bleach Plant (Indirects)	Final Effluent	Final Effluent (Directs) Bleach Plant (Indirects)	Reserved	Reserved
COD	Reserved	Reserved	Reserved	Reserved	Reserved

Source: Permit writers guidance document.

BPK - Bleached Papergrade Kraft. PS - Papergrade Sulfite. TCF - Totally Chlorine Free.

<sup>a</sup>Table 4-1 presents monitoring locations information for Cluster Rules Pollutants. All Phase I mills must also monitor and comply with BPT/BCT limits for pH, BOD<sub>5</sub> and TSS at the final effluent. If they have not certified that they do not use chlorophenolic-containing biocides, they must also monitor and comply with BAT limits for trichlorophenol and pentachlorophenol at the final effluent.

Mills are required to demonstrate compliance at the following two locations:

- The point where wastewater leaves the bleach plant, before being combined with process wastewaters or noncontact cooling water from other operations prior to treatment and discharge. Hereafter, this sample location is referred to as “bleach plant.”
- The point where mills discharge their treated effluent to the receiving streams; hereafter referred to as “final effluent.”

Each mill with operations subject to Subpart B (hereafter, bleached kraft mills) must demonstrate compliance with the limits for TCDD, TCDF, 12 chlorinated phenolic pollutants, and chloroform in the effluent from the bleach plant of each individual fiber line.

Chemical pulp bleaching is the principal source of these pollutants. EPA determined that bleach plant limits for chloroform are necessary because there is potential for its volatilization and loss in mill sewer systems. EPA determined that bleach plant limits are necessary for the other pollutants because they are generated at very low concentrations and may be diluted to below analytical detection limits when combined with other mill wastewaters. Indirect discharging mills must also comply with an AOX limit at the bleach plant, while direct discharging mills are required to monitor for AOX at the final effluent.

The limitations and monitoring requirements for mills with operations subject to Subpart E (hereafter, papergrade sulfite mills) depend on the pulping base used at the mill. EPA divided the Papergrade Sulfite Subcategory into three segments, listed in Table 4-1. Papergrade sulfite mills in Segment A are required to monitor for only AOX, while mills in Segments B and C are required to monitor for TCDD, TCDF, and the 12 chlorinated phenolic compounds, but not AOX.

#### **4.1.1 Best Available Technology and Pretreatment Standards**

The Cluster Rules require that mills existing as of April 15, 1998 that discharge directly to receiving streams control toxic and nonconventional pollutants at the best available technology (BAT) economically achievable level of performance. EPA established Pretreatment Standards for Existing Sources (PSES) that are based on control technologies similar to BAT for indirect dischargers. As shown in Table 4-2, except for the monitoring location for AOX, the Subpart B BAT limitations guidelines and PSES for indirect dischargers are the same. EPA promulgated regulations for new sources (New Source Performance Standards, for direct dischargers, and Pretreatment Standards for New Sources, for indirect dischargers). However no new bleached kraft or papergrade sulfite mills have been constructed since 1998.

**Table 4-2. Subpart B (Bleached Papergrade Kraft and Soda) BAT Effluent Limitations Guidelines and Pretreatment Standards for Existing Sources**

Pollutants	1-Day Maximum <sup>a</sup>
<b>Bleach Plant Effluent</b>	
TCDD	<ML (b)
TCDF	31.9 pg/l
Chloroform	1-Day Maximum: 6.92 g/kg (c)
	Monthly Average: 4.14 g/kg (c)
Trichlorosyringol	<ML(a)
3,4,5-Trichlorocatechol	<ML(a)
3,4,6-Trichlorocatechol	<ML(a)
3,4,5-Trichloroguaiacol	<ML(a)
3,4,6-Trichloroguaiacol	<ML(a)
4,5,6-Trichloroguaiacol	<ML(a)
2,4,5-Trichlorophenol	<ML(a)
2,4,6-Trichlorophenol	<ML(a)
Tetrachlorocatechol	<ML(a)
Tetrachloroguaiacol	<ML(a)
2,3,4,6-Tetrachlorophenol	<ML(a)
Pentachlorophenol	<ML(a)
<b>Final Effluent (for BAT) or Bleach Plant Effluent (for PSES)</b>	
AOX	1-Day Maximum: 0.951 kg/kg
	Monthly Average: 0.623 kg/kg

<sup>a</sup>EPA established monthly average limitations guidelines for only chloroform and AOX.

<sup>b</sup> <ML means less than the minimum level at which the analytical system gives recognizable signals and an acceptable calibration point. The MLs for each pollutant are specified in 40 CFR 430.01(i).

<sup>c</sup>For mills that certify to use TCF, refer to 40 CFR 430.24(a)(2).

Table 4-3 presents the Subpart E BAT limitations guidelines and PSES for papergrade sulfite mills. Regulations for Segment C are not presented because no mills with operations in Segment C are currently operating in the United States.

**Table 4-3. Subpart E (Papergrade Sulfite) BAT Effluent Limitations Guidelines and Pretreatment Standards for Existing Sources**

Pollutants	Segment A Calcium, Magnesium, and Sodium Sulfite <sup>a</sup>	Segment B Ammonium Sulfite
<b>Bleach Plant Effluent</b>		
TCDD	not regulated	<ML
TCDF	not regulated	<ML
Chloroform	not regulated	reserved
Trichlorosyringol	not regulated	<ML
3,4,5-Trichlorocatechol	not regulated	<ML
3,4,6-Trichlorocatechol	not regulated	<ML
3,4,5-Trichloroguaiacol	not regulated	<ML
3,4,6-Trichloroguaiacol	not regulated	<ML
4,5,6-Trichloroguaiacol	not regulated	<ML
2,4,5-Trichlorophenol	not regulated	<ML
2,4,6-Trichlorophenol	not regulated	<ML
Tetrachlorocatechol	not regulated	<ML
Tetrachloroguaiacol	not regulated	<ML
2,3,4,6-Tetrachlorophenol	not regulated	<ML
Pentachlorophenol	not regulated	<ML
<b>Final Effluent (for BAT) or Bleach Plant Effluent (for PSES)</b>		
AOX	1-Day Maximum: 2.64 kg/kkg	reserved
	Monthly Average: 1.41 kg/kkg	reserved

<ML means less than the minimum level at which the analytical system gives recognizable signals and an acceptable calibration point. The MLs for each pollutant are specified in 40 CFR 430.01(i).

<sup>a</sup>EPA established monthly average limitations guidelines for only chloroform and AOX.

<sup>b</sup>For mills that certify to use TCF, refer to 40 CFR 430.24(a)(2).

#### 4.1.2 VATIP and Limits for TCF Mills

As part of the Cluster Rules promulgated in 1998, EPA established the Voluntary Advanced Technology Incentives Program (VATIP) to encourage existing and new direct dischargers subject to Subpart B to reduce pollutant discharges by implementing advanced pollution prevention controls. No comparable program was established for mills subject to Subpart E or for indirect dischargers. By enrolling in VATIP, mills receive additional time to comply with the rule (six or more years, depending on the selected tier), reduced monitoring requirements, and public recognition. EPA established three tiers of Advanced Technology

performance requirements, each with increasingly more effective levels of environmental protection.

Totally chlorine free (TCF) bleaching is performed without using chlorine, sodium or calcium hypochlorite, chlorine dioxide, chlorine monoxide, or any other chlorine-containing compound. Each fiber line that uses exclusively TCF bleaching processes is required only to comply with final effluent AOX limitations; no bleach plant limits are required.

One bleached kraft mill (Weyerhaeuser in Oglethorpe, GA) participates in EPA’s Project XL, which stands for “eXcellence and Leadership.” This national pilot program allows state and local governments, businesses, and federal facilities to work with EPA to develop more cost-effective, strategies for achieving environmental and public health protection. In exchange, EPA offers regulatory, program, policy, or procedural flexibility to conduct the program.

Table 4-4 lists the bleached kraft mills participating in these beyond compliance programs.

**Table 4-4. Bleached Kraft Mills Operating Beyond Compliance**

	NPDES Permit Number	Beyond Compliance Program
<b>VATIP Mills</b>		
International Paper, Eastover	SC0038121	VATIP; Tier 1
Bowater Inc., Catawba	SC0001015	VATIP; Tier 1
Glatfelter, Spring Grove	PA0008869	VATIP; Tier 1
International Paper, Franklin	VA0004162	VATIP <sup>a</sup>
<b>XL Mill</b>		
Weyerhaeuser/Flint River Mill, Oglethorpe	GA0049336	XL
<b>TCF Bleaching Mill</b>		
Evergreen Pulp Company (formerly Louisiana-Pacific), Samoa	CA0005894	TCF

VATIP - Voluntary Advanced Technology Incentives Program. XL - eXcellence and Leadership. TCF - Totally Chlorine Free.

<sup>a</sup>Permit does not indicate VATIP Tier, believed to be Tier 1.

### 4.1.3 Support Documents

EPA's supporting documents that describe the development and implementation of the Cluster Rules ELGs explain in more detail the regulations reviewed in this section. These documents, listed below, can be found at the EPA website

<http://epa.gov/waterscience/pulppaper/>.

- *Supplemental Technical Development Document for Effluent Limitations Guidelines and Standards for the Pulp, Paper, and Paperboard Category: Subpart B [Bleached Papergrade Kraft and Soda] and Subpart E [Papergrade Sulfite].* EPA-821-R-97-011. October 1997.
- *Technical Support Document for the Voluntary Advanced Technology Incentives Program,* November, 1997.
- *Technical Support Document for Best Management Practices for Spent Pulping Liquor Management, Spill Prevention, and Control.* October 1997.
- *Permit Guidance Document for the Pulp, Paper, and Paperboard Manufacturing Point Source Category (40 CFR 430).* EPA-821-B-00-003. May 2000.

### 4.2 Incorporation of Cluster Rules into NPDES Permits

EPA reviewed permits to determine if the appropriate Cluster Rules monitoring requirements were included. Permits are issued to facilities for a specific time period (generally five years) with a requirement to reapply prior to the expiration date. Permit writers are required to use the Cluster Rules guidelines for permits issued after April 15, 1998. Thus, all permits for affected mills should have had limits and monitoring requirements based on the new guidelines by April 2003, unless permit renewal has been delayed or the mill was enrolled in the VATIP.

This subsection presents EPA's review of permits issued for bleached kraft mills, POTWs receiving bleached kraft mill wastewater, and papergrade sulfite mills.

#### 4.2.1 Bleached Papergrade Kraft Mills

At the time the Cluster Rules were promulgated, 84 bleached kraft mills operated in the United States. As of 2004, 72 mills continue to have bleached kraft operations. These mills are listed in Appendix B to this report. The total includes one TCF mill, Evergreen Pulp Company (formerly Louisiana Pacific) in Samoa, CA (which produces a chlorine-free product using peroxide bleach), five mills operating in beyond-compliance programs, four indirect discharging mills subject to PSES, and two mills that share a permit. EPA reviewed 64 permits for these bleached kraft mills to determine if the appropriate Cluster Rules monitoring requirements were included.

Table 4-5 presents the number of permits for bleached kraft mills that are missing Cluster Rules monitoring requirements for AOX, TCDD, TCDF, chloroform and chlorinated phenolic compounds. As shown in the table, permits for 15 mills permits have expired. However, expired NPDES permits remain in effect until the new permit is issued, as long as a complete application for permit renewal was submitted before the expiration date. EPA assumes that these mills have submitted applications to the appropriate permitting authority and that the expired permits remain in effect.

**Table 4-5. Number of Permits for Bleached Kraft Mills Missing Cluster Rules Monitoring Requirements**

	Permits Collected	Permit Has Expired	Pollutant Missing Required Monitoring		
			AOX	TCDD, TCDF, and chloroform	Chlorinated Phenolic Compounds
BPK mills, direct discharges not listed below <sup>a</sup>	54	13/54	4/54	TCDD: 8/54 TCDF: 9/54 Chloroform: 9/54	9/54
BPK mills, indirect dischargers	3	1/3	2/3	1/3	1/3
BPK mills, beyond compliance (VATIP)	4	1/4	0/4	0/4	0/4
Domtar Mill - WI <sup>b</sup>	1	0/1	0/1	0/1	0/1
Boise Cascade - OR <sup>c</sup>	1	0/1	0/1	0/1	0/1
Evergreen Pulp Co. (BPK TCF)	1	0/1	0/1	0/1 <sup>d</sup>	0/1 <sup>d</sup>



**Table 4-5 (Continued)**

	Permits Collected	Permit Has Expired	Pollutant Missing Required Monitoring		
			AOX	TCDD, TCDF, and chloroform	Chlorinated Phenolic Compounds
<b>Total</b>	<b>64</b>	<b>15</b>	<b>6</b>	<b>9</b>	<b>10</b>

NOTE: EPA assumes that expired permits remain legally binding.

BPK - Bleached Papergrade Kraft. VATIP - Voluntary Advanced Technology Incentives Program. TCF - Totally Chlorine Free.

<sup>a</sup>Includes minor discharger Weyerhaeuser/Flint River Mill in Oglethorpe, GA and the two Parsons & Whittemore mills (Alabama Pine Pulp/Alabama River Pulp) in Claiborne, AL covered under a single permit.

<sup>b</sup>Includes the Domtar Mill in Port Edwards, WI (papergrade sulfite), which shares its discharge with the Domtar Mill in Nekoosa, WI (bleached kraft).

<sup>c</sup>Includes the Boise Cascade bleached kraft mill and The City of St. Helens POTW, which share a permit.

<sup>d</sup>Although not required by the Cluster Rules, the permit for this TCF mill includes specific limits for these pollutants.

Permits for 12 mills (10 direct dischargers and two indirect dischargers) do not include all Cluster Rules limits and monitoring requirements. These mills are listed Tables 4-6. The majority of these permits have expired (9 of 12). Of the permits that do not include all Cluster Rule-required monitoring, four were issued after the April 1998 Cluster Rules promulgation date. EPA will request additional information for these mills from the state permitting authorities to learn why Cluster Rules monitoring requirements are missing.

The Cluster Rules require mills to monitor for TCDD and chlorinated phenolic compounds at the bleach plant. Table 4-6 shows that several permits improperly specify final effluent as the compliance monitoring point.

**Table 4-6. Permits for Bleached Kraft Mills Missing Required Bleach Plant Monitoring**

Mill	NPDES Permit Number	Active Permit Expires	Pollutant Absent from Required Monitoring	Pollutant Limited at FE not BP
<b>Direct Discharge</b>				
International Paper Co., Cantonment	FL0002526	8/31/95	TCDD, TCDF, chloroform, CP	-
International Paper, Jay	ME0001937	3/1/99	TCDD, TCDF, chloroform, CP	TCDD, TCDF
New Page, Rumford	ME0002054	3/30/97	TCDD, TCDF, chloroform, CP	TCDD

**Table 4-6 (Continued)**

<b>Mill</b>	<b>NPDES Permit Number</b>	<b>Active Permit Expires</b>	<b>Pollutant Absent from Required Monitoring</b>	<b>Pollutant Limited at FE not BP</b>
Weyerhaeuser Paper Co., Plymouth	NC0000680	5/31/02	TCDD, TCDF, chloroform, CP	TCDD
International Paper Co., Riegelwood	NC0003298	11/30/01	TCDD, TCDF, chloroform, CP	TCDD, CP
Pope & Talbot Inc., Halsey	OR0001074	7/1/98	CP, chloroform	-
Georgia-Pacific, Port Hudson , Zachary	LA0005258	1/1/07	TCDD, TCDF, chloroform, CP	TCDD, TCDF, CP, Chloroform
New Page, Chillicothe	OH0004481	1/31/09	TCDF	-
Weyerhaeuser, Oglethorpe	GA0049336	7/30/02	TCDD, TCDF, chloroform, CP	TCDD
International Paper Co., Texarkana	TX0000167	1/1/01	TCDD, TCDF, chloroform, CP	TCDD
<b>Indirect Discharge</b>				
New Page, Luke	MD0001422	4/30/06	AOX	AOX
Sappi Fine Paper, Cloquet	MN0001431	11/30/96	AOX, TCDD, TCDF, chloroform, CP	-

CP - Chlorinated phenolic compounds.

BP - Bleach Plant.

FE - Final Effluent.

Active permits from the four bleached kraft mills listed in Table 4-7 have no AOX monitoring requirement. Each of these permits has expired and has not been reissued since promulgation of the Cluster Rules. Even though the permit for the MeadWestvaco (New Page) Mill in Rumford, ME reviewed for this study has no AOX limits, the PCS database contains AOX discharge data at the final effluent for the mill. EPA contacted Maine and Florida and confirmed that the permits listed in Table 4-7 are the current active permits. EPA will contact North Carolina to confirm that the two permits for North Carolina mills listed in Table are the current active permits.

**Table 4-7. Permits for Bleached Kraft Mills Missing Required Final Effluent AOX Monitoring**

Mill	NPDES Permit Number	Active Permit Expires
International Paper Co, Cantonment	FL0002526	8/31/95
MeadWestvaco (New Page), Rumford	ME0002054 <sup>a</sup>	3/30/97
Weyerhaeuser Paper Co., Plymouth	NC0000680	5/31/02
International Paper Co., Riegelwood	NC0003298	11/30/01

<sup>a</sup>Mill has AOX discharge loads in PCS from 1997 through 2004.

**4.2.2 POTWs**

EPA reviewed permits for three POTWs that receive bleached kraft mill wastewater. The Cluster Rules do not include ELGs for POTWs that receive Phase I pulp mill wastewater. Instead, permit limits for Cluster Rules pollutants for POTWs are determined by water quality standards and the professional judgment of the permit writer based on the types of industrial wastewater received. Each permit EPA reviewed was issued in the past five years and included TCDD limits at the final effluent. One permit, for the Western Lake Superior Sanitary District POTW in Duluth MN, includes a chloroform final effluent monitoring requirement. Only the permit for Upper Potomac River Commission POTW in Westernport, MD includes limits for the pulp mill bleach plant discharges.

**4.2.3 Papergrade Sulfite Mills**

At the time the Cluster Rules were promulgated, 11 papergrade sulfite mills operated in the United States. As of 2004, only six of these mills still had sulfite operations and all were direct dischargers. Table 4-8 lists these mills, their NPDES permit number, and the segment of the Subpart E regulations that applies to their discharges. None of the operating papergrade sulfite mills produce speciality grade pulp (Segment C).

**Table 4-8. Operating Papergrade Sulfite Mills**

Mill Name	NPDES Permit	Segment
Wausau Mosinee Paper Mills, Brokaw	WI0003379	A (calcium, magnesium, or sodium sulfite)
Weyerhaeuser Paper Co., Rothschild	WI0026042	A (calcium, magnesium, or sodium sulfite)
Fraser Paper, Park Falls	WI0003212	A (calcium, magnesium, or sodium sulfite)
Domtar, Port Edwards	WI0003620 <sup>a</sup>	A (calcium, magnesium, or sodium sulfite)
Kimberly-Clark, Everett	WA0000621	B (ammonium sulfite)
Finch Pruyn & Co Inc., Great Falls	NY0005525	B (ammonium sulfite)

Segment A - Applies to mills that produce pulp using calcium, magnesium, or sodium sulfite acidic cooking liquors.

Segment B - Applies to mills that produce pulp using an ammonium sulfite acidic liquor.

<sup>a</sup>Two Domtar mills (Nekoosa - BPK mill & Port Edwards - a PS mill) share a NPDES permit.

The six operating papergrade sulfite mills include one facility that is counted in both Subparts B and E. The Domtar Port Edwards Mill produces bleached magnesium-based sulfite pulp (Segment A) and has been totally chlorine free since 1993.

Permits for papergrade sulfite mills with operations in Segment A (calcium-, magnesium-, and sodium-based sulfite) should have AOX limits and monitoring at the final effluent. Permits for papergrade sulfite mills with operations in Segment B (ammonium-based sulfite) should have limits for TCDD, TCDF, and 12 chlorinated phenolic pollutants at the bleach plant effluent from each individual fiber line. Permits for the two Segment B mills also include bleach plant chloroform monitoring requirements, even though the Cluster Rules did not. Table 4-9 presents the number of permits for papergrade sulfite mills that do not include Cluster Rule monitoring requirements. Both permits for the two operating Segment B mills include the Cluster Rule requirements.

**Table 4-9. Number of Permits for Papergrade Sulfite Mills Missing Cluster Rules Monitoring Requirements**

Segment	Permits Collected	Permit Expired	Required Monitoring Missing <sup>a</sup>			
			FE-AOX	BP-TCDF	BP-TCDD	BP-CP
A - calcium, magnesium, or sodium sulfite	3	0/3	3/3 (Final Effluent)	Not required	Not required	Not required
B - ammonium sulfite	2	0/2	Reserved	0/2 (Bleach Plant)	0/2 (Bleach Plant)	0/2 (Bleach Plant)
Total	5	0	3	0	0	0

BP = Bleach Plant      FE = Final Effluent      CP = Chlorinated Phenolic Compounds

<sup>a</sup>No active PS mills are indirect dischargers or in the specialty grade segment.

None of the permits for the three mills with operations in Segment A (calcium, magnesium, or sodium sulfite) include required final effluent AOX monitoring. All three mills are located in Wisconsin. EPA plans to contact the Wisconsin NPDES permitting authority to discuss the AOX monitoring requirements. The PCS database contained no report AOX loads for the Segment A mill during the study period, 1998 through 2004.

### **4.3      Analysis of Compliance Monitoring Data**

EPA compared PCS data to the Cluster Rules ELGs. For this review, EPA compiled data for the period 1998, when the Cluster Rules were promulgated, through 2004, the most recent full year for which PCS data were available. For pollutants with concentration-based guidelines (TCDD, TCDF, and the chlorinated phenolic compounds), EPA determined if the mill was meeting the guidelines by examining PCS-reported concentrations. EPA could not determine if the mill was meeting the guidelines for pollutants with mass-based guidelines (chloroform and AOX), because PCS does not include production information. For these pollutants, EPA evaluated the effectiveness of the ELGs in reducing pollutant discharges by comparing the baseline pollutant load estimated during the development of the guidelines to the discharge load calculated using PCS data. As part of the Cluster Rules development, EPA estimated baseline pollutant loads for each mill. Because EPA did not have data from each mill subject to Subpart B or E, EPA modeled baseline discharges for each mill, based on the

operations in use and pulp production as of mid-1995. Hereafter, these production-normalized loads are referred to as “baseline loads.”

As discussed in Section 4.2, the Cluster Rules require monitoring for certain pollutants at the bleach plant and for other pollutants at the final effluent. However, because the descriptions of monitoring locations in PCS are incomplete, EPA could not always identify which locations were bleach plant effluent and which were final effluent. For this reason, EPA reviewed additional information from mill permits and communication with the mills to identify the outfalls as bleach plant effluent, final effluent, or other outfalls not regulated by the Cluster Rules (e.g., noncontact cooling water or stormwater runoff). EPA's classification of each Phase I mill's outfalls is presented in Appendix A to this report.

#### **4.3.1 Bleached Papergrade Kraft**

EPA collected and reviewed 64 NPDES permits for bleached kraft mills. Although most of the permits included limits based on the Cluster Rules ELGs, monitoring data for many of the regulated pollutants was missing from PCS. Table 4-10 lists, for each of the Cluster Rules pollutants, the number of bleached kraft mills for which EPA found permit limits and the number of mills for which it identified 2004 monitoring data in PCS. Table 4-10 also shows, for the mills with monitoring data in PCS, the number for which EPA did not find permit limits and the number for which it has not yet reviewed permits.

For example, EPA found that permits for 53 direct discharging bleached kraft mills included requirements for monitoring TCDD at the bleach plant, as required by the Cluster Rules. However, EPA identified bleach plant TCDD monitoring data in PCS for only 41 mills. Of these mills, one had no permit requirements for TCDD bleach plant monitoring and EPA has not yet reviewed the permits for five mills. Thus, of the 53 mills with required TCDD monitoring, EPA identified data in PCS for only 35, and data for 18 mills (53 - 35) were missing from PCS.

**Table 4-10. Comparison of Permit-Required Monitoring and Monitoring Data in PCS, for Direct Discharge Bleached Kraft Mills**

	Number of Mills With Permits that Include Cluster Rules Monitoring <sup>a</sup>	Number of Mills With 2004 Data in PCS			Number of Mills with Permit limits but no data in PCS
		Total Mills Monitoring	No permit limits	Mill permit not yet reviewed	
<b>Bleach Plant</b>					
TCDD	53	41	1	5	18
TCDF	52	42	2	5	17
Any Chlorinated Phenolic Compound	52	40 <sup>b</sup>	1	4	17
Chloroform	52	28 <sup>b</sup>	1	3	28
<b>Final Effluent</b>					
AOX	57	37 <sup>b</sup>	1	5	26

<sup>a</sup>Excludes indirect dischargers because their monitoring data is not typically reported to PCS.

<sup>b</sup>Two Parsons & Whittemore mills (Alabama Pine Pulp and Alabama River Pulp) share a permit and their monitoring data are reported to PCS as a single facility; and counted as one reporting mill in this table.

Table 4-11 presents the number of bleached kraft mills with permit limits and no data in PCS. The table also presents EPA’s understanding, at this time, of why permit-required monitoring data are missing from PCS. Washington State does not upload in-plant monitoring data to PCS, which accounts for the TCDD, TCDF, chlorinated phenolic compounds, and chloroform in-plant monitoring data missing for four mills. See Section 4.3.3 for more discussion of the Washington State monitoring data. In addition, one TCF mill has bleach plant limits, but is not required to monitor. EPA has no explanation for why most of the permit-required monitoring data are missing from PCS.

EPA noticed, however, that discharges of some of the Cluster Rules pollutants are reported to PCS at a monitoring location inconsistent with ELGs compliance points. During this study, EPA may have incorrectly identified the bleach plant monitoring location as final effluent or it may be incorrectly identified in PCS. In its Federal Register Notice of the Preliminary 2006 Effluent Guidelines Program Plan, EPA will request that operators confirm EPA's classification of outfalls listed in Appendix A.

**Table 4-11. Number of Bleached Kraft Mills With Permit Limits but No Data in PCS and Why Data are Missing**

	TCDD	TCDF	Any Chlorinated Phenolic Compound	Chloroform	AOX
Data Not Expected in PCS (i.e., Not Required at TCF Mill)	1	1	1	1	
State Does Not Upload In-Plant Monitoring to PCS	4	4	4	4	
Reason for No Data in PCS Unknown	13	12	12	23	26
Total Number of Mills With Permit Limits but No Data in PCS	18	17	17	28	26

**Bleach Plant TCDD and TCDF**

Table 4-12 presents the number of mills monitoring TCDD and TCDF at the bleach plant and the final effluent over the period 1998 to 2004. Too few detectable concentrations were available to conduct a trend analysis on the basis of calculated mass (grams/year) discharged. As an alternative, EPA counted the number of mills monitoring for TCDD and TCDF and the number detecting these pollutants at concentrations above analytical detection limits. Because many mills have more than one bleach plant, for this analysis, EPA counted the number of mills that monitor bleach plant effluent, not the number of bleach plants.

**Table 4-12. Number of Mills Reporting TCDD and TCDF Monitoring Data to PCS, 1998 through 2004**

	1998	1999	2000	2001	2002	2003	2004	Stopped monitoring between 1998 and 2004
TCDD at BP	11	14	18	24	31	34	41	13
TCDD at FE	33	34	34	34	30	32	30	
TCDD at either	41	44	45	45	47	50	52	3
TCDF at BP	2	5	9	20	30	34	42	6
TCDF at FE	14	15	15	15	14	13	12	
TCDF at either	14	17	19	29	38	42	49	

FE - Final effluent.

BP - Bleach plant, internal monitoring location.



Table 4-12 shows two trends are occurring with respect to TCDD bleach plant monitoring. Significantly more mills monitored for these pollutants in 2004 than in 1998. During that same period, 13 mills stopped monitoring; however, in all cases, the mills stopped monitoring when they were issued a new permit. Trends in mill TCDF monitoring follow a similar pattern. Final effluent monitoring for TCDD or TCDF is not required by the Cluster Rules, although it may be necessary to ensure compliance with state water-quality standards.

For the mills that report discharges to PCS in 2002, EPA estimated the 1995 baseline loads of TCDD and TCDF were 17.9 million TWPE. In 2002, TCDD and TCDF discharges from these mills accounted for only 1.3 million TWPE, a 92% reduction from baseline. By 2004, TCDD and TCDF discharges were only 26,493 TWPE, more than 99% reduction from the 1995 baseline.

Monthly data for two mills (International Paper in Pine Bluff, AR and Boise Cascade in St. Helens, OR) were unavailable for the analysis described in this preliminary report because they were not properly identified as pulp mills when the EDS system compiled monitoring data from PCS. *PCSLoads2002* contained calculated loads of 0 lb/yr TCDD for those two mills at the final effluent and bleach plant monitoring locations. Data from these mills is excluded from Section 4.3 tables and analysis, but will be included in the final report of this study that will be prepared in support of EPA's 2006 Effluent Guidelines Program Plan.

Table 4-13 presents the concentrations of TCDD and TCDF detected in wastewaters from 15 bleached kraft mills during the period 2001 through 2004. These concentrations include the corrections to the 2002 PCS data described in Section 3.3. All other measurements included in PCS for this time period were reported as less than the detection limit. The table includes several measured concentrations that are less than the minimum level (ML) for Method 1613B (10 pg/L). Measurements below or equal to the ML demonstrate compliance with the Cluster Rules-based permit limits.

**Table 4-13. Concentration of TCDD and TCDF Detected in Bleached Papergrade Kraft Mill Wastewaters (pg/L)**

Mill (NPDES Permit Number)	Location	2001	2002 <sup>a</sup>	2003	2004
<b>TCDD Detects</b>					
Bowater, Catawba (SC0001015)	FE		83.6 (confirmed)	5.2 <sup>b</sup>	
Weyerhaeuser, Johnsonburg (PA0002143)	other <sup>c</sup>	1.7 - 28.9 <sup>d</sup>	0 (corrected)		
Upper Potomac River Commission, Westernport (MD0021687) <sup>c</sup>	FE		0 (corrected)		10
Georgia-Pacific, Brunswick (GA0003654)	FE			10	
Westvaco, Wickliffe (KY0000086)	BP			10	
Bowater, Calhoun (TN0002356)	BP		0 (corrected)	10	
Pope & Talbot, Halsey (OR0001074)	FE		0 (corrected)	0.5 - 6.7 <sup>b, d</sup>	3.6 - 4.7 <sup>b, d</sup>
Simpson Kraft, Tacoma (WA0000850)	FE	0.8 <sup>b</sup>			
<b>TCDF Detects</b>					
Parsons & Whittemore Alabama River Pulp, Claiborne (AL0025968)	BP		19 (confirmed)		
International Paper, Bastrop (LA0007561)	BP				12.8
Georgia-Pacific, Palatka (FL0002763)	FE				12
Weyerhaeuser, Port Wentworth (GA0002798)	BP		0 (corrected)		
Boise, Jackson (AL0002755)	BP		11.3 (confirmed)		
Bowater, Calhoun (TN0002356)	BP			10	

**Table 4-13 (Continued)**

Mill (NPDES Permit Number)	Location	2001	2002 <sup>a</sup>	2003	2004
Georgia-Pacific, Clatskanie (OR0000795)	FE		0 (corrected)		

FE - Final Effluent.

BP - Bleach Plant, internal monitoring location.

NOTE: if no value is shown, either TCDD and TCDF were not monitored, or reported value was less than detection limit (e.g., <10 pg/L).

<sup>a</sup>Screening-level *PCSLoads2002* data were provided to industry April 5, 2005. Industry confirmed TCDD and TCDF concentrations retrieved from PCS and submitted written explanations where disagreements existed. EPA evaluated the information provided and corrected *PCSLoads2002*.

<sup>b</sup>Concentrations less than method 1613 minimum level.

<sup>c</sup>Outfall is surface impoundment formerly used to treat mill effluent.

<sup>d</sup>More than one concentration measured; measured concentrations presented as a range.

ePOTW receiving chemical pulp mill wastewater from Mead/Westvaco (New Page); Luke (MD0021687).

One mill (Bowater Catawba, SC) confirmed it measured a TCDD concentration of 83.6 pg/L in a final effluent sample collected May 13, 2002 [10]. Bowater reports that, since that date, neither TCDD nor TCDF has been measured in mill wastewaters above the method detection limit (10 pg/L). Bowater reported a TCDD concentration of 5.2 pg/L, also at the final effluent, in 2003. This concentration is less than the Method 1613 ML and demonstrates compliance with the mill's permit limits. Prior to 2002, Bowater Catawba was not yet using Elemental Chlorine-Free (ECF) bleaching technology. The mill is enrolled in Tier 1 of EPA's VATIP and as such was provided with a six-year schedule for compliance with the Cluster Rules requirements. After 2002, the Bowater Catawba mill converted to 100% chlorine dioxide bleaching and started up an advanced fiber line [10].

Table 4-13 includes the TCDD concentration measured in 2001 at the Weyerhaeuser mill in Johnsonburg, PA. The outfall in which TCDD was detected is a surface impoundment that was previously used to treat mill effluent. In 1992, the impoundment was drained and is currently in the process of nonhazardous waste closure. The impoundment is not an active treatment facility, but the permitting authority, Pennsylvania Department of Environmental Protection, requires TCDD monitoring of this outfall due to the accumulated sludge deposits. Discharges from this monitoring location represent past practices and do not reflect current mill operations [11]. Since 2001, no TCDD has been measured at the mill above the method detection limit.

## Bleach Plant Chlorinated Phenolic Compounds

EPA analyzed PCS data for chlorinated phenolic compounds in bleach plant effluent. This analysis was similar to the analysis of TCDD and TCDF discharges. Again, too few detectable concentrations were available to analyze discharge loads (grams/year discharged). Instead, EPA counted the number of mills monitoring for chlorinated phenolic compounds and the number detecting them at concentrations above analytical detection limits.

Table 4-14 presents the number of mills for which chlorinated phenolic compounds data were available in PCS for the period 1998 to 2004. By 2004, approximately 40 bleached kraft mills monitored for chlorinated phenolic compounds. Most of these mills monitor for all 12 of the regulated chlorinated phenolic compounds.

**Table 4-14. Number of Bleached Papergrade Kraft Mills Reporting Chlorinated Phenolic Compounds Data to PCS**

	Mills Reporting Chlorinated Phenolic Compounds Data <sup>a</sup>							Stopped monitoring between 1998 and 2004
	1998	1999	2000	2001	2002	2003 <sup>b</sup>	2004	
Trichlorosyringol		3	7	18	29	33	41	
Total Trichlorophenol <sup>c</sup>	2	2	2	1	2	2	2	1
3,4,5-Trichlorocatechol		3	7	18	29	33	40	
3,4,5-Trichloroguaiacol		1	5	14	24	28	34	
3,4,6-Trichlorocatechol		3	7	18	29	33	40	
3,4,6-Trichloroguaiacol		3	6	17	26	30	38	
4,5,6-Trichloroguaiacol		3	7	18	29	33	41	
Tetrachlorocatechol		3	7	18	29	33	41	
Tetrachloroguaiacol		3	7	17	28	32	40	
2,3,4,6-Tetrachlorophenol		3	6	17	26	30	38	
Pentachlorophenol	2	5	9	18	29	32	40	

<sup>a</sup>Operating under a single permit, the Parsons & Whittemore mills (Alabama Pine Pulp and Alabama River Pulp) in Claiborne, AL reported data for 10 chlorinated phenolic compounds from 2002 through 2004. The identified mill counts include the two Parsons & Whittemore mills.

<sup>b</sup>Excludes one mill (Willamette Industries Inc. in Bennetsville, SC), which measured 10 chlorinated phenolic compounds in year 2003 and at no other time during the 1998 through 2004 study period.

<sup>c</sup>Cluster Rules include limitations for 2,4,6-trichlorophenol and 2,4,5-trichlorophenol. PCS contains only a total trichlorophenol parameter.

Although the Cluster Rules have ELGs for 2,4,6-trichlorophenol and 2,4,5-trichlorophenol, no parameter code exists in PCS for either compound. PCS has a parameter code for total trichlorophenol, and total trichlorophenol data are available in PCS for two mills.

Table 4-14 shows that PCS includes 1998 data for trichlorophenol and pentachlorophenol for two bleached kraft mills, but no other chlorinated phenolic compounds. The number of mills monitoring for chlorinated phenolic compounds has increased steadily over time. As of 2004, PCS had data for at least one chlorinated phenolic compound for 40 bleached kraft mills.

Table 4-15 presents the concentrations of chlorinated phenolic compounds detected in wastewaters from the only two mills that reported these compounds at concentrations above the MLs during the period 2001 to 2004. The MLs achievable by EPA Method 1653 for chlorinated phenolic compounds vary by compound. EPA has confirmed the discharge from International Paper mill in Georgetown, SC [12]. EPA has contacted representatives from the Weyerhaeuser Port Wentworth mill to confirm reported concentrations, but has not yet received a response. Because the Weyerhaeuser-reported concentrations are 1,000 times the method ML, the units reported to PCS may be incorrect.

**Table 4-15. Concentrations of Chlorinated Phenolic Compounds Detected in Bleached Papergrade Kraft Mill Bleach Plant Effluent (µg/L)**

Chlorinated Phenolic Compounds		2001	2002	2003	2004
<b>Weyerhaeuser, Pt. Wentworth</b>		<b>NPDES Permit GA0002798</b>			
3,4,5-trichlorocatechol	BP		2,500 - 5,000 (DL=5)		
3,4,6-trichloroguaiacol	BP		2,500 (DL=2.5)		
<b>International Paper, Georgetown</b>		<b>NPDES Permit SC0000868</b>			
4,5,6-trichloroguaiacol	BP				3,100 (DL=2.5)

FE - Final effluent.

BP = Bleach plant, internal monitoring location.

EPA estimated baseline loads for all mills, including those that share discharges (i.e., Domtar mills in Wisconsin and Parsons & Whittemore mills in Alabama). For the pollutant reduction calculations, EPA summed the baseline loads for the two mills.

For the mills that reported discharges to PCS in 2002, EPA estimated 1995 baseline loads of chlorinated phenolic compounds were 4,178 TWPE. In 2002, reported loads, excluding the two Weyerhaeuser Port Wentworth measurements discussed above, were zero. EPA concludes that the ELGs have been effective at reducing bleach plant discharges of chlorinated phenolic compounds.

### **Bleach Plant Chloroform Loads**

EPA analyzed PCS data for chloroform in bleach plant effluents. Unlike TCDD, TCDF, and chlorinated phenolic compounds, chloroform is typically measured at concentrations above method detection limits. For this reason, EPA was able to calculate the load (grams/year) discharged in each mill's bleach plant effluent. Table 4-16 presents the number of mills for which PCS contains bleach plant chloroform data for the period 1999 to 2004 (PCS contains no bleach plant chloroform data for 1998).

In addition to estimating the annual discharge load for each mill, EPA compared the estimated load to the baseline load it had estimated for the mill, and tallied the number of mills for which the annual load was above the baseline and the number below. Table 4-16 shows that the majority of mills (e.g., 26 of the 29 reporting in 2004) report loads below the facility-specific baseline loads.

**Table 4-16. Number of Mills Reporting Chloroform Monitoring Data to PCS, by Year, and Relative to Baseline**

	1998	1999	2000	2001	2002	2003	2004
Total number of mills with bleach plant chloroform data in PCS	0	3	7	13	22	26	29
Number of mills operating above EPA's estimate of their 1995 baseline load	-	-	1	2	2	2	3
Number of mills operating below EPA's estimate of their 1995 baseline load	-	3	6	11	20	24	26
% reduction from baseline <sup>a</sup>	-	99%	99%	97%	98%	98%	98%

<sup>a</sup>Percent reduction is (EPA estimate of 1995 baseline - PCS reported) / (EPA estimate of 1995 baseline) × 100.

EPA also calculated the difference between the estimated annual loads and baseline loads, and the percent reduction from baseline for the mills with chloroform data in PCS for each year. Table 4-16 presents the percent reduction from baselines for each year, 1999 to 2004. For the 29 mills with data in PCS in 2004, the total annual load was 98 percent less than EPA's estimated 1995 baseline for these mills.

During the 1998-to-2004 study period, chloroform bleach plant loads at three mills were greater than EPA's estimate of their 1995 baseline loads. Table 4-17 presents the annual chloroform loads for these three mills. EPA reviewed PCS permit compliance data for these three mills and determined that they did not violate their chloroform permit limits during the study period.

As of 1995, the mills included in Table 4-17 used no hypochlorite, but instead complete substitution of chlorine dioxide (ClO<sub>2</sub>) for chlorine [8]. Changes in production or bleaching activities might have occurred at each of these mills after 1995 so that discharged loads may no longer be comparable to 1995 estimates. EPA will contact these mills to discuss mill changes.

**Table 4-17. Annual Loads of Three Mills with Chloroform Loads Above Baseline Loads**

	<b>1995 Baseline Load (kg/yr)<sup>a</sup></b>	<b>1995 Bleaching Technology</b>	<b>2000<sup>b</sup> (kg/yr)</b>	<b>2001 (kg/yr)</b>	<b>2002 (kg/yr)</b>	<b>2003 (kg/yr)</b>	<b>2004 (kg/yr)</b>
Bowater, Coosa Pines (AL0003158)	246	No hypochlorite; 100% ClO <sub>2</sub>	NR	317	383	292	271
Weyerhaeuser, New Bern (NC0003191)	111	No hypochlorite; 100% ClO <sub>2</sub>	NR	NR	NR	NR	145
Weyerhaeuser, Columbus (MS0036412)	302	No hypochlorite; 100% ClO <sub>2</sub>	637	1,060	1,384	1,442	958

NR - not reported; PCS does not contain chloroform monitoring data.

<sup>a</sup>Estimated baseline is production multiplied by a discharge factor, based on a mills bleaching chemical.

<sup>b</sup>PCS does not contain chloroform data for any of the three mills prior to 2000.

### **Final Effluent AOX, COD, and Color Loads**

EPA analyzed PCS data for AOX, COD, and color. Final effluent discharges of these pollutants were analyzed during the development of the Cluster Rules because they are generated in pulping and bleaching operations. For this reason, although COD and color discharges are not regulated by the Cluster Rules, EPA analyzed their current discharges along with the discharges of AOX. These pollutants are typically measured in final effluent at concentrations above method detection limits. Consequently, EPA was able to calculate discharge loads (kg/year). Table 4-18 presents the number of mills for which PCS contained monitoring data for these pollutants for the period 1998 to 2004. PCS included data for AOX for 17 mills in 1998, increasing to 38 mills by 2004. PCS includes COD and color data for fewer mills; in 2004, PCS included COD data for 7 mills and color data for 20 mills.

In addition to estimating annual discharge load of AOX, COD, and color for each mill, EPA compared the estimated load to the baseline load it had estimated for the mill, and tallied the number of mills for which the annual load was above the baseline and the number below. Table 4-18 shows that, for AOX, the majority of mills (e.g., 30 of the 38 mills with data in PCS for 2004) report loads below the facility-specific baseline loads.



EPA also calculated the difference between the estimated annual loads and baseline loads, and the percent reduction from baseline. Table 4-18 presents the percent reduction from baseline for all reporting mills, for each year from 1998 to 2004. The calculated annual load for most mills is below EPA's estimate of their baseline loads. During the study period, the annual AOX, COD, or color loads for five mills were zero (kg/yr). EPA calculated zero loads from monthly ML measurements or other "no data" indicators. Zero loads are included in the analysis.

EPA suspects the 1999 AOX discharge from Georgia-Pacific in Port Hudson Mill in Zachary, LA may also be erroneous because it is a hundred times greater than any other calculated load. It has a significant impact on the percent reduction for 1999 and is responsible for the gain with respect to the baseline loads for 1999 shown in Table 4-18. As it completes this study, EPA will contact the Zachary, LA mill to verify the accuracy of the 1999 AOX data in PCS.

**Table 4-18. Number of Mills Reporting Monitoring Data for AOX, COD, and Color to PCS by Year and Relative Baseline Loads**

	1998	1999	2000	2001	2002	2003	2004
<b>AOX</b>							
Total number of mills with AOX data in PCS	17	19	21	27	35	41	38
Number of mills operating above EPA's estimate of their 1995 baseline load	4	5	4	3	8	8	8
Number of mills operating below EPA's estimate of their 1995 baseline load	13	14	17	24	27	33	30
% load reduction (gain) from baseline	60%	(334%)	70%	74%	69%	66%	61%
<b>COD</b>							
Total number of mills with COD data in PCS	0	1	3	2	6	6	7
Number of mills operating above EPA's estimate of their 1995 baseline load	-	1	-	1	-	-	-
Number of mills operating below EPA's estimate of their 1995 baseline load	-	-	3	2	6	6	7
% load reduction (gain) from baseline	-	(6%)	53%	39%	38%	39%	45%

**Table 4-18 (Continued)**

	1998	1999	2000	2001	2002	2003	2004
<b>Color<sup>a</sup></b>							
Total number of mills with color data in PCS	18	18	17	18	21	21	20
Number of mills operating above EPA's estimate of their 1995 baseline load	9	8	7	6	6	8	8
Number of mills operating below EPA's estimate of their 1995 baseline load	9	10	10	12	15	13	12
% load reduction (gain) from baseline	6%	22%	30%	29%	39%	14%	8%

<sup>a</sup>VATIP mills excluded from counts.

EPA did not promulgate limits for COD or color under the Cluster Rules, but the state permit writers have the authority to develop facility permit limits that are protective of state water-quality standards (i.e., water-quality-based effluent limits (WQBEL)). Some states with sensitive receiving streams have chosen to include final effluent limits for COD and/or color in bleached kraft mill permits. Table 4-19 presents the number of mills with COD or color data in PCS, by state.

**Table 4-19. Number of Mills With COD or Color Data in PCS in 2004, by State**

	Mill Population in 1998		Mills with 2004 Data in PCS		Report COD <sup>a</sup>	Report Color <sup>b</sup>	
	BPK	PS	BPK	PS	2004 <sup>c</sup>	2004	Between 1998 and 2004
Alabama	11		8			1	1
Maine	7	1	6			3	5 <sup>d</sup>
Washington	4	3 <sup>e</sup>	4	1			
Wisconsin	2	5	2	3			
Georgia	5		3		1	2	2
Pennsylvania	5	1	3		2	3	3
Texas	5		2				
Arkansas	4		4				
Florida	4		2			1	1
Louisiana	4		4				
North Carolina	4		4		1	2	2
South Carolina	4		4			2	3

**Table 4-19 (Continued)**

	Mill Population in 1998		Mills with 2004 Data in PCS		Report COD <sup>a</sup>	Report Color <sup>b</sup>	
	BPK	PS	BPK	PS	2004 <sup>c</sup>	2004	Between 1998 and 2004
Michigan	3		2				
Mississippi	3		2				
Oregon	3		3			1	2
Virginia	3		3		3	3	3
California	2		1				
Kentucky	2		2				
Minnesota	2		1				
New York	1	1	1	1		1	1
Tennessee	2		2			1	1
Idaho	1		1				
Maryland	1						
Montana	1						
New Hampshire	1		1				
Ohio	1		1				
Total	84	11	66	5	7	20	24

<sup>a,b</sup>PCS does not include COD or color data for papergrade sulfite mills.

<sup>c</sup>No mills that reported COD loads to PCS have stopped monitoring during the study period (1998 through 2004). The population of mills reporting COD is greatest in 2004.

<sup>d</sup>The only Maine mill that did not report a color load to PCS is Lincoln Pulp & Paper (ME0002003). EPA has not collected the mill's permit. The Lincoln mill's active permit was issued on 1/23/1997 and expired 3/31/2002.

During the study period, annual loads of either AOX, COD, or color for 21 mills were greater than EPA's estimate of their baseline load. Table 4-20 presents estimated loads for the five mills for which the calculated annual load for more than one pollutant was observed above baseline. Changes in production or bleaching activities might have occurred at each of these mills after 1995 so that discharged loads might no longer be comparable to 1995 estimates.

**Table 4-20. Mills for Which Calculated Annual Load Exceeded EPA Estimated Baseline Load for More than One Pollutant**

	<b>Pollutant</b>	<b>EPA's Estimated Baseline Load (kg/y)</b>	<b>Highest Measured Load (yr)</b>	<b>Highest Measured Load (kg/y)</b>	<b>2004 Load (kg/y)</b>
Kimberly-Clark Corp, Coosa Pines (AL0003158)	AOX	126,126	2001	172,460	125,880
	Color	15,110,200	1998	84,844,730	31,937,542
Weyerhaeuser, Port Wentworth (GA0002798)	AOX	115,045	2004	256,020	256,020
	Color	18,165,000	2003	39,235,226	24,631,232
Pope & Talbot, Halsey (OR0001074)	AOX	66,633	2003	380,037	33,026
	Color	7,540,050	1999	13,113,683	3,251,130
Weyerhaeuser, Bennettsville (SC0042188)	AOX	92,329	1999	279,528	not reported
	Color	10,447,710	1998	30,733,522	not reported
Stone Container, West Point (VA0003115)	COD	10,668,616	1999	11,342,612	8,949,075
	Color	16,383,946	1999	23,364,280	19,067,745

The Weyerhaeuser Flint River Mill is classified as a minor discharger by the state of Georgia; therefore, PCS does not contain discharge data for that mill. The mill voluntarily supplied final effluent monitoring data for AOX, color, and various other conventional pollutants that are measured at the facility [13]. Table 4-21 shows AOX and color loads for this mill; each were significantly below EPA's estimated baseline loads.

**Table 4-21. Weyerhaeuser Flint River Mill (Oglethorpe GA) Calculated Annual Load Compared to EPA Estimated Baseline Load**

	<b>Pollutant</b>	<b>EPA's Estimated Baseline Load (kg/y)</b>	<b>Highest Measured Load (yr)</b>	<b>Highest Measured Load (kg/y)</b>	<b>2004 Load (kg/y)</b>
Weyerhaeuser/Flint River Mill Oglethorpe, GA	AOX	213,629	2002	33,371	7,468
	Color	13,695,500	2004	380,305	380,305

### **4.3.2 Papergrade Sulfite**

As discussed in Section 4.2.3, at the time the Cluster Rules were promulgated, 11 papergrade sulfite mills operated in the United States. EPA identified six papergrade sulfite mills operating in 2004. These six mills include four mills that produce pulp using calcium, magnesium, or sodium sulfite acidic cooking liquors (Segment A); and two mills that produce pulp using an ammonium sulfite acidic liquor (Segment B). Monitoring results for one of these six mills (Domtar Port Edwards) were analyzed with the bleached kraft mill data, because this mill shares a wastewater treatment facility and an NPDES permit with the Domtar Nekoosa bleached kraft mill.

Cluster Rules ELGs for papergrade sulfite mills differ from the ELGs for bleached kraft mills. As summarized in Table 4-3, the ELGs for direct discharging papergrade sulfite mills include:

- Limits only for final effluent AOX for calcium, magnesium, or sodium sulfite mills (Segment A); and
- Bleach plant limits for TCDD, TCDF, and chlorinated phenolic compounds, but not for chloroform or final effluent AOX limits, for ammonium-based sulfite mills (Segment B).

Data are available in PCS for only two papergrade sulfite mills, one magnesium-sulfite mill (Segment A) and one ammonium sulfite mill (Segment B). Table 4-22 presents the baseline loads for these two mills and the estimated loads for 1998 through 2004. Available loading information for each segment is discussed below.

#### **Calcium, Magnesium, or Sodium-Based Sulfite Mills (Segment A)**

Although the Cluster Rules require Segment A mills to monitor AOX at the final effluent, permits for the three Segment A mills do not contain AOX limits, and PCS contains no AOX loads for these mills for 1998 through 2004. Table 4-22 presents data for one mill

(Weyerhaeuser in Rothschild, WI). The concentrations of TCDD and TCDF in final effluent reported for this mill were below the Method 1613B detection limit.

### Ammonium-Based Sulfite Mills (Segment B)

PCS includes monitoring data for all Cluster Rules pollutants for only one of the two ammonium-based sulfite mills (Finch Pruyn in Glens Falls, NY). Table 4-22 presents calculated annual loads where data were available. It should be noted that Finch Pruyn experienced periods of low paper production from 2001 through 2004 due to labor and market conditions, so AOX and other discharges during that period do not reflect normal mill operations.

EPA has not analyzed PCS discharge data for the other ammonium-based sulfite mill (Kimberly-Clark Worldwide in Everett, WA). Washington State has examined this mill's in-plant monitoring data for compliance, but did not submit the data to PCS. See Section 4.3.3 for a discussion of Washington State data.

**Table 4-22. Loads for Two Papergrade Sulfite Mills, 1995 Baseline and 1998 through 2004**

<b>Weyerhaeuser, Rothschild (WI0026042) Magnesium Sulfite, Segment A</b>	<b>EPA's Estimated Baseline Load (kg/y)</b>	<b>1998 (kg/y)</b>	<b>1999 (kg/y)</b>	<b>2000 (kg/y)</b>	<b>2001 (kg/y)</b>	<b>2002 (kg/y)</b>	<b>2003 (kg/y)</b>	<b>2004 (kg/y)</b>
TCDD (final effluent)	0	ND	ND	ND	ND			
TCDF (final effluent)	0	ND	ND	ND	ND			
<b>Finch Pruyn; Glens Falls (NY0005525)<sup>a</sup> Ammonium Sulfite, Segment B</b>	<b>EPA's Estimated Baseline Load (kg/y)</b>	<b>1998 (kg/y)</b>	<b>1999 (kg/y)</b>	<b>2000 (kg/y)</b>	<b>2001 (kg/y)</b>	<b>2002 (kg/y)</b>	<b>2003 (kg/y)</b>	<b>2004 (kg/y)</b>
AOX	323,559				41,834	1,826	63,692	190,568
Chlorinated Phenolic Compounds (bleach plant)								
Trichlorosyringol	53				ND	ND	ND	ND
3,4,5-Trichlorocatechol	347				ND	ND	ND	ND
3,4,5-Trichloroguaiacol	117				ND	ND	ND	ND
3,4,6-Trichlorocatechol	11				ND	ND	ND	ND
3,4,6-Trichloroguaiacol	21				ND	ND	ND	ND
4,5,6-Trichloroguaiacol	83				ND	ND	ND	ND

**Table 4-22 (Continued)**

<b>Finch Pruyn; Glens Falls (NY0005525)<sup>a</sup> Ammonium Sulfite, Segment B</b>	<b>EPA's Estimated Baseline Load (kg/y)</b>	<b>1998 (kg/y)</b>	<b>1999 (kg/y)</b>	<b>2000 (kg/y)</b>	<b>2001 (kg/y)</b>	<b>2002 (kg/y)</b>	<b>2003 (kg/y)</b>	<b>2004 (kg/y)</b>
Tetrachlorocatechol	88				ND	ND	ND	ND
Tetrachloroguaiacol	45				ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	6				ND	ND	ND	ND
Pentachlorophenol	11				ND	ND	ND	ND
TCDD (bleach plant)	0.0002 (g/yr)				ND	ND	ND	ND
TCDF (bleach plant)	0.0018 (g/yr)				ND	ND	ND	ND

<sup>a</sup>2001 to 2004 was a period of low production due labor and market conditions.  
 ND - Concentrations were below the method detection limit.

### **4.3.3 Washington State Paper Mills**

During this detailed review, EPA found that data from only two of the six Washington State mills are included in PCS from 1998 through 2004. As of 2004, six active pulp and paper mills were located in Washington State, including five bleached kraft and one papergrade sulfite mill. In 2004, each of these mills monitored mill effluents for TCDD and TCDF. Typically, these data are submitted to the Washington Department of Ecology, imported into the state's database (the Water Quality Permit Lifecycle System), examined for compliance by the state, and transferred to EPA's PCS system. Because of an error in this transfer process, data from only two of the six Washington State mills are included in PCS (Weyerhaeuser in Cosmopolis and Simpson Kraft in Tacoma). All values of TCDD but one that are included in PCS for these mills are "not detected." The exception is one 2001 measurement from the Simpson Tacoma Kraft Mill, reported as 0.8 pg/L, which is less than the Method 1613 ML of 10 pg/L.

EPA contacted the Washington Department of Ecology about the missing data. The Department of Ecology provided bleach plant concentration data for each of its active mills, but no discharge flow data [14]. Table 4-23 summarizes the reported TCDD and TCDF data, presenting the number of times the pollutant was detected during the reporting year and the number of measurements. For example, the TCDD counts for 2001 for Boise, Wallula are shown as 0/6. This means that all six TCDD measurements made in 2001 were nondetects.

**Table 4-23. Counts of TCDD and TCDF Detected in Washington State Phase I Mill Bleach Plants**

	NPDES Permit Dates	Pollutant	Number of Detects/Number of Measurements			
			2001	2002	2003	2004
<b>Bleached Kraft Mills</b>						
Boise, Wallula (WA0003697)	issued: 7/1/01 expires: 7/1/06	TCDD	0/6	0/12	0/12	0/12
		TCDF	2/6	1/12	0/12	2/12
Simpson Tacoma Kraft, Tacoma (WA0000850)	issued: 11/1/01 expires: 11/1/06	TCDD	0/1	0/12	0/12	0/12
		TCDF	0/1	0/12	0/12	0/12
Weyerhaeuser, Longview (WA0000124)	issued: 6/1/04 expires: 6/1/09	TCDD				0/7
		TCDF				3/7
James River <sup>a</sup> (Georgia-Pacific), Camas (WA0000256)	issued: 4/15/03 expires: 4/15/08	TCDD			K4: 0/8 K5: 0/8	K4: 0/12 K5: 0/12
		TCDF			K4: 0/8 K5: 0/8	K4: 0/12 K5: 0/12
<b>Papergrade Sulfite Mill (Ammonium-Based, Segment B)</b>						
Kimberly-Clark, Everett <sup>b</sup> (WA0000621)	issued: 11/15/04 expires: 2/1/09	TCDD	2/12	0/13	1/17	0/14
		TCDF	13/14	12/13	16/17	10/12
		TCDF (intake) <sup>b</sup>			10/11	8/12

NOTE: If no value is shown, the mill did not monitor for that pollutant.

<sup>a</sup>The James River in Camas, WA monitors TCDD and TCDF at two fiber lines (K4 and K5).

<sup>b</sup>Samples were collected at water intake to determine the extent of external TCDF formation.

As shown in Table 4-23, TCDF was detected in bleach plant effluent from three of the Washington State Phase I mills. Although the Boise, Wallula and Weyerhaeuser, Longview mills detected TCDF, the concentrations were less than the Cluster Rules daily maximum limitation (31.9 pg/L). The Kimberly-Clark, Everett mill detected TCDF at concentrations greater than the Cluster Rules daily maximum limitation and it also exceeded Cluster Rules daily maximum limitations for TCDD. The Kimberly-Clark mill in Everett is discussed in more detail in Section 5.0.



## 5.0 REVIEW OF TRI DATA

As noted in Section 1.0, EPA is conducting this detailed study of the Pulp and Paper Category because it ranked highest among all point source categories for toxic pollutant discharges [1]. EPA calculated this rank using the sum of the TRI-reported pounds, weighted by toxicity, and the estimated PCS annual discharges, weighted by toxicity. EPA refers to pounds weighted by toxicity as toxic-weighted pound equivalents (TWPE). For the Pulp and Paper Category these estimates are:

$$(\text{TRI}) 3.13 \text{ million TWPE} + (\text{PCS}) 1.52 \text{ million TWPE} = 4.65 \text{ million TWPE}$$

As discussed in Section 4.3.1, EPA estimated that, in 2002, one bleached kraft mill, Bowater Catawba, SC, discharged 0.88 grams of TCDD, which equates to 1.37 million TWPE.<sup>4</sup> This mill has since changed its operations and has not detected either TCDD or TCDF in its discharges since 2002. Without the Bowater-related PCS TWPE, the category discharges are:

$$(\text{TRI}) 3.13 \text{ million TWPE} + (\text{PCS}) 0.15 \text{ million TWPE (without Bowater Catawba)} = 3.28 \text{ million TWPE}$$

The TRI TWPE for the Pulp and Paper Category is almost four times greater than any other category. Because of this very large TRI TWPE, even without the Bowater-related PCS TWPE, this category ranks highest among all point source categories for toxic and nonconventional pollutant discharges.

This section presents EPA's preliminary analysis of the Pulp and Paper Category pollutant discharges reported to TRI. Both Phase I and Phase II mills are included in this analysis. Phase III mills are not included because, as discussed in Section 1.2, in 2004 EPA determined that it would not promulgate revised ELGs for Phase III mills. EPA's analysis of TRI data is presented in the following subsections:

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<sup>4</sup>Although this mill dominates the PCS TWPE, it does not similarly dominate the TRI TWPE. Its 2002 dioxins release is less than 6% of the Pulp and Paper Category's total TRI-reported dioxins releases.

- Section 5.1: *TRIRelases2002* Results Discussed with AF&PA;
- Section 5.2: TRI-Reported Dioxins Releases;
- Section 5.3: Comparison of TRI and PCS Dioxins Discharge Data;
- Section 5.4: TRI-Reported Polycyclic Aromatic Compounds (PACs); and
- Section 5.5: Metals and Other Chemicals Reported to TRI.

## 5.1 *TRIRelases2002* Results Discussed with AF&PA

Table 5-1 lists the 10 pollutants with the highest TWPE of TRI-reported discharges for 2002, in order of descending TWPE. Table 5-1 lists the number of mills that reported pollutant discharges to TRI and for each pollutant, the number of mills that reported discharges, the pounds discharged, and TWPE. Discharges include direct discharges to surface waters and transfers to POTWs. POTW transfers are included in the total discharges after POTW removals are taken into account.

**Table 5-1. Top 10 Pollutants in *TRIRelases2002*, for Phase I and Phase II**

Number of TRI-reporting Facilities	Phase I			Phase II			Total
	87 mills			169 mills			256 mills
Pollutants	Mills	Released (lbs)	TWPE	Mills	Released (lbs)	TWPE	TWPE
Dioxins	47	0.1334	2,760,188	14	0.0129	46,363	2,806,551
Lead and Lead Compounds	71	12,717	28,485	114	16,695	37,396	65,881
Manganese and Manganese Compounds	72	3,436,371	49,597	39	857,936	12,383	61,980
PACs	51	884	30,231	27	440	15,067	45,298
Chlorine	5	26,382	13,433	7	21,357	10,874	24,307
Zinc and Zinc Compounds	47	234,243	10,983	24	73,751	3,458	14,441
Potassium Dimethyldithiocarbamate	NR	NR	NR	1	12,341	11,519	11,519
Mercury and Mercury Compounds	32	37	4,289	41	24	2,798	7,087
Copper and Copper Compounds	5	2,539	1,612	5	1,424	904	2,516
Vanadium and Vanadium Compounds	25	43,253	1,514	9	8,447	296	1,809
			<b>2,906,906</b>			<b>143,581</b>	<b>3,050,487</b>

Source: *TRIRelases2002*.

NR - Not Reported.

The largest contributor to the TWPE for both Phase I and Phase II is dioxins, which account for 95% of the Phase I TWPE and 92% of the Phase II TWPE.

EPA met with AF&PA and NCASI April 5, 2005. Prior to that meeting, EPA provided AF&PA with a spreadsheet listing the category's 2002 TRI-reported discharges [15]. Following the meeting, EPA revised its estimates of toxic-weighted TRI-reported discharges, in part because of information provided by AF&PA. The data presented in Table 5-1 reflect EPA's revised estimates. As discussed in more detail later in this section, EPA's revisions included developing a category-specific TWF for PACs discharged by pulp and paper mills and correcting the dioxin congener distribution for one mill [1].

At the time of the April 5 meeting, EPA estimated that dioxins releases amounted to 2.8 million TWPE, accounting for 90% of the category TWPE. Using a worst-case assumption that all PACs discharged by the category were benzo(a)pyrene, EPA estimated that PACs releases amounted to 140,733 TWPE, accounting for 4% of the category TWPE. To provide EPA with a better understanding of the basis for mill-reported releases, NCASI contacted the 9 mills with the highest reported dioxins releases, the 10 mills with the highest reported PACs releases, and also provided EPA with information from *NCASI's Handbook of Chemical-Specific Information for SARA Section 313 Form R Reporting* (SARA Handbook) [6]. In EPA's April 5 estimates of TRI-reported toxic discharges, lead, manganese, and other metals, ranked below dioxins and PACs in total category TWPE. Because these pollutants contributed less to EPA's earlier estimates of the category TWPE, AF&PA did not provide EPA with information about how mills estimate releases of metals and metal compounds.

## **5.2 TRI-Reported Dioxins Releases**

NCASI contacted 9 of the 10 mills that reported the largest dioxins releases for 2002 (one mill, Durango, has closed and was not contacted). Table 5-2 presents the information about these mills that NCASI provided to EPA [16]. Six of the nine mills contacted by NCASI estimated their discharges based on information contained in the SARA Handbook. One mill

(Blandin) used a mass balance developed using SARA Handbook factors combined with its chemical analysis of untreated wastewater.

Two mills, both in Phase I, used monitoring data to estimate their 2002 TRI-reported dioxins discharges. Kimberly-Clark, Everett, WA has monitoring data for TCDF, but (as reported by NCASI) subtracts the contribution from its water supply. Bowater, Catawba, SC had effluent monitoring data, including detected concentrations of TCDD and TCDF<sup>5</sup> and detected concentrations of other congeners. (As previously noted, Bowater has not detected TCDD or TCDF in its effluent above the Method 1613B ML since 2002.) AF&PA provided EPA with the monitoring data Bowater used to estimate its 2002 TRI release [17]. Using these monitoring data, EPA adjusted the congener distribution used to calculate the mill-specific dioxins TWF. This adjustment reduced the estimated TWPE for the Bowater discharges.

Most of the mills contacted by NCASI used dioxins concentrations presented in SARA Handbook *Table 14 (PCDD/F Concentrations in Eight ECF Bleached Chemical Pulp Mill Treated Effluents (NCASI 2002))* [18] to estimate their releases. The mills used the total CDD/Fs value of 88.2 pg/L, a sum calculated using zero for congeners not detected [16]. The mills multiplied their annual wastewater discharge flow by this concentration to calculate the annual mass discharge reported to TRI.

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<sup>5</sup>Bowater Catawba, SC provided a table showing that it detected 2.7 pg/L TCDD and 2.1 pg/L TCDF in mill effluent. Both concentrations are less than the Method 1613B ML (minimum level) of 10 pg/L [17].

**Table 5-2. Dioxin and Dioxin-Like Compound Releases to Water Reported in TRI by Top 10 Mills for Reporting Year 2002**

Facility and Location	Basis for Report	Annual Wastewater Flow (million gallons/yr)	Effluent Concentration Used for Reporting (pg/L)	Release to Water Reported (lb/yr)
Kimberly-Clark Worldwide Inc., Everett, WA	Mill used process mass balance.	–	–	0.0180
Fort James Operating Co., Pennington, AL	Mill used NCASI factors [18].	15,950.5	88.2	0.0117
Georgia-Pacific Crossett Paper Ops., Crossett, AR	Mill used NCASI factors [18].	14,801	88.2	0.0109
Potlatch Corp. Idaho Pulp & Paperboard, Lewiston, ID	Mill used NCASI factors [18].	12,472	88.2	0.00941
Bowater Inc. Coated & Specialty Papers Div., Catawba, SC	Effluent analyses [17].	7,738	121.9	0.00806
Fort James Camas L.L.C., Camas, WA	Mill used NCASI factors [18].	10,728	88.2	0.0079
Durango-Georgia Paper Co., St. Marys, GA	Mill is closed, NCASI did not contact.	NA	NA	0.00745
Georgia-Pacific Corp. Port Hudson Ops., Zachary, LA	NCASI factors (estimated using NCASI Handbook Table 12 - for non-ECF mills) [19].	8,293	105.7	0.00731
Blandin Paper Co., Grand Rapids, MN	Actual data for untreated wastewater less contributions from raw water (SARA Handbook Table 17) and clay (SARA Handbook Table 20) [20].			0.0414
Domtar Maine Corp., Baileyville, ME	NCASI factors [18].	9,437.5	88.2	0.00695

Source: NCASI, April 29, 2005 [16].

NA -Not Applicable.

In addition to the amount of each toxic chemical released, facilities are required to report to TRI the method used to estimate the releases. Table 5-3 presents the methods for estimating dioxins releases reported by pulp mills. TRI defines the estimation methods presented in the table as follows:

- **M - Monitoring Data or Direct Measurement:** An accurate method for developing chemical releases. Monitoring required to be performed under the Cluster Rules or other regulations should be available for developing estimates. If only a small amount of direct measurement data are available or the data are not representative, another technique may give a more accurate result.
- **E - Emission Factor:** A representative value that attempts to relate the quantity of a chemical released with an associated activity. These factors are usually expressed as the weight of chemical released divided by a unit weight, volume, distance, or duration of activity releasing the chemical (e.g., pounds of chemical released per pound of product produced).
- **C - Mass Balance:** Calculation method to determine the amount of chemical entering and leaving an operation. Most useful for chemicals that do not become part of the final product, such as catalysts. For large inputs and outputs, such as wastewater flow, a mass balance may not be the best estimation method. Slight uncertainties in mass calculation can yield significant errors in the release or other waste management activities.
- **O - Engineering Calculation:** Assumptions and/or judgements used to estimate quantities of chemical released. The quantities are estimated by using physical and chemical properties and relationships or by modifying an emission factor to reflect the chemical properties of the chemical in question.

As shown in Table 5-3, 53% of Phase I mills and no Phase II mills which reported dioxins releases reported using emission factors to estimate their releases.

**Table 5-3. Number of Mills' TRI Estimation Techniques for Mills Reporting Non-Zero Dioxins Discharges**

Estimation Method	Phase I		Phase II	
	Number	Percent	Number	Percent
Engineering Calculations (O)	8	19%	4	44%
Direct Measurement (M)	10	23%	2	22%
Emission Factor (E)	23	53%	-	-
Mass Balance (C)	2	5%	3	33%
<b>Total Number of Reported Releases</b>	<b>43</b>		<b>9</b>	

Source: *TRIReleases2002*.

### 5.3 Comparison of TRI and PCS Dioxins Discharge Data

Table 5-4 compares TRI and PCS data for the number of mills reporting non-zero dioxins discharges and the mass released. For TRI, 47 Phase I and 15 Phase II mills reported releases of a total of 68.6 grams of dioxin and dioxin-like compounds in 2002. In contrast, PCS contains data for only one mill (Bowater, Catawba, SC) that reported final effluent discharge of either TCDD or TCDF. Based on PCS data, EPA estimated that the Bowater Catawba mill discharged 0.88 grams of TCDD in 2002.

**Table 5-4. Comparison of TRI and PCS; Number of Mills Reporting Non-Zero Releases and Mass of Dioxins Released**

		Phase I	Phase II
<i>TRIReleases2002</i>			
Mills reporting dioxin and dioxin-like compounds greater than zero <sup>a</sup>	Number of mills	47	14
Total reported category discharge <sup>b</sup>	Grams/yr	60.4	5.9
<i>PCSLoads2002</i>			
Mills reporting TCDD greater than zero <sup>a</sup>	Number of mills	1	0
Total category discharge	Grams/yr	0.88	0
Mills reporting TCDF greater than zero <sup>a</sup>	Number of mills	0	0
Total category discharge	Grams/yr	0	0

<sup>a</sup>Mills reporting discharge of zero are not presented.

<sup>b</sup>Indirect and direct discharges reported; indirect account for POTW removal (83% estimated for dioxin and dioxin-like compounds).

Bowater reported to TRI that they discharged 3.6 grams of dioxin and dioxin-like compounds in 2002. According to information provided by NCASI, this estimate was based on the average daily flow of 21.2 million gallons per day (MGD) and “total CDD/Fs” concentration of 121.9 pg/L [17]. Using concentration and flow information in PCS, EPA calculated that the mill discharged 0.88 grams of TCDD in 2002. The Bowater PCS discharge was the result of a single measurement (83.6 pg/L) above the method detection limit (10 pg/L). Because this concentration was measured on a quarterly reporting cycle, to calculate the annual discharge load (pounds/year), EPA assumed it represented the mill’s effluent concentration for three months.

Kimberly-Clark in Everett, WA had the largest 2002 TRI-reported releases of dioxins and dioxin-like compounds (8.19 grams), but no TCDD or TCDF data are reported to PCS for this mill.

Based upon discussions of the PCS reported load that EPA had with the mill and Washington Department of Ecology, there are two factors that contribute to the mill’s TCDF discharges. First, the Washington Department of Ecology, Kimberly-Clark, and EPA’s Chemical Engineering Branch have determined that the mill’s water intake contains unchlorinated TCDF precursors, and at certain times of the year TCDF formation occurs [21]. Second, the chlorination process used at the mill is atypical and has been shown to generate 2,3,7,8-TCDF, which transfers to the mill process water [16]. To quantify intake loadings, the mill collects TCDF measurements of the chlorinated process water. The mill’s NPDES permit contains Cluster Rules TCDD and TCDF bleach plant monitoring requirements and an allowance for TCDF periodic measurements above the method detection limit (10 pg/L). Compliance monitoring data were not contained in PCS, but were provided by the Washington Department of Ecology. Kimberly-Clark has measured TCDF in both the process water and bleach plant effluent from 2001 through 2005 [14]. EPA will continue to investigate TCDD and TCDF loads at the Everett mill.



#### 5.4 TRI-Reported PACs

NCASI contacted the 10 mills that reported the largest PACs releases for 2002. Table 5-5 presents the information about these mills NCASI provided to EPA [16]. Seven of the nine mills for which NCASI obtained information estimated their discharges based on information contained in the SARA Handbook. The two remaining mills estimated releases based on results of chemical analysis of their wastewater. For both mills, concentrations of all PACs were less than analytical detection limits, but the mills used a fraction of the detection limit to estimate a pollutant mass discharged for TRI.

The mills that used the SARA Handbook to estimate their TRI releases used *Table 5 PAC Concentrations in Pulp Mill Effluents*. This table is reproduced as Table 5-6. NCASI explained that where mills chose to use the data in SARA Handbook *Table 5*, they used the value in the “TOTAL” column that corresponded to their pulping type.

EPA used the data from Table 5-6 to calculate a category-specific toxicity weighting factors (TWF) for PACs discharged by pulp and paper mills [1]. Because there are few bisulfite, chemi-thermo- mechanical pulp, and thermo-mechanical pulp mills compared to the number of kraft mills, EPA used the kraft mill concentrations to calculate the category PAC TWF.

**Table 5-5. PAC Releases to Water Reported in TRI by Top 10 Mills for Reporting Year 2002**

Facility and Location	Basis for Report	Annual Wastewater Flow (million gallons/yr)	Effluent Concentration Used for Reporting (µg/L - unless otherwise stated)	Release to Water Reported (lb/yr)
Groveton Paper Board, Inc., Groveton	Mill believes it produces PACs in semi-chemical liquor combustion kiln that is fitted with a wet scrubber. Treated effluent analysis for 10 PACs made in conjunction with an NPDES Permit application showed all PACs analyzed (10 cmpds) were not detected at 5 ppb. Mill used 1 ppb for all analyzed PACs as the basis for reporting [22].	1,788.5	10 ppb (1 ppb for each of 10 PACs)	149.2
Meadwestvaco Maryland Inc., Luke	Mill used annual priority pollutant scan for which 8 PACs were reported to be not detected at a detection limit of 5.0 ppb. Mill used ½ of detection limit for reporting [23].	7,641.3	20 ppb (2.5 ppb for each of 8 PACs)	1,269.5 (transferred to POTW)
Alabama River Pulp Co. Inc., Perdue Hill	Mill used NCASI factors [24].	14,288.7 (kraft) 1,768.0 (TMP)	0.213 (kraft) 0.789 (TMP)	39
Rayonier Performance Fibers Jesup Mill, Jesup	Mill used NCASI factors [24].	20,576	0.213	37
Weyerhaeuser Pulp Mill, Cosmopolis	Mill used NCASI factors [24].	7,394	0.605	37
Domtar Inds. Inc. Ashdown Mill, Ashdown	Mill used NCASI factors [24].	20,121	0.213	35.7
Monadnock Paper Mills, Inc., Bennington	Mill has not responded to request for information.			
International Paper, Augusta	Mill used NCASI factors. Mill has since identified an error in the calculation and will be filing a correction.			32.1
SP Newsprint Co. Newbert Mill, Newberg	Mill used NCASI factors [24].	4,716	0.789	30.8
International Paper Courtland Mill, Courtland	Mill used NCASI factors [24].	17,045.9	0.213	30.24

Source: NCASI, April 29, 2005 [16].

TMP - Thermo-mechanical pulp.

**Table 5-6. PAC Concentrations in Pulp Mill Effluents (H.-C. Lavellee, Inc. 1990)<sup>a</sup>**

Pulping Type	N <sup>b</sup>	PAC ->	1	2	3	4	5	6	Total <sup>c</sup>
		Concentration (ppb or µg/L)							
		MDL	0.05	0.05	0.05	0.1	0.05	0.1	
Kraft	2	Range					ND to Tr		
		Average	ND	ND	ND	ND	0.038	ND	0.213
Bisulfite	4	Range	ND to 0.07				ND to 1.6		
		Average	0.036	ND	ND	ND	0.419	ND	0.605
Chemical Thermo-mechanical Pulp	4	Range					ND to 0.055		
		Average	ND	ND	ND	ND	0.033	ND	0.208
Thermomechanical Pulp	2	Range		ND to 0.13	ND to 0.65		ND to 0.42	ND to 0.1	
		Average	ND	0.078	0.338	ND	0.223	0.075	0.789
Fine Paper <sup>d</sup>	1	Range	ND	ND	ND	ND	ND	ND	
		Average							ND (0.40)

MDL - Method Detection Limit.

Tr - Trace (assumed equal to MDL).

ND - Not Detected.

<sup>a</sup>Only for mills that use chemicals containing trace quantities of PACs; PACs are not manufactured during pulping or bleaching (Young et al. 1990).

<sup>b</sup>Number of mills tested.

<sup>c</sup>Compounds reported as less than the detection limit have been included in the total at one-half the detection limit.

<sup>d</sup>Non-integrated mill.

**PACs in the Table:**

1 - Benzo(a)anthracene; 2 - Benzo(a)pyrene; 3 - Benzo(b+k)fluoranthene; 4 - Dibenzo(a,h)anthracene; 5 - Fluoranthene; 6 - Indeno(1,2,3-c,d)pyrene.

NCASI calculated the emission factors for the industry based on six PACs: benzo(a)anthracene, benzo(a)pyrene, benzo(b+k) fluoranthene, dibenzo(a,h)anthracene, fluoranthene, and indeno(1,2,3-c,d)pyrene. For the kraft mills, only fluoranthene was detected above the method detection limit; however, four of the other five compounds were detected above the method detection limit for the other pulping types. Because the calculated TWF will be used for all mills in the Pulp and Paper Category, EPA used one-half the detection limit for compounds that were not detected in kraft mill wastewaters. NCASI also calculated the emission factor using one-half the detection limit for compounds that were not detected. As shown in Table 5-1, when the PACs TWPE is calculated using the category-specific TWF, PACs account for the fourth highest TWPE of the TRI-reported chemical discharges for Phase I and

Phase II mills, comprising 1.5% of Phase I and Phase II TWPE. This is a significant change from the April 5, 2005 results, in which PACs comprised 4% of the Phase I and Phase II TWPE.

Table 5-7 presents the methods for estimating PACs releases reported by pulp and paper mills. As shown in Table 5-7, 77% of Phase I mills and 65% of Phase II mills that reported PACs releases reported using emission factors to estimate their releases.

**Table 5-7. Number of Mills Reporting PAC TRI Estimation Techniques, by Phase and Discharge Type**

	Phase I		Phase II	
	Number	Percent	Number	Percent
Engineering Calculations (O)	10	18%	8	31%
Direct Measurement (M)	3	5%	1	4%
Emission Factor (E)	44	77%	17	65%
Mass Balance (C)	-	-	-	-
<b>Total Number of Reported Releases</b>	<b>57</b>		<b>26</b>	

Source: *TRIRelases2002*.

Note: See descriptions of O, M, E, and C on page 5-6.

## **5.5 Metals and Other Chemicals Reported to TRI**

As shown in Table 5-1, after dioxins, the pollutants with the largest TWPE reported discharged by Phase I and Phase II mills are lead and lead compounds and manganese and manganese compounds. A total of 185 Phase I and Phase II mills reported discharges of lead and lead compounds, more mills than reported discharges of any other pollutant. As it completes this detailed study, EPA will discuss with AF&PA and NCASI how mills estimate their TRI-reported discharges of these pollutants. EPA will also investigate technical literature to learn more about possible process sources of these wastewater pollutants.

Thirteen mills reported wastewater discharges of chlorine (Cl<sub>2</sub>). However, chlorine reacts very quickly with water to form HOCl, Cl<sup>-</sup>, and H<sup>+</sup>. This is an equilibrium reaction (at a pH above 4, the equilibrium shifts almost completely toward formation of these products). Because pulp and paper mills discharge wastewater at between pH 7 and pH 9, EPA

expects no releases of chlorine ( $\text{Cl}_2$ ) in wastewater. As it completes this detailed study, EPA plans to investigate these chlorine releases and discuss them with industry.

## **6.0 STATUS OF THE DETAILED STUDY AND NEXT STEPS**

This report presents the preliminary results of EPA's detailed study of the pulp and paper industry. EPA began the study during its 2005 annual review of existing effluent guidelines and will complete the study during its 2006 annual review. The results of the study will be published with EPA's 2006 Effluent Guidelines Program Plan. EPA has prepared this preliminary report to provide the public opportunity to comment on the data collected to date and EPA's analysis of these data. In its Federal Register Notice of the Preliminary 2006 Effluent Guidelines Program Plan, EPA will request additional information about the pulp and paper industry to support the completion of this study.

EPA's progress in addressing the two main issues of this study and the steps it will take to continue the study are summarized in the following subsections:

- Section 6.1: Analysis of the Implementation and Impact of the Cluster Rules;
- Section 6.2: Investigation of the Non-bleaching Sources of Toxic and Nonconventional Pollutants; and
- Section 6.3: Requests for Additional Information.

### **6.1 Analysis of the Implementation and Impact of the Cluster Rules**

EPA has made substantial progress in determining how the 1998 Cluster Rules have been implemented and their effect on mill discharges.

EPA collected 73 permits applicable to Phase 1 mills and reviewed them to determine if they were developed using Cluster Rules effluent limitations guidelines. EPA received another five permits after completing of the analyses described in this preliminary report. EPA found that most of the permits it analyzed followed the Cluster Rules guidelines, though at least seven permits issued after April 15, 1998 did not. To complete the detailed study, EPA will:

- Analyze late-arriving permits; and
- Contact the state staff that developed the seven permits that do not incorporate the guidelines to understand how they were developed.

EPA analyzed data available in PCS to assess the impact of the Cluster Rules on wastewater discharges. As discussed in Section 4.0, for mills with data available in PCS, EPA found that by 2004, almost all of them met Cluster Rules concentration-based guidelines for TCDD, TCDF, and chlorinated phenolic compounds. For pollutants with mass-based guidelines, EPA found that the majority of mills discharged less than EPA's estimated baseline loads (pounds/year). However, EPA found that data for Cluster Rules pollutants were missing from PCS for many mills. To complete the detailed study, EPA will:

- Contact mills that EPA identified as discharging pollutant loads (pounds/year) much greater than EPA's baseline estimate. These include three mills with chloroform loads above baseline and one mill for which PCS data indicate the AOX load was much higher in one year than in other years. EPA will contact the mills to verify that the data in PCS are correct.
- Discuss with EPA's Office of Enforcement and Compliance Assurance (OECA) the permit-required monitoring data that are missing from PCS. OECA is responsible for maintaining PCS.
- Discuss with state permitting authorities the permit-required monitoring data that are missing from PCS. States are responsible for loading Discharge Monitoring Report (DMR) data into PCS.
- Correct the identification of mill outfalls using information provided by industry or others, and update the analysis of industry discharges.

## **6.2 Investigation of the Non-bleaching Sources of Toxic and Nonconventional Pollutants**

EPA has not yet focused on investigating non-bleaching sources of toxic pollutants (dioxins, PACs, metals, ammonia, and possibly others). Non-bleaching sources include discharges from Phase II mills as well as non-bleaching sources at Phase I mills, such as papermaking and recovery operations. As of July 2005, EPA had analyzed TRI-reported

discharges of dioxins and PACs, by reviewing information provided by AF&PA. In addition, EPA has made a preliminary analysis of nutrient (nitrogen- and phosphorus-containing parameters) discharges reported in PCS. EPA found that the Pulp and Paper Category ranked high in both nitrogen and phosphorus discharges reported to PCS [25]. To complete the detailed study, EPA will:

- Discuss with AF&PA and NCASI how Phase I and Phase II mills estimate TRI-reported releases of toxic pollutants other than dioxins and PACs, particularly lead, manganese, zinc, and other metals.
- Contact mills with high TRI-reported releases of toxic compounds (including the one mill that reported releases of potassium dimethyldithiocarbamate) to understand how they estimated their releases.
- Further analyze nitrogen and phosphorus data in PCS, including the reported concentrations and locations of mills that report nutrient discharges.
- Investigate the process sources and potential control technologies for nitrogen and phosphorus discharged by pulp and paper mills.
- Review technical literature focusing on:
  - Spent pulping liquor from unbleached kraft mills and papermachine additives and coatings, which are potential sources of toxic pollutant releases,
  - Wastewater pollutants derived from combustion-related activities,
  - Applicability, performance, and cost of nitrogen and phosphorus control technologies used in the pulp and paper industry,
  - Changes in the production process implemented so mills will comply with the Cluster Rules, to identify process improvements or additional pollution prevention programs implemented since 1998 and compile the available information on the pollutant reductions, and
  - EPA's National Listing of Fish Advisories (NLFA) which presents the current status of advisories against consuming dioxin-tainted fish. The NLFA provides tracking information from 1993 to the present. EPA will compare current fish advisories to the fish consumption advisories in place at the time of the 1998 ELGs revision.



### **6.3            Requests for Additional Information**

This subsection presents the requests for additional information that EPA will make in its Federal Register Notice of the Preliminary 2006 Effluent Guidelines Program Plan.

As discussed in Section 4.0, to evaluate the implementation of the Cluster Rules, EPA reviewed pipe and outfall descriptions contained in PCS for bleached papergrade kraft and papergrade sulfite mills (Phase I mills). EPA identified these pipes and outfalls as bleach plant effluent, final effluent, or other type of monitoring location. EPA requests that operators of these Phase I mills verify EPA's identification of their PCS monitoring locations listed in Appendix A of this report.

Some permits require in-process monitoring (bleach plant effluent monitoring) but the permitting authority (state) does not include in-process monitoring results in PCS. EPA requests that operators of bleached papergrade kraft or papergrade sulfite mills provide results of their permit-required (or other) bleach plant effluent monitoring, where these monitoring results are missing from PCS.

As presented in Section 5.0, EPA reviewed the information provided by AF&PA and its member companies regarding the measurement techniques used to calculate TRI-reported toxic discharges at 19 individual Phase I mills. EPA requests additional details of methods used to estimate releases of toxic pollutant discharges reported to TRI, in particular those methods used by Phase II mills (mills without bleached papergrade kraft or papergrade sulfite operations) to estimate releases of dioxins, PACs, and toxic metals.

EPA requests information about non-bleaching sources of toxic wastewater pollutants, such as pollutants derived from combustion-related activities, spent pulping liquor from unbleached kraft mills, and papermachine additives and coatings.

EPA requests examples (i.e., case studies) of mill process changes implemented in response to the Cluster Rules, including the wastewater pollution reduction benefits of

installing best available control technologies (BAT) and using best management practices (BMPs) for the control of spent pulping liquor losses.

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**Appendix A**

**PCS DISCHARGE LOCATIONS AND EPA DESIGNATED PIPE USAGE**

## **Appendix A**

### **PCS Discharge Locations and EPA Designated Pipe Usage**

The attached table lists National Pollutant Discharge Elimination System (NPDES) permits that EPA is reviewing as part of the pulp and paper detailed study. The permits listed are for Phase I mills (mills with wastewater discharges that meet the applicability of 40 CFR 430 Subpart B (Bleached Papergrade Kraft and Soda) and Subpart E (Papergrade Sulfite). Permits for four POTWs receiving significant amounts of pulp mill wastewater are also included. The table includes the following:

- **Mill NPDES ID number;**
  
- **Discharge Pipe** - numbers that appear in PCS for each NPDES permit. For example, NPDES AL000396 has 12 discharge pipes, numbered 1 through 12.
  
- **Designated Pipe Usage** - EPA's best guess at the usage of the discharge pipe. EPA has designated pipes and outfalls as:
  - FE - Final Effluent;
  - BE - Bleach Plant; or
  - OOS - Out of Scope. Out of scope pipes include stormwater runoff, non-contact cooling water, emergency overflow, etc;
  
- **Evidence** - a code for the evidence that EPA used to categorize the discharge pipe. EPA used permits and PIPE descriptions contained in the PCS database to designate location. If these two resources provided insufficient information to identify the discharge pipe, EPA used the pollutant discharged as indicator. For example, the Cluster Rules require final effluent AOX monitoring. Absent additional information, the presence of AOX indicates final effluent. EPA used the following codes to describe the evidence it used to categorize the discharge pipe:
  - 1 - permit;
  - 2- PCS pipe description; or
  - 3- pollutant as an indicator.
  
- **Pipe or Outfall Description** - taken from PCS or the NPDES permit.

EPA requests operators of the mills listed in Appendix A confirm the monitoring location designations.

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
AL0000396	001	BP	2	2003 PERMIT NO 1/2 HARDWOOD
AL0000396	001	BP	2	2003 PERMIT NO 3 SOFTWOOD
AL0000396	001	FE	2	COMBINED PROCESS & SANITARY
AL0000396	001	BP	3	BP in 2002 and prior
AL0000396	002	OOS	2	STORM WATER SEMI-ANNUAL
AL0000396	003	OOS	2	STORM WATER SEMI-ANNUAL
AL0000396	004	OOS	2	STORM WATER SEMI-ANNUAL
AL0000396	005	OOS	2	STORM WATER SEMI-ANNUAL
AL0000396	006	OOS	2	STORM WATER SEMI-ANNUAL REPORT
AL0000396	007	OOS	2	SEMI-ANNUAL MONITORING/REPORTI
AL0000396	008	OOS	2	STORM WATER SEMI-ANNUAL REPORT
AL0000396	009	OOS	2	COMBINED STORM WATER 002 & 003
AL0000396	010	OOS	2	COMBINED STORM WATER 004-006
AL0000396	011	OOS	2	RIVER INTAKE PUMP FILTER SC BW
AL0000396	012	OOS	2	2003 PERMIT ANNUAL
AL0002682	001	BP	2	BLEACH PLT ALK 001A/B REPORTIN
AL0002682	002	FE	2	OXIDATION POND EFFLUENT
AL0002755	001	FE	2	PROCESS & NON-CONTACT WSTWTR
AL0002755	001	BP	2	BLEACH PLANT INTERNAL DISCHARG
AL0002755	001	BP	3	BP in 2000 and prior
AL0002755	002	OOS	2	DSN002 STORMWATER ANNUAL
AL0002780	001	FE	2	PROCESS WASTEWATER DISCHARGE
AL0002780	002	OOS	2	WOODYARD STORM DRAINAGE
AL0002780	003	OOS	2	DSN003 STORMWATER
AL0002780	004	OOS	2	STORM WATER
AL0002780	005	OOS	2	STORM WATER SEMI-ANNUAL REPORT
AL0002780	006	OOS	2	STORM WATER
AL0002780	009	OOS	2	STORM WATER



**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
AL0002780	010	OOS	2	FIRE & STORM WATER, STEAM CON
AL0002780	011	OOS	2	STORM WATER
AL0002780	012	OOS	2	STORM WATER VARIOUS AREAS
AL0002780	013	OOS	2	STORM WATER
AL0002780	014	OOS	2	STORM WATER
AL0002801	001	FE	2	TIER I LIMITS
AL0002801	002	OOS	2	DSN002 STORM WATER NON-PROCESS
AL0002801	003	OOS	2	STORMWATER (UNCONTAMINATED)
AL0002801	004	OOS	2	DSN004 STORM WATER NON-PROCESS
AL0002801	007	OOS	2	NONCONTACT COOLING WATER
AL0002801	008	OOS	2	EMERGENCY BYPASS.
AL0002801	009	OOS	2	DSN009 STORM WATER WOODYARD
AL0002801	010	OOS	2	STORMWATER (UNCONTAMINATED)
AL0002801	012	OOS	2	STORM WATER
AL0002801	013	OOS	2	DSN013 STORM WATER NON-PROCESS
AL0002801	019	OOS	2	DSN019 STORM WATER NON-PROCESS
AL0002801	021	OOS	2	DSN021 STORM WATER
AL0002801	022	OOS	2	STORM WATER VARIOUS AREAS
AL0002828	001	BP	2	DSN001A BLEACH PLANT INTERNAL
AL0002828	001	BP	2	DSN001B BLEACH PLANT INTERNAL
AL0002828	001	BP	3	BP in 2000 and prior
AL0002828	001	FE	2	PROCESS
AL0002828	005	OOS	2	ASH POND & AIR SCRUBBER
AL0002828	006	OOS	2	STORM WATER
AL0003018	002	FE	1	PROC, SANTRY STRMWTR DSN 002
AL0003018	003	BP	1	DRID (A = No. 1 (Hardwood) Bleach plant internal requirement; B = No. 2 (Softwood) Bleach plant internal requirement

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
AL0003018	004	OOS	2	STORMWATER QUARTERLY REPORTING
AL0003018	005	OOS	2	STORMWATER QUARTERLY REPORTING
AL0003018	006	OOS	2	STORMWATER QUARTERLY REPORTING
AL0003018	007	OOS	2	STORMWATER NO MONITORING/REPOR
AL0003018	008	OOS	2	DSN008 STORMWATER NO MONTI/REP
AL0003018	011	OOS	2	DSN011 STORMWATER
AL0003158	001	BP	2	DSN001D BEGIN 040101
AL0003158	001	BP	2	DSN001E BEGIN 040101
AL0003158	001	BP	3	BP in 2002 and prior
AL0003158	001	FE	2	PROCESS WASTEWATER
AL0003158	002	OOS	1	NC COOLING/ASH POND OF/STORM
AL0003158	003	OOS	1	DSN003 SEMI ANNUAL MONITORING;
AL0003158	004	OOS	1	DSN003 SEMI ANNUAL MONITORING;
AL0003158	006	OOS	1	DSN006 STORMWATER SEMI-ANNUAL;
AL0003301	001	BP	2	DSN001A BLEACH PLANT INTERNAL
AL0003301	001	BP	2	DSN001B BLEACH PLANT INTERNAL
AL0003301	001	BP	3	BP in 2000 and prior
AL0003301	001	FE	2	DSN001 AOX REPORTING
AL0003301	001	FE	2	PROCESS
AL0003301	002	OOS	1	LANDFILL STORMWTR W/O LEACHATE
AL0003301	003	OOS	1	LANDFILL STORMWTR W/O LEACHATE
AL0025968	001	BP	1	Alkaline discharge into the effluent treatment system from the Alabama Pine Pulp (APP) bleach line
AL0025968	001	BP	1	Alkaline discharge into the effluent treatment system from the Alabama River Pulp (ARP) bleach line

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
AL0025968	001	BP	3	BP in 2001 and prior
AL0025968	001	FE	2	TOTAL FACILITY DISCHARGE
AL0025968	001	BP	1	Acid discharge into the effluent treatment system from the APP bleach line
AL0025968	001	BP	1	Acid discharge into the effluent treatment system from the ARP bleach line
AL0025968	002	OOS	2	RIVER WATER FROM CYCLONE SEPAR
AL0025968	003	OOS	2	DSN003 ANNUAL STORM WATER
AL0025968	004	OOS	2	OVERFLOW TREATED MILL FRESH WA
AL0025968	005	OOS	2	2002 PERMIT ANNUAL; WAST=03
AL0025968	006	OOS	2	2002 PERMIT ANNUAL; WAST=03
AR0001210	001	FE	1	QUARTERLY REPORTING
AR0001210	002	OOS	2	CONTROLLED DSCH FROM MOSSY LK
AR0001210	101	BP	1	101-MONTHLY-LINE 1A HARD WOOD
AR0001210	102	BP	1	102-MONTHLY-LINE 1B HARD WOOD
AR0001210	103	BP	1	103-MONTHLY-LINE 2 SOFT WOOD
AR0001210	SMS	OOS	2	SMS002-DOWNSTREAM MONITORING
AR0001210	TX1	OOS	2	001-QUARTERLY-CHRONIC TOXICITY
AR0001601	001	OOS	1	TOTAL FACILITY OUTFALL
AR0001601	002	OOS	2	002-MONTHLY-EMERGENCY OVERFLOW
AR0001601	SUM	OOS	2	001 & 002 COMBINED
AR0001601	TX1	OOS	2	001-SEMIANNUAL-ACUTE TOXICITY
AR0002968	001	FE	1	PROCESS/SANI WW; CONTAM. STORM
AR0002968	01A	BP	1	01A-INTERNAL-LINE 1A-HARDWOOD
AR0002968	01B	BP	1	01B-INTERNAL-LINE 1B-HARDWOOD
AR0002968	01C	BP	1	01C-INTERNAL-LINE 2-SOFTWOOD
AR0002968	TX1	OOS	2	CHRONIC TOXICITY REPORTS

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
AR0035823	001	FE	1	TOTAL FACILITY DISCHARGE
AR0035823	002	OOS	2	002-MONTHLY-WTR TRMT TNK BOTTM
AR0035823	003	OOS	2	003-MONTHLY-RUNOFF & COOLING
AR0035823	004	OOS	2	004-MONTHLY-SAND FLTR BACKWASH
AR0035823	101	BP	1	101-INTERNAL-BLEACH PLANT
AR0035823	TX1	OOS	2	001-QUARTERLY-ACUTE TOXICITY
CA0004065	001	FE	2	NON-SEASONAL PARAMETERS
CA0005894	001	FE	1	PULPMILL 001/MONTHLY
CA0005894	101	BP	1	WTR PLANT 101/MONTHLY
CA0005894	201	OOS	2	WTR SUPPLY/MONTHLY
CA0005894	INF	OOS	2	INFLUENT/MONTHLY
FL0002526	001	FE	1	PROCESS AND BLOWDOWN DISCHARGE
FL0002631	001	FE	2	TOTAL FACILITY DISCHARGE
FL0002763	001	FE	1	PERMIT MONITORING POINT A
FL0002763	002	OOS	1	MONITORING POINT C
FL0002763	003	BP	1	INSTREAM MONITORING POINT R3
FL0020206	001	FE	2	TREATED WASTEWATER
GA000195	001	OOS	3	
GA000195	002	OOS	3	
GA000279	001	FE	1	PROCESS WASTEWATER
GA000279	006	BP	1	** BLEACH PLANT EFFLUENT
GA000280	001	FE	1	ANNUAL
GA000280	010	OOS	3	QUARTERLY.....
GA000365	001	FE	1	TIDAL DISCHARGE 001
GA000365	002	OOS	2	PARSHALL FLUME
GA000365	003	BP	1	BLEACH PLNT #1
GA000365	004	BP	1	BLEACH PLNT # 2
GA000365	005	BP	1	BLEACH PLNT # 3
GA000365	010	OOS	3	** 001-TREATED PROCESS WATER**
GA000365	011	OOS	2	NONCNT COOLWTR#008,018,019,020
GA000365	020	OOS	2	** 002 TPW--PARSHALL FLUME ***
GA000365	021	OOS	2	CAR WASH

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
GA000365	030	OOS	2	OUTFALL 003 BLEACH PLNT. # 1
GA000365	050	OOS	2	OUTFALL 005 BLEACH PLNT. # 2
GA000365	0A0	OOS	3	
GA000365	0B0	OOS	3	
GA004933	001	FE	1	Process Wastewater
GA004933	0A0	OOS	3	
ID0001163	001	FE	1	001 DSCHG UNDER LOW FLOW
KY0000086	001	FE	1	PROCESS WASTEWATER
KY0000086	002	OOS	2	UPSTREAM STORMWATER MONITORING
KY0000086	003	OOS	2	DOWNSTREAM STORMWATER MONITORG
KY0000086	004	OOS	2	STORMWATER RUNOFF FROM LANDFIL
KY0000086	BP0	BP	2	BLEACH PLANT EFFLUENT
KY0001716	001	FE	2	FINAL EFFLUENT LIMITS
KY0001716	002	OOS	2	PROCESS WATER (CORRUGATED)
KY0001716	003	OOS	2	STORMWATER RUNOFF
KY0001716	004	OOS	2	STORMWATER RUNOFF
KY0001716	005	OOS	2	STORMWATER RUNOFF
KY0001716	006	OOS	2	STORMWATER RUNOFF
KY0001716	007	OOS	2	STORMWATER RUNOFF
KY0001716	008	OOS	2	STORMWATER RUNOFF
KY0001716	BP0	BP	2	BLEACH PLANT #2 INTERNAL POINT
LA0003468	001	FE	2	PROCESS WASTEWATER
LA0003468	009	OOS	2	INTAKE WATER TREATMENT PLANT
LA0003468	010	OOS	2	STORM WATER RUNOFF
LA0003468	011	OOS	2	STORM WATER RUNOFF
LA0003468	012	OOS	2	STORM WATER RUNOFF
LA0003468	013	OOS	2	PLANT SITE STORMWATER
LA0003468	014	OOS	2	STORM WATER RUNOFF
LA0003468	015	OOS	2	PLANT SITE STORMWATER
LA0003468	016	OOS	2	PLANT SITE STORMWATER

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
LA0003468	017	OOS	2	STORM WATER RUNOFF
LA0003468	101	BP	2	BLEACH PLANT EFFLUENT
LA0003468	TX1	OOS	2	10/02-12/02 DMR TOXIC RPT
LA0005258	001	FE	1	TREATED PROCESS WASTEWATER
LA0005258	002	OOS	1	PLANT SITE STORMWATER
LA0005258	101	BP	1	Bleach Plant No.1
LA0005258	201	BP	1	Bleach Plant No.2
LA0005258	301	BP	1	Bleach Plant No.3
LA0005258	SUM	OOS	2	SUM OF OUTFALL 001 & 003
LA0005258	TX1	OOS	2	WHOLE EFFLUENT TOXICITY
LA0007561	001	FE	1	TREATED PROCESS WASTEWATER
LA0007561	101	OOS	2	WASTEWATER FROM WHAM BRAKE
LA0007561	202	BP	1	WASTEWATER FROM A-LINE BLEACH
LA0007561	203	BP	1	WASTEWATER FROM B-LINE BLEACH
LA0007561	TX1	OOS	1	QUARTERLY 48HR. ACUTE TOXICITY
LA0007927	001	FE	1	TREATED PROCESS WASTEWATER
LA0007927	002	OOS	1	NON-PROCESS AREA STORMWATER
LA0007927	101	BP	1	PROCESS WASTEWATER
LA0007927	TX1	OOS	3	QUARTERLY CHRONIC TOXICITY-001
MD000142	001	OOS	1	NONCONTACT COOLING WATER
MD000142	002	OOS	1	NONCONTACT COOLING WATER
MD000142	003	OOS	1	ASH/WATER SLUDGE SUPERNATE
MD000142	004	OOS	1	NONCONTACT COOLING WATER
MD000142	005	OOS	1	NONCONTACT COOLING WATER
MD000142	006	OOS	1	NONCONTACT COOLING WATER
MD000142	007	FE	1	influent chamber of the POTW
MD000142	01S	OOS	2	01S OUTFALL
MD000142	02S	OOS	2	02S OUTFALL
MD000142	03S	OOS	2	ASH & RAW WATER SLUDGE
MD000142	04S	OOS	2	04S OUTFALL

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
MD000142	05S	OOS	2	OUTFALL 05S
MD000142	06S	OOS	2	OUTFALL 06S
MD000142	101	OOS	2	UGS GAUGING STATION LUKE
MD002168	001	FE	1	IND AND MUN WASTEWATER
MD002168	01S	OOS	3	OUTFALL 01S
MD002168	101	OOS	3	INFLUENT/CHLOR MUN SEWAGE
ME000016	001	FE	2	TREATED PROCESS WASTEWATER
ME000016	002	OOS	2	RECOVERY CONDENSATE & COOLANT
ME000016	003	OOS	2	FILTER HOUSE BCKWASH WATER
ME000016	009	OOS	2	TRASH SCREEN SHOWER WATER
ME000016	020	OOS	2	COOLING WATER RECOVERY PLANT
ME000187	001	FE	1	TREATED PROCESS WASTEWATER
ME000187	002	OOS	2	COOLING,CONDENSATE & STORM H2O
ME000187	003	OOS	2	TURBINE/BLEACH PLANT COOLING
ME000193	001	FE	1	TREATED PROCESS WASTEWATER
ME000200	001	FE	2	TREATED PROCESS WASTEWATER
ME000200	003	OOS	2	TOXICITY TESTING AND TCDD
ME000202	001	FE	1	TREATMENT PLANT EFFLUENT
ME000202	002	OOS	1	NON CONTACT COOLING WATER
ME000202	003	OOS	1	FILTER BACKWASH WATER
ME000202	004	OOS	1	STEAM CONDENSATE/WOOD ROOM
ME000202	006	OOS	1	STEAM CONDENSATE
ME000202	100	BP	1	INTERNAL WASTE STREAM
ME000205	001	FE	1	TREATED PROCESS WASTEWATER
ME000205	002	OOS	2	NON CONTACT COOLING WATER
ME000205	003	OOS	2	NON CONTACT COOLING WATER
ME000205	004	OOS	2	NON CONTACT COOLING WATER
ME000232	001	FE	2	TREATED PROCESS WASTEWATER
ME000232	002	OOS	2	SANDFILTER BACKWASH
ME000232	003	OOS	2	NON CONTACT COOLING WATER
ME000232	100	BP	2	INTERNAL WASTE STREAM
ME002152	001	FE	1	TREATED PROCESS WASTEWATER

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
ME002152	002	OOS	2	STORMWATER RUNOFF
ME002152	003	OOS	2	STORMWATER RUNOFF
ME002152	004	OOS	2	STORMWATER RUNOFF
ME002152	005	OOS	2	STORMWATER RUNOFF
ME002152	007	OOS	2	STORMWATER RUNOFF
ME002152	100	BP	1	BLEACH PLANT
MI0000027	001	FE	1	WASTEWATER TO ESCANABA RIVER
MI0000027	002	OOS	2	NONCONT COOL H2O TO ESCANABA R
MI0000027	00A	BP	2	OUTFALL 00A THROUGH 001; WAST=01
MI0001210	001	OOS	2	001A/NONCONTACT COOLING
MI0027391	001	FE	1	001 MOSQUITO CREEK DISCHARGE
MI0027391	002	OOS	2	002 WASTEWATER BIG BLACK CREEK
MI0027391	101	OOS	2	101 WASTEWATERS MUSKEGON RIVER
MI0042170	001	FE	2	FACILITY DISCHARGE
MI0042170	001	BP	2	001B BLEACH PLT PROCESS WASTEW
MN000143	010	OOS	2	010 NON-CONTACT COOLING WATER
MN000143	020	OOS	2	Clearwell overflow discharge
MN000143	030	FE	2	Proc water supply line dschg
MN000143	701	OOS	2	Stream monitoring
MN000164	001	FE	1	Total process effluent discharge
MN000164	030	OOS	2	Dioxin & Furan Monitoring
MN000164	040	OOS	2	LIFT STATION #8 BYPASS
MN000164	050	OOS	2	LIFT STATION #2 BYPASS
MN000164	060	OOS	2	LIFT STATION #3 BYPASS
MN000164	501	OOS	2	PRIMARY & SECONDARY SLUDGES
MN000164	950	BP	2	BLEACH PLANT EFFLUENT
MN004978	010	FE	2	DRID Q=Quarterly effluent; DRID M=001 Total Facility Discharge; Identified as 001 in Permit issued 8-27-2002



**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
MN004978	701	OOS	2	Blatnik Bridge Monitoring
MN004978	702	OOS	2	Raw water intake
MN004978	703	OOS	2	SUPERIOR/CLOQUET WATER INTAKE
MS000267	001	FE	2	TOTAL PROCESS OUTFALL
MS003170	001	FE	2	PROCESS WASTEWATER
MS003170	002	OOS	2	SANITARY WASTEWATER
MS003170	003	BP	2	INTERNAL OUTFALL PROCESS WW
MS003641	001	FE	1	PROCESS WASTEWATER
MS003641	002	OOS	2	MILL STEAM CONDENSATES FIRE
MS003641	003	BP	1	INTERNAL OUTFALL-PROCESS WW
MT000003	001	FE	2	DISCHARGE FROM OUTFALL 001
MT000003	002	FE	2	DISCHARGE FROM OUTFALL 002
MT000003	003	FE	2	DISCHARGE FROM OUTFALL 003
MT000003	004	OOS	2	UNCONTAMINATED COOLING WATER
MT000003	CDD	OOS	2	COLLECTIVE DIRECT DISCHARGE
MT000003	RIV	OOS	2	CLARK FORK RIVER
MT000003	SUM	OOS	2	COMBINED ANNUAL DISCHARGE
NC000027	001	FE	2	EFF
NC000027	002	BP	2	Pine bleach plant
NC000027	003	BP	2	Hardwood bleach plant
NC000068	001	FE	1	PROCESS WATER
NC000068	002	OOS	1	PROCESS WW
NC000068	005	OOS	2	NONCONTACT COOLING/FINE PAPER
NC000319	001	FE	1	EFF
NC000319	003	BP	1	bleach plant effluent
NC000329	001	FE	1	EFF
NH000065	001	OOS	2	NON-CONTACT COOLING WATER
NH000065	003	OOS	2	NON-CONTACT COOLING WATER
NH000065	005	OOS	2	NON-CONTACT COOLING WATER
NH000065	009	OOS	2	NON-CONTACT COOLING WATER
NH000065	010	OOS	2	BURGESS FILTER HOUSE BACKWASH

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
NH000065	011	OOS	2	NON-CONTACT COOLING WATER
NH000065	013	OOS	2	BURGESS HOT WATER OVERFLOW
NH000065	014	OOS	2	NON-CONTACT COOLING WATER
NH000065	015	OOS	2	NON-CONTACT COOLING WATER
NH000065	016	FE	2	PROCESS AND STORMWATER
NH000065	017	OOS	2	CASCADE FILTER BACKWASH/OVERFL
NH000065	018	OOS	2	CASCADE TREATED PROCESS/WASTE
NH000065	100	BP	2	TESTING BLEACH PLANT EFFLUENT
NH000065	SUM	OOS	2	COMBINATION OUTFALLS 016 & 018
NY0004413	001	FE	1	PROCESS WASTEWATER
NY0004413	002	OOS	2	SANITARY WASTEWATER
NY0004413	01A	BP	1	BLEACH PLANT WASTEWATER INTNL
NY0005525	008	FE	1	PROCESS DISCHARGE
NY0005525	009	OOS	1	Stormwater
NY0005525	011	OOS	1	Cooling Water, Fresh Water Overflow to Forebay (Hudson River)
NY0005525	012	OOS	1	Cooling Water, Fresh Water Overflow to Hudson River
NY0005525	08A	BP	1	Bleach Plant Effluent
OH000448	001	FE	1	001 EFFLUENT
OH000448	002	OOS	1	Storm water effluent
OH000448	003	OOS	1	Storm water effluent
OH000448	004	OOS	1	Storm water effluent
OH000448	005	OOS	1	Storm water effluent
OH000448	006	OOS	1	Storm water effluent
OH000448	007	OOS	1	Storm water effluent
OH000448	008	OOS	1	Storm water effluent
OH000448	009	OOS	1	Storm water effluent
OH000448	582	OOS	1	582 (BYPRO) SLUDGE REMOVED FRO
OH000448	586	OOS	1	586 (BYPRO) SLUDGE REMOVED FRO

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
OH000448	600	BP	1	600 INTERNAL MONITORING STATIO
OH000448	802	OOS	1	802 PAINT CREEK, UPSTREAM OF 0
OH000448	902	OOS	1	902 PAINT CREEK,DOWNSTREAM OF
OH000448	903	OOS	2	903 PAINT CREEK, DOWNSTREAM 1,
OR000079	001	FE	1	PROCESS EFFLUENT
OR000079	002	OOS	2	CRAWFORD CREEK STORM WATER
OR000079	003	OOS	1	WTP FILTER BACKWASH DITCH
OR000079	004	OOS	2	LOG WASHER EFFLUENT
OR000079	FAC	BP	2	BLEACH PLANT STREAM
OR000107	001	FE	2	PROCESS & SANITARY WASTEWATER
OR000107	00S	OOS	2	SANITARY STP EFFLUENT
PA0002143	001	OOS	1	001-DILL HILL CLOS ACT RUNOFF
PA0002143	002	FE	1	002 MILL & MISC WASTEWATER
PA0002143	004	OOS	2	004 PULP MILL SW RUNOFF-EMER
PA0002143	102	OOS	1	#5 PAPER MACHINE AREA SW RUNOF
PA0002143	202	BP	1	Bleach Plant
PA0008265	001	FE	1	TOTAL FACILITY DISCHARGE
PA0008265	002	OOS	2	STORMWATER OUTFALL 002
PA0008265	003	OOS	2	STORMWATER OUTFALL 003
PA0008265	004	OOS	2	STORMWATER OUTFALL 004
PA0008265	005	OOS	2	STORMWATER OUTFALL 005
PA0008265	006	OOS	2	STORMWATER OUTFALL 006
PA0008265	007	OOS	2	STORMWATER OUTFALL 007
PA0008265	008	OOS	2	STORMWATER OUTFALL 008
PA0008265	009	OOS	2	STORMWATER OUTFALL 009
PA0008265	010	OOS	2	STORMWATER OUTFALL 010
PA0008265	011	OOS	2	STORMWATER OUTFALL 011
PA0008265	012	OOS	2	STORMWATER OUTFALL 012
PA0008265	013	OOS	2	STORMWATER OUTFALL 013
PA0008265	014	OOS	2	STORMWATER OUTFALL 014
PA0008265	015	OOS	2	STORMWATER OUTFALL 015

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
PA0008265	016	OOS	2	STORMWATER OUTFALL 016
PA0008265	017	OOS	2	STORMWATER OUTFALL 017
PA0008265	018	OOS	2	STORMWATER OUTFALL 018
PA0008265	019	OOS	2	STORMWATER OUTFALL 019
PA0008265	020	OOS	2	STORMWATER OUTFALL 020
PA0008265	101	BP	1	101-1ST,2ND,3RD STAGE BLEACH P
PA0008869	001	FE	1	OUTFALL 001
PA0008869	002	OOS	2	002-NON CONTACT COOLING WATER
PA0008869	101	BP	1	IMP 101-BLEACH PLT EFFL-SOFTWD
PA0008869	102	BP	1	IMP 102-BLEACH PLT EFFL-HARDWD
PA0008869	S11	OOS	2	STORMWATER OUTFALL SW11
PA0008869	S27	OOS	2	STORMWATER OUTFALL SW27
PA0008869	S40	OOS	2	STORMWATER OUTFALL SW40
PA0008869	S41	OOS	2	STORMWATER OUTFALL SW41
PA0008869	S42	OOS	2	STORMWATER OUTFALL SW42
PA0008869	SW1	OOS	2	STORMWATER OUTFALL SW1
PA0008885	001	FE	3	OUTFALL 001
PA0008885	003	OOS	2	003 EMER SPILL BASIN OUTFALL
PA0026301	001	FE	3	OUTFALL 001
PA0026301	002	OOS	2	ORF OVERFLOW
PA0026301	101	BP	2	INTERNAL MP 101/MAIN TPWS
PA0026301	201	OOS	2	EFFLUENT FROM OVERFLOW RET FAC
SC0000868	001	FE	1	TOTAL FACILITY DISCHARGE
SC0000868	01A	BP	1	Line A
SC0000868	01B	BP	1	Line B
SC0000868	01C	BP	1	Line C
SC0001015	001	FE	2	001 PROCESS WASTEWATER
SC0001015	003	OOS	3	
SC0001015	005	OOS	3	
SC0001015	01A	OOS	1	facility's sanitary wastewater
SC0001015	01B	BP	1	Bleach Plant Testing, internal point source
SC0038121	001	FE	1	PROCESS/SANITARY/RUNOFF

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
SC0038121	01A	OOS	1	TREATED SANITARY EFFLUENT
SC0038121	01B	BP	1	Bleach Plant
SC0038121	01C	BP	1	Bleach Plant
SC0042188	001	FE	1	
SC0042188	01A	OOS	3	
SC0042188	01B	BP	1	
SC0042188	T11	OOS	3	
SC0042188	T12	OOS	3	
SC0042188	TB1	OOS	3	
SC0042188	TB2	OOS	3	
TN0001643	001	FE	1	RAW TRE,POW GEN,PUL/PAP, ST WA
TN0001643	005	OOS	1	NONCONTACT COOLING WATER
TN0001643	01A	BP	1	Internal monitoring point, effluent from bleach plant only
TN0001643	01T	OOS	2	ANNUAL BIOMONITORING
TN0001643	S07	OOS	2	STORMWATER RUNOFF
TN0001643	S08	OOS	2	STORMWATER RUNOFF
TN0001643	S09	OOS	2	STORMWATER RUNOFF
TN0001643	S10	OOS	2	STORMWATER RUNOFF
TN0001643	S11	OOS	2	STORMWATER RUNOFF
TN0001643	S12	OOS	2	STORMWATER RUNOFF
TN0001643	S13	OOS	2	STORMWATER RUNOFF
TN0001643	S14	OOS	2	STORM WATER RUNOFF
TN0001643	S16	OOS	2	STORMWATER RUNOFF
TN0001643	S17	OOS	2	STORM WATER RUNOFF
TN0001643	S18	OOS	2	STORMWATER RUNOFF
TN0001643	S19	OOS	2	STORMWATER RUNOFF
TN0002356	001	FE	1	RAIN RUNOFF-COAL STORAGE AREA
TN0002356	003	OOS	1	UNCONTAMINATED COOLING WATER
TN0002356	004	OOS	1	TRAV SCRE FILT BKW/PUMP COOL W
TN0002356	005	OOS	1	TRAV SCRE FILT BW/PUMP COOL WA

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
TN0002356	006	OOS	1	COAL PILE RUNOFF, STORMWATER
TN0002356	01A	BP	1	PROCESS WW
TN0002356	01B	BP	1	PROCESS WW
TN0002356	01T	OOS	2	BI-ANNUAL BIOMONITORING
TN0002356	02A	BP	2	INTERN MONIT PT, TREA DOMES WW
TX0000167	001	FE	1	TREATED PROCESS WASTEWATER
TX0000167	101	OOS	1	TREATED PROCESS WASTEWATER at the aeration pond
TX0000167	102	OOS	3	YEARLY REPORTING - OUTFALL 102
TX0000167	103	OOS	3	YEARLY REPORTING - OUTFALL 103
TX0001643	001	FE	2	TREATED PROCESS WASTEWATER
TX0001643	002	OOS	2	STORMWATER RUNOFF
TX0001643	TX1	OOS	2	TOXICITY REPORTING FOR 001
TX0003891	001	FE	2	PROCESS DISCHARGE
TX0003891	002	OOS	2	STORMWATER RUNOFF
TX0003891	01A	FE	2	PROCESS WASTEWATER - 01A
TX0003891	101	BP	1	Bleach plant No. 4
TX0003891	102	OOS	1	FILTER BACKWASH
TX0003891	201	BP	1	Bleach plant No. 5
TX0003891	TX1	OOS	2	48-HOUR ACUTE FRESHWATER -001
TX0003891	TXA	OOS	2	24-HOUR ACUTE FRESHWATER - 001
TX0052591	001	FE	2	TOTAL TREATED EFFLUENT OUTFALL
TX0052591	01A	OOS	2	QUARTERLY REPORTING FOR 001B
TX0052591	01B	OOS	2	ANNUAL REPORTING
TX0052591	SLD	OOS	2	LANDFILL
TX0052591	SLL	OOS	2	LAND APPLICATION
TX0052591	SLS	OOS	2	SURFACE DISPOSAL
TX0052591	TX1	OOS	2	TOXICITY REPORTING FOR 001B
TX0053023	001	FE	2	TOTAL REGULATED DISCHARGE
TX0053023	002	OOS	2	STORMWATER - 002
TX0053023	003	OOS	2	STORMWATER - 003
TX0053023	004	OOS	2	STORMWATER - 004
TX0053023	SLD	OOS	2	QUARTERLY REPORTING - SLUDGE

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
TX0053023	TX1	OOS	2	TOXICITY REPORTING FOR 001
TX0053023	TXA	OOS	2	SEMI-ANNUAL 24HR ACUTE TOX-001
VA0003115	001	FE	3	
VA0003115	005	OOS	3	
VA0003115	008	OOS	3	
VA0003115	101	BP	3	
VA0003115	102	BP	3	
VA0003646	001	OOS	1	
VA0003646	002	OOS	1	
VA0003646	003	FE	1	
VA0003646	004	OOS	1	
VA0003646	005	OOS	1	
VA0003646	006	OOS	1	
VA0003646	007	OOS	1	
VA0003646	008	OOS	1	
VA0003646	009	OOS	1	
VA0003646	010	OOS	1	
VA0003646	011	OOS	1	
VA0003646	012	OOS	1	
VA0003646	013	OOS	1	
VA0003646	014	OOS	1	
VA0003646	015	OOS	1	
VA0003646	301	BP	1	internal outfall on A unit bleach line
VA0003646	302	BP	1	internal outfall on B unit bleach line
VA0003646	303	BP	1	internal outfall on C unit bleach line
VA0003646	401	OOS	1	
VA0003646	999	OOS	1	
VA0004162	001	FE	1	Final Effluent
VA0004162	101	BP	1	"D" Bleach Plant Effluent
VA0004162	102	BP	1	"E" Bleach Plant Effluent
VA0004162	103	BP	1	"F" Bleach Plant Effluent
WA000012	001	FE	1	COMBINED OUTFALL 001/002
WA000012	003	OOS	1	Stormwater

**PCS Discharge Locations and EPA Designated Pipe Usage**

<b>Mill NPDES</b>	<b>Discharge Pipe (DSCH)</b>	<b>EPA Designated Pipe Usage <sup>a</sup></b>	<b>Evidence <sup>b</sup></b>	<b>Pipe or Outfall Description</b>
WA000012	005	OOS	2	SANITARY SEWAGE TREATMENT PLNT
WA000025	001	FE	1	PULP MILL & STP DISCHARGE
WA000025	002	OOS	1	DISCHARGE TO BLUE CREEK
WA000025	00S	OOS	1	SEWAGE PACKAGE PLANT
WA000062	001	FE	3	PAPER FROM PURCHASED PULP
WA0000621	003	OOS	1	
WA0000621	008	OOS	1	
WA0000621	00F	OOS	1	
WA0000850	001	FE	1	COMMENCEMENT BAY DISCHARGE
WA0001091	009	FE	1	TOTAL PLANT DISCHARGE
WA0003697	001	FE	1	PULP & PAPER MILL DISCHARGE
WI0003212	001	FE	1	TREATED PROCESS WASTEWATER
WI0003212	005	OOS	1	EVAPORATORWATERS
WI0003212	006	OOS	1	006A VACUUM PUMP SEAL
WI0003212	009	OOS	1	006B NONCONTACTCOOL WATER
WI0003379	002	OOS	1	OUTFALL 002 DISPOSAL WELL
WI0003379	003	OOS	1	OUTFALL 003 BARRIER WELL
WI0003379	004	FE	1	TREATED PROCESS WASTEWATER
WI0003379	104	OOS	3	REPORT 004A AS 104
WI0003620	001	OOS	1	CLO2 LIFT STA EMERG.OVERFLOW
WI0003620	002	FE	1	WWTP EFFLUENT
WI0003620	003	OOS	2	PE#8 PAPERMACH CLEARWTR SEWER
WI0003620	005	OOS	2	NEPCO LAKEALUM SLDG SETTLE BSN
WI0003620	006	OOS	2	NEKOOSA CLEARWATERSEWER
WI0003620	007	OOS	2	PE BLEACH PLT EMERG OVERFLOW
WI0003620	008	OOS	2	NEK COLL. TANK EMER.OVERFLOW
WI0003620	009	OOS	2	PE COLL. TANK EMER.OVERFLOW
WI0003620	011	OOS	2	NEKOOSA STNDPIPE OVERFLOW
WI0003620	013	OOS	2	PIPE 099 RENUMBERED AS 013
WI0003620	099	OOS	2	COMBINED DISCH FROM1,2,7,8,9



### PCS Discharge Locations and EPA Designated Pipe Usage

Mill NPDES	Discharge Pipe (DSCH)	EPA Designated Pipe Usage <sup>a</sup>	Evidence <sup>b</sup>	Pipe or Outfall Description
WI0026042	010	FE	1	WWTP EFFLUENT
WI0026042	011	OOS	1	EMERGENCY PULP MILL OVERFLOW
WI0026042	012	OOS	1	EMERGENCY PAPER MILLOVERFLOW
WI0026042	013	OOS	1	WOODROOM SEWER
WI0026042	014	OOS	1	PIPE 098 RENUMBERED 014
WI0026042	015	OOS	1	NCCW
WI0026042	098	OOS	1	010, 011, 012 & 013 COMBINED
WI0026042	110	OOS	1	ZID MONITORING
WI0030651	001	FE	2	PLANT EFFLUENT
WI0030651	701	OOS	2	INFLUENT TO PLANT
WI0037991	001	FE	1	WATER QUALITY CENTER
WI0037991	010	OOS	1	NONCONTACT COOLING WATER
WI0037991	011	OOS	1	BIRON DIV.STORMWATER
WI0037991	012	OOS	1	BIRON DIV.SEAL WATER
WI0037991	013	OOS	1	BIRON DIV NCCW
WI0037991	014	OOS	1	BIRON DIV EMERGENCY OUTFALL
WI0037991	015	OOS	1	WIS RAPIDSSEAL WATERNCWW
WI0037991	016	OOS	1	WIS RPD DIV EMERGENCY OUTFALL
WI0037991	017	OOS	1	WIS RAPIDSINFILT. NCCW WI RP
WI0037991	018	OOS	1	CRANBERRY CREEK OUTFALL
WI0037991	019	OOS	1	WIS RAPIDSSTORMWATERSEALWATER
WI0037991	020	OOS	1	WR PULP MILLS OVERFLOW
WI0037991	021	OOS	1	KRAFT DIV NCCW
WI0037991	022	OOS	1	PIPE 098 RENAMED 022
WI0037991	098	OOS	1	001, 014, 016, 201 COMBINED
WI0037991	111	OOS	1	BIRON DIV NCCW
WI0037991	201	OOS	1	KRAFT DIV PUMP STN EMRGNCY OV
WI0037991	211	OOS	1	BIRON DIV NCCW EFFL

a - EPA has designated pipes and outfalls as either Final Effluent (FE), Bleach Plant (BP), Out of Scope (OOS). Out of scope pipes include stormwater runoff, non-contact cooling water, emergency overflow, etc.

## **PCS Discharge Locations and EPA Designated Pipe Usage**

b - EPA used permits and PIPE descriptions contained in the PCS database to designate location. If these two resources provided insufficient information the pollutant discharged was used as indicator. For example, the Cluster Rules require final effluent AOX monitoring, absent additional information the presence of AOX indicates FE. The data source is indicated with either: 1 - permit, 2- PCS pipe description, or 3- pollutant as an indicator.

**Appendix B**

**CURRENT STATUS OF PHASE I MILLS**

## **Appendix B Current Status of Phase I Mills**

The attached table lists mills that EPA identified as Phase I mills (mills with at least some portion of their wastewater discharges that met the applicability of 40 CFR 430 Subpart B (Bleached Papergrade Kraft and Soda) and Subpart E (Papergrade Sulfite) as of April 15, 1998, when the Cluster Rules were promulgated. The table includes the following:

- **Mill Name** (updated to the 2005 ownership).
- **City.**
- **State.**
- **Phase I Subcategory** which EPA believes applies to at least a portion of mill discharges. Phase I subcategories include bleached papergrade kraft and soda (BPK) and papergrade sulfite (PS).
- **Discharge** status of the mill, either discharge directly to surface waters (i.e., direct dischargers) or to a POTWs (indirect dischargers).
- **SIC code** included in PCS. If the mill is not included in PCS (for instance, if it is an indirect discharge mill) there is no SIC code. The pulp, paper, and paperboard industry corresponds to three separate Standard Industrial Classification (SIC) codes: 2611 (pulp mills), 2621 (paper mills excluding building paper mills), and 2631 (paperboard) which identify the facilities principal product or group of products For a given mill, the SIC code in PCS may differ from the primary SIC code identified in TRI.
- **NPDES** permit number, for direct discharges.
- **TRI ID** number.
- **SID** - The site identification number given to the mill for EPA's 1990 industry-wide survey.
- **Comment** - about the current operating status of the mill.

EPA requests operators of the mills listed in Appendix B confirm current mill operating status.

### Current Status of Phase I Mills

Mill Name	City	State	Phase I Sub-category <sup>a</sup>	Dis-charge <sup>b</sup>	SIC <sup>c</sup> Code	NPDES	TRI ID	SID <sup>d</sup>	Comment
Container Corp. of America	Brewton	AL	BPK	D	2611	AL0002682	36426-CNTNR-HIGHW	9177	
Parsons & Whittemore (Alabama River Pulp Co. Inc.)	Claiborne (Perdue Hill)	AL	BPK	D	2621	AL0025968	36470-LBMRV-OFFHI	7901	Shares NPDES and TRI with BPK - SID:5298
(Parsons & Whittemore) Alabama Pine Pulp	Claiborne (Perdue Hill)	AL	BPK	D				5298	Shares NPDES and TRI with BPK - SID:7901
Kimberly-Clark Corp	Coosa Pines	AL	BPK	D	2611	AL0003158	35044-SPLPN-ALABA	697	
Champion International Corp.	Courtland	AL	BPK	D	2621	AL0000396	35618-CHMPN-POBOX	8040	
Gulf States Paper Corp.	Demopolis	AL	BPK	D	2631	AL0002828	36732-GLFST-HIGHW	9233	
Boise Cascade Corp.	Jackson	AL	BPK	D	2621	AL0002755	36545-BSCSC-307WE	1895	
James River Corp. (Naheola Mill)	Pennington	AL	BPK	D	2631	AL0003301	36916-JMSRV-ROUTE	6515	
International Paper Co. (Riverdale)	Selma	AL	BPK	D	2611	AL0003018	36701-HMMRM-RIVER	2899	
Domtar	Ashdown	AR	BPK	D	2611	AR0002968	71822-NKSPP-HIGHW	4771	
Georgia-Pacific Corp.	Crossett	AR	BPK	D	2621	AR0001210	71635-GRGPC-PAPER	9700	
Potlatch	McGehee	AR	BPK	D	2631	AR0035823	71654-PTLTC-HIGHW	335	
International Paper Co.(Hammermill)	Pine Bluff	AR	BPK	D	2611	AR0001970	71611-NTRNT-FAIRF	2910	Phase II mil in close proximity (NPDES:AR0001601; Mid-America Packaging)
Evergreen Pulp Co.	Samoa	CA	BPK	D	2611	CA0005894	95564-LSNPC-LPDRI	5540	TCF Mill (uses peroxide bleaching); operates on the edge of profitability; recently bought by Chinese company.
Champion International Corp.	Cantonment (Pensacola)	FL	BPK	D	2621	FL0002526	32533-CHMPN-375MU	1513	
Georgia-Pacific Corp.	Palatka	FL	BPK	D	2621	FL0002763	32078-GRGPC-STATE	7805	
Stone Container Corp.	Panama City	FL	BPK	I	2611	FLR05B551	32401-STNCN-1EVER	3771	indirect; not in PCSLoads2002 (POTW=FL0002631; Bay County Wastewater Treatment Plant)
Federal Paper Board Co.	Augusta	GA	BPK	D	2611	GA0002801	30913-FDRLP-HIGHW	310	
Koch Cellulose LLC	Brunswick	GA	BPK	D	2611	GA0003654	31520-BRNSW-WEST9	3611	
Weyerhaeuser/Flint River Mill	Oglethorpe	GA	BPK	D	2611	GA0049336	31068-BCKYC-OLDST	3114	minor; not in PCSLoads2002; Project XL participant
Stone Container (Savannah River)	Pt. Wentworth	GA	BPK	D	2611	GA0002798	31407-STNCN-1BONN	9982	
Potlatch	Lewiston	ID	BPK	D	2621	ID0001163	83501-PTLTC-805MI	2216	

**Current Status of Phase I Mills (Continued)**

Mill Name	City	State	Phase I Sub-category <sup>a</sup>	Dis-charge <sup>b</sup>	SIC Code <sup>c</sup>	NPDES	TRI ID	SID <sup>d</sup>	Comment
Willamette Industries Inc.	Hawesville	KY	BPK	D	2611	KY0001716	42348-WLLMT-POBOX	8897	Recycled cbrd mill closed according to AF&PA, Oct 2002. Pulp and paper mill still open
New Page	Wickliffe	KY	BPK	D	2621	KY0000086	42087-WSTVC-HIGHW	6360	
International Paper Co.	Bastrop	LA	BPK	D	2611	LA0007561	71220-NTRNT-705CO	1907	
Boise Cascade Corp.	Deridder	LA	BPK	D	2621	LA0007927	70634-BSSTH-USHIG	9747	
Tembec	St. Francisville	LA	BPK	D	2611	LA0003468	70775-JMSRV-ENDOF	5677	
Georgia-Pacific Corp.	Zachary (Port Hudson)	LA	BPK	D	2621	LA0005258	70791-GRGPC-ZACHA	181	
New Page	Luke	MD	BPK	I	2621	MD0001422	21540-WSTVC-300PR	9926	indirect; PCSLoads2002 contains TSS, oil & grease, and Aluminum (POTW=MD0021687; Upper Potomac River Commission)
International Paper Co. (And'scogn)	Jay	ME	BPK	D	2621	ME0001937	04239-NTRNT-RILEY	6139	
S.D. Warren (SAPPI)	Hinckley (Skowhegan)	ME	BPK	D	2621	ME0021521	04976-SDWRR-RFD3U	832	
Lincoln Pulp & Paper Co.	Lincoln	ME	BPK	D	2611	ME0002003	04457-LNCLN-KATAH	7254	
Georgia-Pacific	Old Town	ME	BPK	D	2621	ME0002020	04468-JMSRV-PORTL	9195	
New Page	Rumford	ME	BPK	D	2621	ME0002054	04276-BSCSC-ROUTE	4084	
Domtar Industries Inc.	Woodland (Baileyville)	ME	BPK	D	2411	ME0001872	04694-GRGPC-MILLA	2374	
New Page	Escanaba	MI	BPK	D	2611	MI0000027	49829-MDPBL-COUNT	1492	
SAPPI Fine Paper NA	Muskegon	MI	BPK	I	2621	MI0001210	49443-SDWRR-2400L	5844	indirect; PCSLoads2002 contains Chlorine (POTW=MI0027391; Muskegon County Wastewater Management System)
Champion International Corp.	Quinnesec (Norway)	MI	BPK	D	2611	MI0042170	49876-CHMPN-USHIG	3042	
SAPPI	Cloquet	MN	BPK	I	2611	MN0001431	55720-PTLTC-NORTH	2212	indirect; not in PCSLoads2002 (POTW=MN0049786; Western Lake Superior Sanitary District)
Boise Cascade Corp.	International Falls	MN	BPK	D	2611	MN0001643	56649-BSCSC-SECON	1052	
Weyerhaeuser Paper Co.	Columbus	MS	BPK	D	2621	MS0036412	39703-CLMBS-CARSO	8662	
Koch Cellulose LLC	New Augusta	MS	BPK	D	2611	MS0031704	39462-LFRVR-HWY29	8525	
Weyerhaeuser Paper Co.	New Bern (Vanceboro)	NC	BPK	D	2611	NC0003191	28560-WYRHS-STREE	5657	

**Current Status of Phase I Mills (Continued)**

Mill Name	City	State	Phase I Sub-category <sup>a</sup>	Dis-charge <sup>b</sup>	SIC Code	NPDES	TRI ID	SID <sup>d</sup>	Comment
Federal Paper Board Co.	Riegelwood	NC	BPK	D	2631	NC0003298	28456-FDRLP-RIEGE	2608	
Blue Ridge Paper	Canton	NC	BPK	D	2621	NC0000272	28716-CHMPN-MAINS	4572	
Weyerhaeuser Paper Co.	Plymouth	NC	BPK	D	2621	NC0000680	27962-WYRHS-TROWB	8544	
James River Corp. (Crown Paper Co.)	Berlin	NH	BPK	D	2611	NH0000655	03570-JMSRV-650MA	1688	
Finch Pruyn & Co Inc.	Glens Falls	NY	PS	D	2611	NY0005525	12801-FNCHP-1GLEN	1277	PS-B; Ammonium
International Paper Co.	Ticonderoga	NY	BPK	D	2611	NY0004413	12883-NTRNT-SHORE	5123	
New Page	Chillicothe	OH	BPK	D	2621	OH0004481	45601-MDCRP-401SP	4696	
Georgia-Pacific	Clatskanie	OR	BPK	D	2611	OR0000795	97016-JMSRV-WAUNA	2818	
Georgia-Pacific	Halsey	OR	BPK	D	2611	OR0001074	97348-PPTLB-30480	1811	
Boise Cascade Corp.	St. Helens	OR	BPK	D	2611	OR0020834	97051-BSCSC-1300K	644	Shares NPDES with POTW
Willamette (Penntech Papers Div.)	Johnsonburg	PA	BPK	D	2621	PA0002143	15845-PNNTC-100CE	4491	
Appleton Papers Inc.	Roaring	PA	BPK	D	2611	PA0008265	16673-PPLTN-100PA	5701	
P. H. Glatfelter Co.	Spring	PA	BPK	D	2621	PA0008869	17362-PHGLT-228SO	4920	VATIP-Tier 1
Bowater Inc.	Catawba	SC	BPK	D	2611	SC0001015	29704-BWTRC-5300C	2449	VATIP-Tier 1; PCS dioxin detect in 2002 confirmed by mill (83.6pg/L)
Union Camp Corp.	Eastover	SC	BPK	D	2621	SC0038121	29044-NNCMP-ROUTE	1421	VATIP-Tier 1
International Paper Co.	Georgetown	SC	BPK	D	2631	SC0000868	29442-NTRNT-KAMIN	7647	
Willamette Industries Inc.	Bennetsville	SC	BPK	D	2621	SC0042188	29512-WLLMT-HWY91	1908	
Willamette Industries Inc.	Kingsport	TN	BPK	D	2621	TN0001643	37662-MDPPR-POBOX	1146	
Bowater Inc.	Calhoun	TN	BPK	D	2621	TN0002356	37309-BWTRS-ROUTE	9523	
International Paper Co.	Texarkana (Queen City)	TX	BPK	D	2621	TX0000167	75504-NTRNT-POBOX	8135	
Temple Inland Forest Products	Evadale (Silsbee)	TX	BPK	D	2631	TX0003891	77656-PLPPP-POBOX	2647	
Westvaco Corp.	Covington	VA	BPK	D	2631	VA0003646	24426-WSTVC-RIVER	4318	
Union Camp Corp.	Franklin	VA	BPK	D	2611	VA0004162	23851-NNCMP-HIGHW	6412	VATIP-Permit does not indicated Tier
Smurfit-Stone	West Point	VA	BPK	D	2611	VA0003115	23181-CHSPK-19THM	5187	
Weyerhaeuser Paper Co.	Longview	WA	BPK	D	2611	WA0000124	98632-WYRHS-340II	8668	
Boise Cascade Corp.	Wallula	WA	BPK	D	2611	WA0003697	99363-BSCSC-POBOX	732	
Georgia-Pacific	Camas	WA	BPK	D	2611	WA0000256	98607-JMSRV-NE4TH	324	
Scott Paper	Everett	WA	PS	D	2611	WA0000621	98201-SCTTP-2600F	5124	PS-B; Ammonium based

### Current Status of Phase I Mills (Continued)

Mill Name	City	State	Phase I Sub-category <sup>a</sup>	Dis-charge <sup>b</sup>	SIC Code <sup>c</sup>	NPDES	TRI ID	SID <sup>d</sup>	Comment
Simpson Tacoma Kraft Co.	Tacoma	WA	BPK	D	2611	WA0000850	98421-SMPSN-801PO	3720	
Wausau Paper Mills Co.	Brokaw	WI	PS	D	2611	WI0003379	54417-WSPPR-2NDST	7080	PS-A; Magnesium-based bisulfite process
SmartPapers LLC	Park Falls	WI	PS	D	2621	WI0003212	54552-FLMBP-200NO	23	PS-A; Calcium based
Stora Enso	Wisconsin Rapids	WI	BPK	D	2611	WI0037991	54494-CNSLD-950FO	7850	In 2002, mill submitted 3 separate TRI release reports (pulp mill, paper mill, and water quality center)
Weyerhaeuser Paper Co.	Rothschild	WI	PS	D	2621	WI0026042	54474-WYRHS-200GR	4139	PS-A; Calcium based
Domtar Industries Inc.	Nekoosa	WI	BPK	D	2611	WI0003620	54457-NKSML-MARKE	4468	Shares NPDES with PS - SID:7163
Domtar Industries Inc.	Port	WI	PS	D	2621		54469-PRTDW-100WI	7163	PS-A; Shares NPDES with BPK - SID:4468
International Paper Co.	Mobile	AL	BPK	D	2621	AL0002780		6354	idle in '02; PCSLoads2002 contains dioxin, TSS, iron, etc.
Scott Paper Co./SAPPI	Mobile	AL	BPK	D	2621	AL0002801	36652-SCTTP-BAYBR	4774	idle after '02; PCSLoads2002 contains BOD5, oil & grease, TSS, etc
Simpson Paper Co.	Anderson	CA	BPK	D				8657	idle in '02
St. Joe Forest Products Co.	Port St. Joe	FL	BPK	I		FLR10K742		3820	idle in '02; not in PCSLoads2002
Gilman Paper Co.	St. Marys	GA	BPK	D	2611	GA0001953	31558-GLMNP-10000	8850	idle after '02; PSCLoads2002 contains dioxin, BOD5, and TSS. According to AF&PA, closed October 2002.
Great Northern Paper Co.	Millinocket	ME	PS	D	2621	ME0000167	04462-GRTNR-1KATA	6841	phase II
SAPPI Fine Paper NA	Westbrook	ME	BPK	D	2621	ME0002321	04092-SDWRR-89CUM	130	phase II
International Paper Co.	Moss Point	MS	BPK	I	2621	MS0002674		7115	idle in '02; PCSLoads2002 contains BOD5, TSS, dissolved oxygen
Stone Container Corp.	Missoula	MT	BPK	D	2611	MT0000035	59806-STNCN-MULLA	3218	phase II
Procter & Gamble Paper	Mehoopany	PA	PS	D	2621	PA0008885	18629-PRCTR-ROUTE	7401	phase II
International Paper Co.	Erie	PA	BPK	I	2611	PA0000124	16533-HMMRM-1540E	3982	phase II (POTW=PA0026301; Erie City/Erie Sew Auth). According to AF&PA closed June 2002.
Champion International Corp.	Houston (Sheldon)	TX	BPK	D	2621	TX0053023	77044-CHMPN-11611	4545	idle after '02; PCSLoads2002 contains AOX, COD, dioxin, etc.



### Current Status of Phase I Mills (Continued)

Mill Name	City	State	Phase I Sub-category <sup>a</sup>	Dis-charge <sup>b</sup>	SIC <sub>c</sub> Code	NPDES	TRI ID	SID <sup>d</sup>	Comment
Champion International Corp	Lufkin	TX	BPK	D	2621	TX0001643	75902-CHMPN-HIGHW	4079	idle after '02; PCSLoads2002 contains AOX, dioxin, TSS, etc. According to AF&PA idled indefinitely Oct. 2003
Simpson Paper Co.	Pasadena	TX	BPK	I	2621		77506-PSDNP-901NS	2816	phase II (POTW=TX0005380; Gulf Coast Waste Disposal Auth)
James River II Inc	Camas	WA	PS	D				324	idle in '02; Factsheet (issued 4-3-03) excerpt: August 27, 2001, the Camas Mill announced the permanent closure of the sulfite pulp mill and four paper machines
Georgia-Pacific Corp.	Bellingham	WA	PS	D	2611	WA0001091	98225-GRGPC-300WL	4005	idle after '02; PCSLoads2002 contains TSS, mercury, BOD5; (at promulgation the only mill in the specialty grade mills segment)
Badger Paper Mills Inc.	Peshtigo	WI	PS	I				3764	phase II (POTW=WI0030651; Peshtigo City WWTF)

a - Phase I subcategories include bleached papergrade kraft (BPK) and papergrade sulfite (PS) pulping operations.

b - Mill either discharge directly to surface waters (i.e., direct dischargers) or to a POTWs (indirect dischargers).

c - The pulp, paper, and paperboard industry corresponds to three separate Standard Industrial Classification (SIC) codes: 2611 (pulp mills), 2621 (paper mills excluding building paper mills), and 2631 (paperboard) which identify the facilities principal product or group of products. Table lists the SIC code listed in PCS. For a given facility, the SIC code in PCS may differ from the primary SIC code identified in TRI.

d - EPA performed an industry-wide survey in 1990. Each mill was given a survey identification number (SID).