ENVIRONMENTAL FATE

The assessment that follows is a general characterization of the environmental fate and wastewater treatment pathways for the isocyanate substances based on PMNs containing isocyanate data. The isocyanates subject to this fate assessment comprise a diverse group of compounds whose fate in the environment varies little. Hydrolysis would represents the primary fate mechanism for the majority of the compounds reviewed, but, is tempered somewhat by the lack of water solubility. In the absence of hydrolysis, sorption to solids (e.g., sludge and sediments) will be the primary mechanism of removal. Biodegradation is minimal for most compounds and volatilization is negligible. Atmospheric degradation is not expected with removal from air occurring by washout or dry deposition.

Volatilization

The volatility of most compounds reviewed ranged from 10^{-4} to 10^{-7}. Volatilization from surface waters (e.g., lakes and rivers) is expected to take years. In wastewater treatment this process is not expected to be significant.

Sorption

Review of the estimated properties suggest that this mechanism is the primary removal mechanism in the ambient environment and in wastewater treatment in the absence of significant hydrolysis. Sorption to solids in wastewater treatment is considered strong to very strong for most compounds. Sorption to sediments and soils in the ambient environment is very strong in most instances. Migration to groundwater and surface waters is not expected due to sorption or hydrolysis.

Hydrolysis

Hydrolysis of the N=C=O will occur in less than hours in most instances and within minutes for more than 90% of the substances reviewed. However, the low to very low solubility of these substances will generally lessen the effectiveness of hydrolysis as a fate pathway. But hydrolysis should be considered one of the two major fate processes for the isocyanates.

Biodegradation

Aerobic and/or anaerobic biodegradation of the isocyanates is not expected to occur at significant levels. Most of the substances reviewed indicate greater than months for degradation. Degradation of the hydrolysis products will occur at varying rates depending on the moiety formed.