

EPA ANNOUNCES FRAMEWORK FOR CLUSTER RULE EFFLUENT LIMITATIONS GUIDELINES

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THE EPA WILL PROMULGATE THE EFFLUENT GUIDELINES PORTION OF THE CLUSTER RULE IN SEVERAL STAGES.

ON JULY 2, 1996, EPA ASSISTANT ADMINISTRATOR (water) Bob Perciasepe signed a Notice of Availability that announced the framework for the final Cluster Rule wastewater standards. There was a 30-day comment period following the July 15 publication of the Federal Register Notice. The following is a summary of the major changes the EPA proposes for the effluent limitations portion of the combined air/water Cluster Rule.

The EPA plans to promulgate the effluent guidelines portion of the Cluster Rule in stages of several subcategories at a time. At this point, the agency intends to promulgate effluent limitations guidelines and standards only for the Bleached Papergrade Kraft and Soda (BPK) subcategory, and the Papergrade Sulfite (PGS) subcategory, with the other subcategories to follow at a later date. The notice states that the effluent regulations for the BPK and PGS subcategories are to be promulgated first, to address the original consent decree requirement concerning dioxins and furans.

Following the original December 1993 proposal, the EPA received further technology and cost information from industry, AF&PA, and NCASI. Additionally, the agency carried out site visits and field sampling studies at mills in the United States, Canada, and Europe. These data have been included in the post-proposal analyses, and changes in effluent limitations and anticipated compliance costs reflect this input.

BLEACHED PAPERGRADE KRAFT AND SODA SUBCATEGORY (BPK)

Basis of revisions for BPK

For best available technology economically achievable (BAT), the EPA has determined that two options identified in the proposal "merit careful consideration for effluent limitations." Option A is based on 100% chlorine dioxide substitution and generally reflects the industry proposal per the AF&PA. Option B, which is largely the same as the original proposal basis for BAT, is based on some form of extended delignification (oxygen delignification or extended cooking) plus 100% chlorine dioxide substitution. Here, extended delignification technologies produce unbleached softwood pulps at kappa no. 15 and hardwood at kappa no. 10.

The EPA does not indicate which BAT option it intends to promulgate; instead, it states that Option A should be given "equal weight" as a potential basis for BAT. It states that comments received on this notice will "assist in the final decision." The EPA indicates that new source performance standards (NSPS) are likely to be based on Option B, suggesting that the EPA could base BAT for existing mills on Option A. However, comparison of the annualized costs for the two options shows that the EPA may have difficulty justifying a decision to opt for Option A for BAT.

The EPA sees benefits in adopting Option B due to an anticipated reduction in chronic toxicity that is likely due to the reduction of nonchlorinated compounds as measured by chemical oxygen demand (COD). Addition-

Parameter	Limitation basis	1993 proposed limitation	New Option A	New Option B
TCDD	Daily	ND*	ND	ND
TCDF	Daily	359 ng/kg	24.1 pg/L	24.1 pg/L
Chlorinated phenolics	Daily	ND	ND	ND
Chloroform	Monthly	2.01 g/kg	2.8 g/kg	2.8 g/kg
AOX	Monthly	0.156	0.448	0.162
COD	Monthly	25.4	45.6**	30.4**

*ND = nondetect

** For BPK pulping sources only

ng/kg = nanograms kilokilogram

pg/L = picograms/liter

g/kg = grams/kilokilogram

I. Proposed effluent limitations (kg/a.d.m.t.), Bleached Papergrade Kraft and Soda subcategory

	1993 proposed Option 1	1993 proposed Option 2	1996 revised Option 1	1996 revised Option 2
Basis of limit	Avg. of best 90% of mills	Avg. of best 50% of mills	Avg. of best 90% of mills	Avg. of best 50% of mills
BOD ₅	2.65	1.57	2.73	1.73
TSS	4.46	2.72	4.41	2.73

II. Long-term average performance levels for BCT (kg/o.m.m.t.*), Bleached Papergrade Kraft and Soda subcategory

Type of cost	1993 proposed limitations	1996 New Option A	1996 New Option B
Capital, US\$ million	2184	998	2036
O&M, US\$ million/year	11.8	109	(7)
Annualized cost			
US\$ million/year	223.2	140	155
US\$/u.b.m.t.	7.50	4.78	5.27

u.b.m.t. = unbleached metric tons

III. Cost estimated to implement BAT/PSES, Bleached Papergrade Kraft and Soda subcategory

ally, Option B includes reduction in the potential for formation of dioxins [tetrachlorodibenzo-p-dioxin (TCDD)], furans [tetrachlorodibenzofuran (TCDF)], and the chlorinated compounds bulk analytical parameter, adsorbable organic halides (AOX).

The agency "endeavored" to look at totally chlorine-free (TCF) technology for BAT, but no data were available indicating that it was suitable for or capable of producing full-brightness market softwood pulp. Therefore, TCF is not one of the options being considered for BAT, although a TCF mill would qualify under its "incentives" package, described later.

For conventional pollutant parameters [biochemical oxygen demand (BOD₅) and total suspended solids

(TSS)], NSPS limitations (with non-conventional and toxic pollutant control per BAT Option B) would be based on the average of the best 50% of the existing mills in the subcategory (BCT Option 2, as follows under "Proposed effluent limitations"). Existing mill limits are to be based on best conventional pollutant control technology (BCT) as opposed to a revision of the best practicable control technology (BPT) limits.

The EPA is considering dropping methylene chloride, methyl ethyl ketone (MEK), and acetone as regulatory parameters. It is also considering making color a permit-specific parameter, with no national limitation. The EPA still considers AOX to be an "appropriate measure of the performance of in-process and end-of-pipe technologies in reducing the mass of chlorinated organic pollutants such as dioxin and furan."

The regulation of COD continues to be considered, and the EPA also considers it to be a good monitoring parameter for best management practices (BMP). However, the EPA does not have sufficient data at this time to determine the contributions of COD from non-BPK pulping sources, such as paper mills. Thus, in this notice, the EPA provides anticipated regulatory limitations for the pulping operations at a BPK mill and indicates that

* o.m.m.t. = off-machine metric ton.

CLUSTER RULE

Target parameter	Tier I	Tier II	Tier III
AOX LTA, kg/kkg	0.3	<0.10	<0.05
Prebleaching kappa target	20 SWD 13 HWD	NP*	NP
Flow reduction target	Recycle all pre-bleaching filtrates	Pulping condensate, evaps condensate, and bleach plant flow $\leq 10 \text{ m}^3/\text{kkg}$	Pulping condensate, evaps condensate, and bleach plant flow $\leq 5 \text{ m}^3/\text{kkg}$
*NP = not provided			

IV. Incentive tiers for further environmental improvements for BPK

Parameter	Limitation basis	1993 Proposed limitation	New segment a.	New segment b.
TCDD	Daily	None	None	ND
TCDF	Daily	None	None	ND
Chlorinated phenolics	Daily	None	None	ND
AOX	Daily	0.1	ND	TBD*
COD	Monthly	71.2	TBD	TBD
*To be determined				

V. Proposed effluent limitations (kg/a.d.m.t.), Papergrade Sulfite subcategory

allowances for the papermaking operations and other on-site pulping will be part of the final promulgated rule.

Effluent limitations revisions for BPK

A summary of the changes in the proposed effluent limitations is presented in Tables I and II.

Economic assessment revisions for BPK

The EPA received additional cost data after the proposed regulation was published. Revised capital cost curves and new operating and maintenance values were used in re-estimating the costs of compliance. In addition, data were gathered and included relating to the recovery area impacts due to the implementation of BAT, as were data for existing spill control and costs for implementing spill control measures. The agency states that, with the new information, it concludes that no recovery boiler replacements will be necessary for a mill to comply with BAT for either Option A or B, but that estimates now include a much higher mill-specific cost for the implementation of BMP.

The EPA currently defines "technology in place" to include process changes, upgrades, or renovations either completed, underway, or committed to as of mid-1995. This basis was used to estimate revised compliance costs. A summary of the costs (in 1995 dollars) estimated to implement BAT and pretreatment standards for existing sources (PSES) is presented in Table III.

The EPA will no longer use the 1993 proposal market model. It has not completed a combined impact assessment [including BAT, BCT, BMP, and maximum achievable control technology (MACT)] but has made a preliminary assessment for BAT/PSES. For Option A, with an annualized cost estimate of US\$ 140 million, the EPA estimates that one mill would close, with a loss of approximately 500 jobs. For Option B, with an annualized cost estimate of US\$ 155 million, the EPA estimates that three mills would close, with a loss of 4100 jobs.

The EPA calculated cost-effectiveness ratios using pre-tax compliance costs in 1981 dollars. For Option A, the EPA calculated a ratio of US\$ 12 per pound-equivalent of pollutant removal. For Option B, a ratio of US\$ 11 per pound-equivalent was calculated. US\$ 78 per pound-equivalent was calculated for the increment between Option A and B.

Incentives for further environmental improvements for BPK

New from the EPA are proposed "incentives for further environmental improvements" to encourage mills to investigate, develop, and implement advanced technologies to achieve effluent quality better than the basis for BAT. One goal of this program is to achieve the greatest environmental results possible consistent with mills' capital investment cycles. The EPA states that it [expects] that those technologies would move mills toward mini-

	1993 proposed Option 1	1993 proposed Option 2	1996 revised option
Basis of limit	Avg. of best 90% of mills	Avg. of best 50% of mills	Avg. of best 90% of mills
BOD ₅	4.97	3.60	7.06
TSS	5.46	4.74	8.39

VI. Long-term average performance levels for BCT (kg/o.m.m.t.), Papergrade Sulfite subcategory, Segments a. and b.

mum impacts and closed loop operations." It notes that "Tiers I and II should reflect movement toward the long-term goal of minimizing impacts of mills in all environmental media through partially or fully closed loop processes." The agency goes on to say, however, that "while completely closed-loop operation offers a theoretically desirable goal, the EPA is concerned that, without considerably more research and mill trials, the potential exists for cross-media transfers or product quality concerns." The EPA suggests that TCF mills would be automatically eligible for the incentives program based solely on their AOX performance.

The incentives are based on a set of three tiers, each specifying target levels for AOX, prebleaching kappa number, and flow reduction. All three are applicable for BAT; Tiers II and III are applicable for NSPS. All other BAT limitations for Option B would also apply. Table IV summarizes the details with each tier of these incentives.

The EPA has proposed two sets of incentives, one prior to achievement of incentives-related BAT and the other afterward. The first set would provide mills with up to an additional 15 years of compliance time and would apply to mills that can achieve the more stringent effluent limits noted within the incentive package. The EPA has also proposed a method by which a mill not wanting to use an enforcement order could use the permitting process to achieve a longer compliance time frame. The EPA proposes to code "Alternative BAT Limits" into the (CFR) when the Cluster Rule is promulgated, allowing a mill to use a permit to receive an extended compliance time frame for these alternatives. The extended compliance time frames would be up to 5 years for Tier I, 10 years for Tier II, and 15 years for Tier III.

The second set of incentives would provide monitoring, enforcement, and public recognition benefits to a mill that has met the first set of incentives but wishes to go beyond this. These incentives include:

- Greater certainty regarding permit limits and requirements
- Reduced effluent monitoring
- Reduced penalties
- Reduced inspections
- Public recognition programs
- Fast-track permit modification.

In describing the proposed incentives program, the notice focused heavily on "if Option A were selected." Although the EPA has indicated that it continues to consider two different options for BAT, the language in this section appears to lean toward the EPA moving toward Option A for BAT. The final BAT option selection will be heavily based on the comments the EPA receives related to the incentives program, and mills should continue to consider their site-specific technology requirements for meeting either Option A or Option B.

PAPERGRADE SULFITE SUBCATEGORY (PGS)

Basis of revisions for PGS

The EPA is considering splitting PGS into three segments: (a) paper grade sulfite pulp using either calcium, magnesium-, or sodium-based sulfite; (b) paper grade sulfite pulp using ammonium-based sulfite; and (c) "specialty-grade" sulfite pulp with a high percentage of alpha cellulose and high brightness, used for products such as plastic molding compounds. The EPA plans to promulgate effluent limitations for the first segment and for most pollutants for the second segment. The effluent limitations for chloroform and AOX for the second segment and all the effluent limitations for the third segment will be delayed until the agency receives further data upon which to base these limitations.

The EPA proposes the following as the technology basis for BAT and PSES for the three segments: (a) TCF bleaching using E_{op}P sequence, (b) elemental chlorine-free (ECF) bleaching using DE_pD sequence without hypochlorite, and (c) ECF bleaching using ODE_{op}D sequence. Note that for the third segment, the EPA indicates that technology development work is still ongoing to assist in defining BAT.

For NSPS, the EPA has proposed that the technology basis be the same as that for BAT. The EPA stated that NSPS conventional pollutant limitations will continue to be based on the single best performing end-of-pipe secondary wastewater treatment system.

Effluent limitations revisions for PGS

A summary of the changes in the PGS proposed effluent limitations is presented in Tables V and VI.

Economic assessment revisions for PGS

The estimated compliance costs for PGS were revised to include updated capital, operating, and maintenance data. The EPA does not intend to promulgate effluent limitations for the third segment with this first set of pro-

mulgated Cluster Rule regulations; therefore, the compliance costs are for the first two segments only.

The estimated capital costs of compliance for the combined first two segments is US\$ 57.9 million, and the operating and maintenance cost estimate is US\$ 1.3 million/year. The total annualized cost estimate for these two segments is US\$ 6.6 million/year.

Similar to changes made for BPK, the EPA has not completed for PGS a combined impact assessment (including BAT, BCT, BMP, and MACT), but it has made a preliminary assessment for BAT/PSES. For the first two segments, at the estimated annualized cost of US\$ 6.6 million/year, the EPA estimates that no mills would close, with no related job losses. The cost-effectiveness ratio using pretax compliance costs, in 1981 dollars, for the direct dischargers in the first two segments is US\$ 10 per pound-equivalent of pollutant removal. A US\$ 284 per pound-equivalent was calculated for the indirect dischargers.

REVISIONS FOR ALL SUBCATEGORIES

Best management practices (BMP)

The EPA still intends to promulgate BMP for both direct and indirect dischargers, but it is to be modified somewhat. BMP will now focus only on spent pulping liquor, turpentine, and soap/tall oil, not on green or white liquors. Hard secondary containment will not be required for spent liquor storage tanks in that tank integrity testing will suffice. The EPA intends that mills monitor their BMP performance by tracking measurements of organic loading into effluent treatment, such as COD.

The agency is considering requiring BMP implementation as special national pollutants discharge elimination system (NPDES) permit conditions and requiring implementation of BMP within 30 months of the effective

date of the final Cluster Rule, or the date the mill's next NPDES permit is issued, whichever is later.

Pretreatment standards (PSES/PSNS)

The EPA indicates that secondary biological treatment systems at direct discharging mills and at publicly operated treatment works (POTWs) have comparable reductions in BOD₅, TSS, AOX, COD, and color. Therefore, the EPA does not plan to promulgate national pretreatment standards for these pollutants for existing or new sources. Site-specific limitations may apply, though, depending upon the permitting authority.

Definition of "new source"

The EPA will clarify its definition of "new source" to include only greenfield mills and new production capacity increases at existing mills. This will exclude replacement systems if kept close to existing production levels.

Monitoring requirements

The agency does not agree with industry's assertion that certifying that a mill is using ECF bleaching, without reference to operating conditions, is sufficient to warrant reduced monitoring requirements. The EPA points out that detectable concentrations of dioxin can be generated in cases where mills do not exercise careful control of chemical application (e.g., chlorine dioxide). It also points out the variability in chloroform generation depends on the type of pulp washing used by a mill.

Methods of wastewater analysis

The EPA intends to incorporate analytical method modifications if they have a positive effect on the reliability of the analytical data produced. This includes modifications to methods for analysis of volatiles, AOX, chlorophenolics, and color. TJ

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