# CHAPTER 4
# TREATABILITY

**4-1. General.** Compounds with Henry's constant greater than 100 atm (moderate volatility) are generally amenable to air stripping.

**4-2. Fouling.** Retention or accumulation of solids within an air stripper is called fouling or scaling (these terms are used interchangably). Bivalent metal ions frequently precipitate in air strippers. Influent that contains calcium (above 40 mg/L), magnesium (above 10 mg/L), iron (above 0.3 mg/L), or manganese (above 0.05 mg/L) may cause scaling (Hammer, 1975). When iron begins to precipitate, microbial growth increases the rate and amount of solids accumulation. Because the contact between air and water in any type of air stripper will result in oxidation, precautions are essential. Pre-treatment to remove interference, adding a chemical to prevent precipitation, or periodic cleaning of the air stripper to remove accumulation must be included in the design.

**4-3. Contaminant Effects.** Treatability studies are necessary when existing data are not adequate for predicting system performance and when interfering chemicals, such as alcohols, ketones, or surfactants, are present. A treatability study is needed in the rare instance when the concentration of the contaminant is in excess of one third of its solubility. Treatability studies are generally not required or recommended for standard air strippers operating within the range called for by the manufacturer of the trays or packing. However, if vapor pressure and solubility data for the contaminant are not available from references, such as Yaws (1994), or from the chemical manufacturer, a pilot study should be conducted.

**4-4. Loading Rate.** A pilot study is necessary if the anticipated loading rate of either air or water is outside the range for which design information is available. Manufacturers do not recommend operation outside the loading rate limits. Low hydraulic loading may cause low mass transfer efficiency. Increased air rates over the optimum are generally a waste of energy and may decrease the rate of water flow to the point of flooding.

**4-5. Diameter.** Even minor variations of the stripper diameter can have a significant effect on treatability. A change in diameter results in an inverse geometric effect on the loading and distribution of both air and water phases. "Safety factors" should be completely evaluated through the calculations to assure that the over-design does not adversely affect normal operation. Large-diameter towers are not generally available for treatability studies, so geometric similarity between the pilot scale and full scale is important.

**4-6. Treatability Study Scope.** A typical treatability study scope is included as Appendix B.