OCCUPATIONAL AND ENVIRONMENTAL HEALTH IMPACTS RELATED TO THE USE OF REPLACEMENT FIREFIGHTING AGENTS AT U.S. AIR FORCE TRAINING SITES: A PROGRESS REPORT

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The U.S. Air Force is one of the nation's largest users of stratospheric ozone-depleting halons. Although there are numerous operational sources of halon emissions within the Air Force, the largest single source of these emissions is firefighter training, where halon 1211 is used as the primary fire extinguisher. To reduce halon 1211 emissions associated with firefighting activities (both operational and during training), the Air Force has developed several alternative halon extinguishing agents having low stratospheric ozone depletion potentials.

Before these alternative agents can be put into general use, it is necessary to demonstrate that the agents are not only effective in fighting fires, but also cause minimal adverse health and environmental effects. "Validation" studies are currently underway to examine these effects and to ensure that only those agents having minimal adverse effects are seriously considered for future use.

As part of the validation process, occupational and community exposure assessments are being conducted to determine the health risks associated with promising alternative agents. Firefighter inhalation measurements will be made during simulated training exercises, and inhalation exposure to the community surrounding the training site will be evaluated using dispersion modeling techniques. Additionally, multi-media exposure (i.e.,

exposure to air-contaminated soils, crops, drinking water, etc.) will also be evaluated.

A variety of potentially hazardous air contaminants have been examined in this study. These include halon extinguishing agents, fuels used to sustain the fire, products of incomplete combustion associated with both the halons and fuels, acid gases, chlorinated organics, carbon monoxide, and particulates. Measurement methods will include carbon molecular sieve adsorption, SUMMA passivated cannister analysis, polyurethane foam absorption, filtration, cascade impaction, non-dispersive infrared analysis, and fourier-transform infrared analysis. Measurements will be made under conditions intended to be representative of typical atmospheric and combusion scenarios under which firefighter training exercises routinely take place.

In addition to examining the effects associated with the alternative halon extinguishing agents, tests will be conducted: (1) using halon 1211, and (2) without attempting to extinguish the fire (i.e., a free-burn). The purpose for examining halon 1211 and free-burn conditions is to establish a baseline against which the effects of alternative halon use can be weighted.

Field measures are expected to begin during the summer of 1991 and should be completed by the end of the year. The occupational and community exposure assessments will be completed early in 1992. Midwest Research Institute will conduct the study with assistance from the New Mexico Energy Research Institute and in cooperation with the U. S. Air Force Armstrong Laboratory and the U. S. Environmental Protection Agency's Global Climate Change program. The study is sponsored by Capt. John Floden of the U. S. Air Force Halon Replacement Program.