

EXECUTIVE SUMMARY
HEALTH RISK ASSESSMENT OF WILDLAND FIRE-FIGHTING CHEMICALS:
LONG-TERM FIRE RETARDANTS
September 2017

The U.S. Forest Service uses a variety of fire-fighting chemicals to aid in the suppression of fire in wildlands. These products can be categorized as long-term retardants, foams, and water enhancers. This chemical toxicity risk assessment of the long-term retardants examined their potential impacts on fire-fighters and members of the public. Typical and maximum exposures from planned activities were considered, as well as an accidental drench of an individual in the path of an aerial drop.

This risk assessment evaluates the toxicological effects associated with chemical exposure, that is, the direct effects of chemical toxicity, using methodologies established by the U.S. Environmental Protection Agency. A risk assessment is different from and is only one component of a comprehensive impact assessment of all types of possible effects from an action on health and the human environment, including aircraft noise, cumulative impacts, physical injury, and other direct or indirect effects. Environmental assessments or environmental impact statements pursuant to the *National Environmental Policy Act* consider chemical toxicity, as well as other potential effects to make management decisions.

Each long-term retardant product used in wildland fire-fighting is a mixture of individual chemicals. The product is supplied as a concentrate, in either a wet (liquid) or dry (powder) form, which is then diluted with water to produce the mixture that is applied during fire-fighting operations. The risk assessment process for a product had a two-part approach: (1) toxicity data for the whole product were considered, to account for any effects due to the product being a mixture (synergism or antagonism); and (2) each and every ingredient in the product formulations was screened, and risk from any ingredient with toxicity exceeding a screening threshold (see Section 2.3.2) was separately quantified.

The results presented in this risk assessment depend on a number of factors, including the availability of relevant scientific information, standard risk assessment practices, exposure assumptions, and toxicity dose-response assumptions. Whenever possible, this risk assessment integrated chemical-specific scientific information on toxicity endpoints. The approaches used to address these factors introduce minor to significant amounts of uncertainty into the risk assessment's conclusions; this assessment identifies the types of uncertainty affecting this analysis and estimates the degree to which they may affect the conclusions reached. Overall, when assumptions were required, a conservative approach was taken, to provide risk results that are protective of human health.

Summary of Estimated Risks to Human Health from Long-Term Retardants

- For typical and maximum exposures, all products were predicted to pose negligible risk to fire-fighting personnel from the retardant products.

- No risks were predicted for adult and child members of the public cleaning a structure that had been treated with a retardant.
- In the accidental drench scenario, no risks were predicted for workers or members of the public.
- Risks are expected to generally be negligible for
 - rehabilitation team members
 - individuals who could re-enter areas to which retardant has been applied, such as hikers, researchers, hunters, biologists, or children playing
 - dermal exposure from harvesting mushrooms or berries from wildlands after vegetative regrowth has occurred, in areas that were treated with retardants
 - handling dogs or other domestic animals whose fur contains residues as a result of exposure to vegetation in treated areas
- Individuals are advised against consuming vegetables from home gardens to which retardant may have been applied, or from areas in wildlands where residues are apparent.