

The Effects of Toxic Incendiary Materials Used in Prescribed Burns



The Forest Service starts almost all prescribed burns via "aerial ignition"--and does not like to talk about what "aerial ignition" really means. They tell us that the **incendiary devices are Delayed Aerial Ignition Devices (DAIDs) dropped from**

helicopters. The Forest Service's failure to analyze the effects violates Code of Federal Regulation § 1501.2(b), requiring each agency to identify environmental effects in adequate detail, and C.F.R. § 1508.8:

The *Interagency Aerial Ignition Guide*, NFES#1080, published January 2004 specifies that DAIDs are small plastic spheres, each made of 2.3 grams of polystyrene, containing 3.3 grams of potassium permanganate (p. III-9). Each sphere is injected with 1 cubic centimeter of ethylene glycol (antifreeze) (pp. III-1, III-12) immediately before being dropped on the forest from a helicopter flying at 300 feet altitude (p. III-2) at less than 50 miles per hour (p. III-9). **The ethylene glycol and potassium permanganate undergo a thermal reaction and ignite about 20 seconds after mixing (p. III-1).** The number of spheres dropped on the forest depends on how wet or dry the forest is; the *Guide* indicates that ignition points can be anywhere from 6 to 195 feet apart. (Table 5, p. III-10). From this information it is easy to calculate how much potassium permanganate, antifreeze, and burnt plastic will be dropped.

Here is a sample calculation for a 2,900 acre prescribed burn: The EA states that to reduce smoke impacts, burning will take place when the forest floor is moist (EA at 17), so we can expect the spheres to be in fact dropped as frequently as six feet apart. If this is done in ignition lines spaced 50 feet apart, there could be as many as 144 spheres per acre, and the potential environmental impact should be evaluated accordingly. A simple calculation tells us that 144 spheres per acre, each containing 3.3 grams of potassium permanganate, over 2,900 acres,

will pollute target air, soil and water, with one and a third metric tons of potassium permanganate and its combustion products. There will also be 417 liters of antifreeze, and 417,000 burned up pieces of styrofoam, all being dispersed widely throughout the air and water of the wilderness. The Forest Service specifies prescribed burns must be repeated every five to ten years, in the target area, in perpetuity. (EA at 3). The Forest Service has made no effort whatsoever to determine the environmental impact of all this poison.

The same *Ignition Guide* does contain a **Material Safety Data Sheet (“MSDS”) on potassium permanganate** (at pp. C-29 to C-31) **which, however, fails to address any effects on fish or wildlife.** The 24-hour LC-50 of potassium permanganate for fish is between 1.5 and 5 mg/liter for most species of fish, and that the 96-hour LC-50 is 0.75 mg/liter (Management, Distribution & Revision Solutions [MSDS], Fisher Scientific). This is the concentration **of potassium permanganate sufficient to kill 50% of fish** in a given amount of time. Another simple calculation reveals that the amount of potassium permanganate potentially to be used, for only the first go-round, if it all spilled into a stream or reservoir, would be **enough to kill half of the fish in almost two billion liters of water. Even one sphere, if dropped into a stream, could wipe out the fish in 4,400 liters of water.** The spheres are routinely being dropped in areas with bodies of water, including drinking water reservoirs and the streams that feed them.

Unfortunately, combustion does not make this material disappear. The waste product of the combustion is **manganese dioxide**, which is also **extremely toxic to wildlife and to humans.** According to the California Office of Environmental Health Hazard Assessment, the EPA’s exposure limit for workers to prevent “impairment of neurobehavioral function in humans” is 0.05 micrograms (millionths of a gram) of manganese compounds per cubic meter of air. In a 2,900 acre burn, the Forest Service creates as much as 760,000 grams (476 grams per acre x 2900 acres x 87 [mol. wt. of manganese dioxide] ÷ 158 [mol. wt. of potassium permanganate]) of manganese dioxide, as a waste product of combustion--just in the first go-round.

Another calculation reveals that a 2,900 acre burn **pollutes fifteen trillion cubic meters of air in the forest/ Wilderness Area with a highly toxic material. Even one sphere will pollute 66 million cubic meters of air. Some of this will blow in the wind and settle over surrounding areas.** When it settles into the soil in the Wilderness/forest and in surrounding areas, **the soil will be permanently polluted with manganese, a heavy metal.**