Generic Occupational Exposure and Environmental Release Scenario

Manufacturing of Photographic Film/Paper

Process Description:

The manufacturing of photographic film, or paper, is a simple coating operation where several emulsion layers are coated onto the substrate one at a time, or the emulsions are mixed together and applied as one single coating. Because of the light sensitivity of some of the emulsions, the coatings have to be applied in near or total darkness. Once the emulsion has been spread over the substrate, it is conveyed to a cooling chamber where the gel thickens, and then into a drying chamber where much of the water is removed from the coated gelatin.

The silver halide microcrystals popularly used in modern photography are sensitive to electromagnetic radiation with wavelengths shorter than 500 nm. In other words, these crystals are said to be blue sensitive, but green and red insensitive. Therefore, the silver halides are spectrally sensitized with dyes. These, and other chemical sensitizers produce optimum photographic properties when used in trace amounts (ie, µmol sensitizer/mol Ag). Other emulsion additives aid in facilitating coating operations (surfactants), reducing spontaneous development in unexposed regions (antifoggants), and reducing surface abrasion and permit high temperature processing (aldehydes). The concentration of these sensitizers in the emulsions range from 0.002-1%.

Occupational Exposures:

Potential worker exposure to the PMN substance is expected to be minimal because of the low concentration in the emulsion. However, for a generic scenario, the textile dye drug room study will be referenced for this scenario. Worker inhalation exposure during the weighing procedure will range from 0.11-5.77 mg/m^3 while dermal exposure will range from 650-1950 mg/day. These numbers will then be multiplied by the concentration of the PMN in the emulsion. Other worker exposure to the PMN once the emulsion is transferred to coating applicator is negligible as the process is a closed system.

Approximately 3-6 workers/site will potentially be exposed to the PMN substance up to 300 days/yr. Based on the Production or Import volume, professional judgement should be used in determining the number of sites that will process the PMN.

the copier collection bin and disposal of the zerox paper copies containing the toner.

Some paper may be recycled and return to paper mills where the paper is deinked and the PMN is released in wastewater from the deinking process. This wastewater would then probably undergo biological treatment on-site. However, the amount of PMN released per site-day to water at these sites is difficult to estimate. See Post Consumer Waste section of the Carbonless Copy Paper Manufacture and Recycling Operations Generic Scenario by Greg Macek.