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## Foam: The Environment and Disposal Issues

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The use of Class B Aqueous Film-Forming Foam (AFFF) has raised concern in the environmental community regarding the proper disposal of foam-water solution. The recent withdrawal from the market by a major manufacturer has resulted in an increased environmental awareness by the market place.

Foam can reach the environment through any of the following means:

1. Fire or catastrophic event
2. System discharge or false activation
3. Training of firefighters
4. System testing or commissioning

In some cases, the resulting discharge may be contained and treated as wastewater before being returned to the environment. If this is possible, the potential for ecological damage is minimized. However, if the release is the result of a fire, other factors must be considered. For example, if there are unburned fuels mixed in with the foam-water solution, they must be contained and arrangements must be made for separation from the foam-water solution.

For water immiscible fuels, a fuel-water separator can be used to phase separate the fuel-water solution. The fuel is skimmed from the surface of the foam water solution and reclaimed. The foam-water solution is then suitable for discharge to a sewage treatment plant. The treatment facility must be capable of handling the volume of wastewater to be discharged without upsetting the balance of the system. The potential for foaming must also be recognized and dealt with accordingly in the treatment of the foam-water solution.

In the event of a foam discharge, either accidental or deliberate, the foam-water solution may find its way onto and into the ground or into a stream, river or lake. If this happens, it may not be possible to contain the discharge. Should such a discharge occur, the following should be considered when addressing any clean-up effort.

### Toxicity

Toxicity is the ability of a substance to cause damage to living tissue, impairment of the central nervous system, severe illness or, in extreme cases, death when ingested, inhaled, or absorbed by the skin. Toxicity is objectively evaluated on the basis of test dosages made on experimental animals under controlled conditions. The most important of these are the LD<sub>50</sub> (lethal dose, 50%) and LC<sub>50</sub> (lethal concentration, 50%) test which exposes the animal to oral ingestion and inhalation of the material being evaluated. LC<sub>50</sub> is the quantity of a substance administered by inhalation that is necessary to kill 50% of the test animals exposed to it within a specified time. LD<sub>50</sub> is the quantity of a substance necessary to kill 50% of exposed animals in laboratory tests within a specified time.

### Aquatic Toxicity

Toxicity may present a problem if the foam-water solution from a fire or an accidental spill finds its way into the aquatic system. The chemicals used in Ansul foams have been selected because of their favorable environmental characteristics. However, any chemical foreign to an ecosystem can have a negative impact on that ecosystem. It is recommended that the Material Safety Data Sheet (MSDS) of the product involved be consulted for environmental impact guidance. Ideally, a foam should have a toxicity rating of "practically non-toxic" or better. This rating means that the foam does not cause more than 50% mortality (LD<sub>50</sub>) in 96 hours at a concentration of 100mg/L. All Ansul foams meet or exceed these criteria.

### Biodegradability

This is the measure of the susceptibility of a substance to decompose by microorganisms. All AFFF, AR-AFFF, FP and FFFP foams are manufactured using chemicals that biodegrade. However, the fluorosurfactants used to manufacture these products are not completely degradable.

### Disposal of Class B Agents

If hydrocarbon fuels are mixed with the foam solution, the use of an oil-water separator is recommended. All discharges should be handled in accordance with local, state, or federal regulations. A qualified individual should evaluate these wastes to determine if flammable materials are present at hazardous concentrations and review the applicability of sewer code restrictions. If volatile materials in the waste present an explosion hazard, these wastes should not be discharged to the treatment facility. Such wastes should receive further treatment or they

should be incinerated by a facility designed to handle such wastes.

The waste may be metered into the sewer that flows into a waste treatment system only after qualified individuals determine that the waste meets sewer codes and that flammable materials are not present in the waste at concentrations that present a risk of explosion in the sewer. Wastes must be metered into the system at a sufficiently slow rate so that the foam-water solution will not cause foaming in the aeration basin of the waste system. This rate will be determined by the local situation and must follow all local, state and federal regulations. Since these regulations may vary, consult the necessary authorities before discharge. Waste treatment plant authorities must also be consulted to determine the discharge flow into the facility so that appropriate discharge rates can be determined to prevent foaming.

For ANSULITE® 1x3 or 3x3 alcohol-resistant products used at 1% or 3%, the discharge rate of the foam-water solution should be adjusted so that the amount of solution entering the waste treatment facility will be equal to or less than 25 mg of the original product concentrate per liter of sewerage. For ANSULITE® 3x6 alcohol-resistant products, the rate can be adjusted to 50 mg per liter of sewerage when used at 3% or 25 mg/liter when used at 6%.

For ANSULITE® AFFF products, the treatment rate should be equal to or less than 100 mg/liter of sewage for 6% AFFF, 50 mg/liter for 3%, and 25 mg/liter for 1%.

If foaming occurs or there is a need to treat more foam-water solution at a faster rate, antifoam agents may be added to the foam-water waste flow into the treatment facility. These antifoam agents may be obtained from one of the following suppliers:

- Dow Chemical
- General Electric
- Henkel
- Union Carbide
- Wacker Silicones

Antifoam agents should be based on silicone technology. The amount of antifoam required depends on the volume of foam-water solution to be treated. It is recommended that the amount of antifoam be determined by testing a representative sample of the foam-water solution prior to discharge.

Specific questions concerning foam agent use and disposal should be directed to Ansul Technical Services at 1-800-862-6785 or 1-715-735-7415.