Final.

CARBONLESS COPY PAPER MANUFACTURE AND RECYCLING OPERATIONS GENERIC SCENARIO

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I. NUMBER OF SITES

$$NS = PV/(CCPPV \times \% \text{ Conc})$$

where:

NS = Number of carbonless copy paper (CCP) manufacturing sites
PV = Production Volume of PMN chemical (kg/yr)
CCPPV = Production volume of CCP (Kg/site-yr). If not available use 56,000,000 kg/site-yr (See supplemental information).
% Conc. = concentration of PMN chemical in CCP. If not available use 1.5 % for solvents (Klass, 1990b) and 0.1% for color formers (Macek, 1991).

II. DAYS/YR

Assume 350 days/yr for carbonless copy paper manufacture, broke processing and deinking operations (Klass, 1991).

III. WORKER EXPOSURE

Ten workers per shift are potentially exposed during CCP manufacture (Appleton, 1989). This consists of the following:

3 workers - prepare the capsules and coatings
5 workers - operate the coating equipment
2 workers - work in the finishing area

Workers are exposed up to 250 days/yr. The worker activity with the highest potential for exposure is the loading of solid materials into mixing equipment. This operation is performed manually. For color-formers, inhalation exposure should be based on the OSHA PEL for particulates not elsewhere classified of 15 mg/m^3. For solvents, inhalation exposure should be based on the vapor pressure using CEB's standard models. Dermal exposure for all worker activities should be estimated using CEB's standard models (CEB, 1991).

IV. ENVIRONMENTAL RELEASE

1. Coating losses

$$kg/s/d = (PV \times \%loss)/(NS \times 350\ days/yr)$$

where:

kg/s/d = daily release of PMN chemical to on-site wastewater treatment
PV = production volume of PMN chemical (kg/yr)
%loss = coating losses - use 0.2% (Klass, 1990a)
NS = Number of sites

Note: On-site wastewater treatment consists of the following steps (Appleton, 1989):

1. primary clarification
2. activated sludge
3. secondary clarification
4. release to POTW

2. Pre-Consumer Waste (Broke)

This is waste generated at the CCP plant from trimming and offspec product but reprocessed at a pulp mill. This pulp mill may be located on the same site. The list of pulp mills that reprocess CCP broke is attached.

$$kg/s/d = (PV \times BGR \times \%Removal)/(NS \times ND)$$

where:

kg/s/d = daily release of PMN chemical to wastewater treatment at broke reprocessing plants
PV = production volume of PMN chemical (kg/yr)
BGR = broke generation rate - assume 4% (Klass, 1990a)
%Removal = Percentage of PMN chemical released to wastewater treatment from broke processing. If no data is available, assume 10% (Klass, 1990b). EPA has received the result of a study done for PMN 90-237/248/249 which indicated that removal rates as high as 98% are possible (WMU, 1990). The remainder of the PMN chemical is retained by the papermaking process and ends up in the paper produced from the recycled fibers (Klass, 1991).
NS = Number of sites that reprocess broke paper containing the PMN chemical. Assume that it equals the number of CCP plants, up to a maximum of 5 (Macek, 1991).
ND = Number of days - assume 350

3. Post-Consumer Waste

This type of wastepaper is generated from office recycling programs and sorting of office waste by paper packers and broker/dealers (Klass, 1990b). The amount of CCP recycled as post-consumer waste is estimated to be 1.8% (Klass, 1990b).

Eighty percent of this waste is assumed to be reprocessed at deinking mills and twenty percent at boxboard mills (Klass, 1990b). Equations for estimating daily releases from these types of facilities are given below.

Deinking Mills

$$kg/s/d = (PV \times 1.8\% \times 80\% \times \%Removal)/(NS_d \times ND)$$

where:

kg/s/d = daily release of PMN chemical to wastewater treatment at broke processing plant
PV = production volume of the PMN chemical (kg/yr)
%Removal = percentage of PMN chemical released to wastewater treatment from deinking - assume 10%
NS_d = Number of deinking mills that accept wastepaper containing CCP - assume 39 (Klass, 1990b)
ND = Number of days/yr - Assume 350

Boxboard Mills

$$kg/s/d = (PV \times 1.8\% \times 20\% \times \%Removal)/(NS_b \times ND)$$

same as above except:

NS_b = number of boxboard mills that accept wastepaper containing CCP - assume 190 (Klass, 1990b)

REFERENCES

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4. WMU. 1990. Laboratory Carbonless Paper Coating, Repulping, and Papermaking to Prepare Whitewater Samples for SAS-310 Content Analysis and Assessment of the Removal of SAS-310 During Wastewater Treatment. Kalamazoo, MI: Western Michigan University. November 13.

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CARBONLESS COPY PAPER SCENARIO

SUPPLEMENTAL INFORMATION

1. Production Data for Carbonless Copy Paper Plants (Klass, 1991)

Company	Location	CCP Produced (tons/yr)
Appleton	W. Carrolton, OH	10,000
Appleton	Combined Locks, WI	35,000
Appleton	Roaring Spring, PA	10,000
Appleton	Appleton, WI	160,000
Appleton	Camp Hill (Harrisburg), PA	100,000
Mead	Chillicothe, OH	140,000
Mead	Indianapolis, IN	30,000
3M	Nekoosa, WI	70,000
Nashua	Merrimack, NH	30,000
Moore	Visalia, CA	35,000
Moore	Fremont, OH	85,000
Moore	Honesdale, PA	35,000
	Average Plant	61,667

61,667 tons/yr x 2000 lbs/ton x 1 lb/2.2 kg = 56 x 10^6 kg/yr

2. Facilities that reprocess CCP broke (Klass, 1991)

Appleton, Combined Locks, WI
Appleton, Roaring Spring, PA
Appleton, West Carrolton, OH
Mead, Chillicothe, OH
Georgia-Pacific, Nekoosa, WI