UFF Position Statement:
Implementation of Comprehensive Exposure Prevention and Decontamination Programs

Firefighting remains one of the most hazardous and least studied occupations, particularly in terms of exposures and the relationship to occupational disease. Firefighting exposures are complex in regard to the mixture of particles and chemicals involved and the magnitude of contamination varies by job assignment. The list of agents detected at fire scenes, and in the fire stations where firefighters spend each shift, is vast. Research shows that these agents have been found on scenes, in apparatus, and in all areas of the stations including rest areas, kitchens and the adjacent apparatus bay.

The most notable chemical agents to which firefighters are exposed include polycyclic aromatic hydrocarbons (PAH), polybrominated diphenyl ethers (PBDE), and polychlorinated biphenyls (PCB). The PAH category includes benzofluoranthene, also found in overhaul air samples. Other volatile organic compounds such as benzene and formaldehyde, as well as inorganic compounds like cyanide should also be noted.

Adverse health effects associated with these agents include incidents of heart disease and cancers. Firefighters are at increased risk of certain types of cancer as a result of occupational exposure to carcinogens such as asbestos, benzene, styrene, PAH and certain heavy metals. Additionally, the risk of disease increases with increasing exposure. Specific respiratory exposures include asphyxiates such as carbon monoxide, carbon dioxide and hydrogen sulfide; irritants such as ammonia, hydrogen chloride, particulates, nitrogen oxides, phenol and sulfur dioxide. An additional cardiovascular risk is the exposure to particulates in the ultrafine range which have been detected in smoke. Exposure to these gaseous and particulate agents has been linked to acute and chronic effects resulting in increased firefighter risk of specific cancers and cardiovascular disease.

During active fire suppression, firefighters wear self-contained breathing apparatus (SCBA) with a full-face mask that provides skin and respiratory protection. However, exposure can result from other sources like dirty turnout gear that is transported in the cab of apparatus or improperly stored in the fire station. Exposure can also result from gear that is stored dirty or from walking around the living quarters after a fire. In these scenarios, exposure to PAH occurs from inhalation, skin contamination and dermal absorption. Firefighters skin may be exposed to products of combustion and particulates through or around personal protective equipment (PPE). These products, including volatile contaminants, can be released as ultrafine particles or evaporate from the PPE and inhaled by firefighters. Contamination on turnout gear, if not cleaned, increases with each fire response.

Research shows that field decontamination using dish soap, water and scrubbing was most effective, reducing PAH contamination on gear by 86%. Cleansing wipes also show benefit by reducing PAH on the neck as much as 54%.

In light of this information, it is the position of the Urban Fire Forum that Fire Service Leaders should work to implement a comprehensive exposure prevention and decontamination program. The elements to build such a program include the following.

- **Raise awareness and educate firefighters to the risk of exposure.**
  Raised awareness and exposure prevention efforts are cost effective means to reduce occupational cancer risk. Therefore, fire service leaders should increase efforts to educate members about the increased risk of cancer, and safe work practices to reduce exposure to

contaminants. This education includes proper training, proper use of PPE, proper cleaning, and proper use of approved respiratory protection during all phases of firefighting.

- **Wear SCBA during knockdown, overhaul and other activities where exposure to products of combustion is likely.**
  SCBA should be worn from the time of entering a smoky structure, extinguishing a fire and through overhaul operations. Other activities where SCBA should be worn may include walking through smoke plumes during size-up, standing in smoke plumes during ventilation and standing in smoke as a pump operator outside the structure.

- **Avoid or minimize exposure to smoke.**
  If not directly involved in fire attack, remain upwind of fires. If firefighters are unable to stay upwind, then SCBA should be worn. If possible, incident command should be established upwind.

- **After fire attack and overhaul operations, decontaminate gear on scene.**
  In a designated area prior to removing PPE, fire fighter's PPE should be gently scrubbed with soapy solution beginning at the helmet downward, and rinsed. PPE should then be removed and placed in a bag for transport back to the station.

- **Minimize the risk of skin absorption by contaminants.**
  Firefighters should wash hands, face, neck, and any skin-exposed area immediately with wet wipes or with soap and water.

- **Minimize inhalation of contaminants off-gassing from contaminated gear.**
  Firefighters should doff gear before entering the rehabilitation area on scene and bag it. Contaminated turnout gear should not be worn or stored inside the apparatus cab when returning to the station. Firefighters should not store soiled/dirty turnout gear in personal vehicles. PPE should be returned from the scene to the station via apparatus. If not possible, PPE should be stored in an air tight containers or a bags tightly closed and placed in the trunk. PPE should never be washed at home.

- **Keep soiled PPE in a designated area.**
  Firefighters should not walk around the station in dirty PPE and fire boots after a fire. Gear should be placed in a designated area set for cleaning via washer extractor or independent service provider per NFPA 1851 and/or manufacturer's instructions.

- **Shower.**
  Firefighters should shower as soon as possible upon returning to the station to thoroughly cleanse their skin of soot, particulates, and contaminates.

- **Implement a firefighter daily exposure tracking program.**
  The National Fire Operations Reporting System (NFORS) project has developed and tested the Firefighter Exposure Application (Firefighter Career Diary) for use in the fire service. This app has been chosen as the exposure tracker for premier firefighter cancer studies in the U.S. and is available at no cost to all U.S. and Canadian fire departments as part of the NFORS project.

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