

7. POLLUTION CONTROL AND SAFETY

Environmental Considerations:

Vigilance is required in both the design and operation of process plant to ensure that legal standards are met and that no harm is done to the environment. Considerations must be given to:

- (1) All emissions to land, air, water.
- (2) Waste management.
- (3) Smells.
- (4) Noise.
- (5) The visual impact.
- (6) Any other nuisances.
- (7) The environmental friendliness of the products.

Waste Management:

Waste arises mainly as by products or unused reactants from the process, or as off- specification product produced through mis-operation.

Gaseous Waste:

Gaseous effluents which contain toxic or noxious substances will need treatment before discharge into the atmosphere. Gaseous pollutants can be removed by absorption or adsorption. Finely dispersed solids can be removed by scrubbing, or using electrostatic precipitators. Flammable gases can be burnt.

Liquid Waste:

The waste liquids from a chemical process, other than aqueous effluents will usually be flammable and can be disposed of by burning in suitable designed incinerators. The gases leaving an incinerator may be scrubbed, & acid gases neutralized.

Aqueous Waste:

The principal factors which determine the nature of an aqueous industrial effluent and on which strict controls will be placed by the responsible authority are:

- (1) pH.
- (2) Suspended solid.
- (3) Toxicity.
- (4) Biological oxygen demand.

The pH can be adjusted by the addition of acid or alkali. Lime is frequently used to neutralize acidic effluents.

Suspended solids can be removed by settling, using clarifiers. For some effluents it will be possible to reduce the toxicity to acceptable level by dilution. Other effluents will need chemical treatment. The oxygen concentration on water course must be maintained at a level sufficient to support aquatic life. It is measured by a standard BOD test.

Toxicological data:

The toxicological data for a cumene plant is usually supposed to have the following values on the various environmental parameters as given below:

Threshold limit value	50 ppm
Skin effects	primary irritant
Absorption through skin	slowly absorbed
Narcotic properties	yes
Depressant properties	yes
Medical examination for workers	required in some countries
Other precautions	as for all aromatics

Noise:

It can cause a serious nuisance in the neighbourhood of a process plant. Noisy equipment should, as far as practicable, be sited well away from the site boundary. Earth banks and screens of trees can be used to reduce the noise level perceived outside the site.

Visual Impact:

Large equipments such as storage tanks, can be painted to blend in with, or even contrast with, the surroundings. Landscaping and screening by belts of trees can also help improve the overall appearance of the site.