MEMORANDUM

SUBJECT: Options for Mitigating the Hazards of Flammable Propellents in Aerosol Pesticide Products

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I believe that our current procedures for regulating the flammability of pesticide aerosol products are inadequate. The purpose of this memo is to present the problem and various options for solution.

The Problem

Currently the Office of Pesticide Programs is judging the applicability of flammability warning on pesticide labeling based upon two tests: the flash point test and the flame extension test. The flash point test is applicable to liquid products and the liquid component of aerosols. The flame extension test measures the flame extension created by holding an aerosol 6 inches from a lit candle. Depending on the flash point determined and the length of the flame extension, the product can bear the signal words "EXTREMELY FLAMMABLE" or "FLAMMABLE" (with associated warnings) and/or precautions referring to the possibility of the container bursting.

These two tests are inadequate to determine the potential for fire and explosion hazard for certain pressurized aerosol pesticide products. If a product contains propane, butane, isobutane, or dimethyl ether, all extremely flammable propellents, it can still pass through the flash point and flame extension tests without being put into the EXTREMELY FLAMMABLE or FLAMMABLE categories.

Since only the liquid component of an aerosol is tested in the flash point test, it is only the liquid component which is being judged, not the propellant. This test, therefore, is inadequate to assess the flammability hazard of the petroleum derived propellents, all of which are highly flammable.
A registrant can circumvent the purpose of the flame extension test by adjusting the propellant system to produce less than an 18 inch long spray pattern. The product will then produce less than an 18 inch flame extension. In other cases, as with water based products, the product will extinguish the candle flame. Indeed, a can of 100% propane or butane can extinguish the candle in the flame extension test if the valve is appropriately adjusted. There is no warning as to flammability, yet these products can contain petroleum derived propellents with flash points from 40 to 200 degrees below zero. If the flash point of the propellents were judged separately from the product, they would all fall into the "EXTREMELY FLAMMABLE" category. Yet these products bear labeling which gives the user little or no warning as to the potential danger they can pose.

Due to its easy circumvention, the flame extension test is of little use in assessing consumer product hazard. By requiring only a flash point test for the liquid component, the propellant flammability hazard remains unquantified. However, if the propellant flash point were assessed in addition to the flash point of the liquid, this would give us a much more realistic data base upon which to make a flammability warning assessment.

The Agency has been receiving a growing number of complaints and reports of fires and explosions caused by products not bearing any mention of flammability. This situation has been considerably worsened since the 1970s by the banning of the chlorofluorocarbon propellents and the increasingly widespread use of total release products such as foggers. The petroleum based propellents have largely displaced the nonflammable chlorofluorocarbon propellents in the marketplace. The total release products pose hazard above and beyond most other aerosols in that, rather than the product being released in short bursts, the entire contents are released. Also, the application site is more often closed up, trapping the flammable gases within the area. The petroleum based propellents dominate the fogger market due to their greater dispersal pattern required for a fogger. Also of significant consideration is the fact that the petroleum propellents are the least expensive propellents on the market.

The New York City Fire Department's (NYCFD) statistics on fires caused by these flammable propellents, when projected to the population of the U.S. at large, suggest an excess of 500 fires/explosions/year in this country. Many of these fires could have been prevented if these products had been more appropriately labeled as to the products' potential for fire hazard.
In some reports of accidents involving these type of products, although the directions were read and followed to the letter, mishap due to fire or explosion still occurred. Among those who diligently read the label, such mishaps can be entirely prevented with the proper warning.

As with most pesticide mishaps, a large portion occur due to misuse. A substantial reduction of mishaps could, nonetheless, be realized among this group of users. One is less likely to take chances with a product labeled "EXTREMELY FLAMMABLE" than one which merely cautions against bursting.

Present information suggests that once a product is released into the air, the flammable gas separates from the liquid component and this gas can and sometimes is ignited by flame and/or sparks. These fires/explosions have caused significant injury and property damage. Fortunately, we have no record of direct human fatalities in as a result of these accidents. (NYCFD reports a firefighter fatality as a result of fighting a fire caused by pressurized pesticide products. The total release product seems most subject to accident due to the large volume of flammable gas released. Pilot lights seem to be the source of ignition in a majority of the incidents. The fact that human deaths have not occurred is probably due to the fact that the areas treated are evacuated when the fogger is discharged.

The potential for flammability hazard manifests itself in three distinct phases of product life: shipment and storage, use, and disposal. A majority of the fires/explosions reported occur during product use with ignition after the liquid/gas separation. However, significant mishaps also occur with the flammable gas still in the can as with storage, in shipping, and with the unused portion of product disposed by incineration. In all three phases of product life, the potential for fire and explosion is not warned against under current labeling requirements.

Options

Some sort of action is needed to deal with this increased hazard posed by the widespread use of the petroleum based propellents. These options are: