

EPA Chemical Emergency Preparedness and Prevention Advisory

Hydrogen Fluoride

This advisory recommends ways Local Emergency Planning Committees (LEPCs) and chemical facilities can reduce risks posed by the presence of hydrogen fluoride (HF) in their communities. Hydrogen fluoride, a strong inorganic acid, is produced and used as a gas or liquid without water (i.e., in anhydrous form), or in a water (aqueous) solution. The anhydrous form is potentially more hazardous than hydrogen fluoride in dilute water solutions, because anhydrous hydrogen fluoride has greater potential for fuming and forming vapor clouds. If anhydrous hydrogen fluoride is accidentally released, it may react with water vapor to form a white vapor cloud. Under certain conditions, such a cloud has the potential to travel considerable distances close to the ground and pose a threat to people in its path. EPA stresses that although mishandling of HF can cause harm, there is no cause for undue alarm about its presence in the community when it is properly and safely managed.

Inhalation of hydrogen fluoride vapor, either in anhydrous form or from water solutions, can cause irritation if the exposure is mild (i.e., low concentration in air for a short time), or severe damage to the respiratory system or death in the case of exposure to high concentrations. Contact with the liquid or vapor can severely burn skin, eyes, and other tissue. Burns from hydrogen fluoride are particularly dangerous and require immediate and special treatment by trained medical personnel.

The largest use of hydrogen fluoride is in the manufacture of fluorine-containing chemicals, particularly chlorofluorocarbons (CFCs). Hydrogen fluoride may be used in some petroleum refinery operations, aluminum production, nuclear applications, glass etching and polishing, and metal treating and cleaning.

Although major incidents involving hydrogen fluoride have been rare, one example was an accident at a Texas petroleum refinery. A construction accident at an alkylation unit resulted in the release of 30,000 to 50,000 pounds of hydrogen fluoride and isobutane. The vapors migrated to an adjacent residential area. Eighty-five square blocks and approximately 4,000 residents were evacuated. There were no fatalities. More than 1,000 residents went to three neighboring hospitals. Although about 100 were admitted, most of those reporting to hospitals were treated on an outpatient basis. In some cases, there were reports of skin irritation and irritation to the eyes, nose, throat, and lungs. Some vegetation in the path of the cloud was also damaged.

Federal Requirements:

Hydrogen fluoride's acute toxicity prompted EPA to list it as an extremely hazardous substance (EHS), with a threshold planning quantity (TPQ) of 100 pounds, under Section 302 of the Emergency Planning and Community Right-to-Know Act (commonly known as SARA Title III). OSHA's Process Safety Management Standard, published February 24, 1992, requires facilities with anhydrous hydrogen fluoride in quantities at or above the threshold of 1,000 pounds to implement process safety management to protect

employees by preventing or minimizing the consequences of chemical accidents. In addition, OSHA regulations require that facility employees who could potentially be exposed to hydrogen fluoride in any form be trained to handle and use it safely and to recognize and deal with the potential hazards posed by this chemical. EPA regulations required under the Clean Air Act soon will require facilities with HF above a threshold quantity to prepare risk management plans; these plans will be provided to LEPCs and the state.