

EH Procedure for Dealing with Bonfires

Milton Keynes Council position on bonfires

The Council actively discourages bonfires whether they are in gardens, on allotments or demolition/construction sites. The council's number one priority is to "Improve the quality of the environment". Bonfires have a seriously detrimental effect on health and the wider environment. It is not possible to have a bonfire, of any sort, without it causing air pollution and releasing toxic chemicals and the 'greenhouse gas' carbon dioxide into the environment. The toxic fumes from any bonfire will affect other people, either directly or indirectly by adding to the general burden of air pollution, and thus constitute a Statutory Nuisance under the Environmental Protection Act 1990 on the grounds that the fumes are "injurious to health" (see appendix for some facts about wood smoke and health).

Environmental Health strategy for dealing with bonfire complaints

Complaints about smoke nuisance from domestic bonfires:

Perpetrators should be warned that they are causing a nuisance; the toxic properties of smoke should be explained to them. They should be told it is impossible to have a bonfire in a domestic urban setting without it causing a Statutory Nuisance under the Environmental Protection Act 1990 because the smoke and fumes are 'injurious to health'. They should be told that if there is any repetition a Statutory Nuisance Abatement Notice prohibiting bonfires will be served on their property and that breach of such a notice is a criminal offence which may result in prosecution in the Magistrate's Court. If the perpetrator is uncooperative, and particularly if they refuse to extinguish the fire, then an abatement notice should be served even for a first offence.

Complaints about smoke nuisance from bonfires on commercial/industrial sites including construction sites:

Again the problems caused by smoke and its toxic properties should be explained but in this case an abatement notice should normally be served for a first offence. This is because:

- (a) They should know better;
- (b) The fires are usually bigger with correspondingly greater amounts of toxic smoke;
- (c) They usually involve the illegal disposal of trade waste (which may be a separate offence under regulations enforced by the Environment Agency and should be reported to the Agency).

Dealing with accumulations of materials intended to be burnt as a bonfire

If an EH officer is called to an accumulation of material intended to be burnt as an unauthorised bonfire we can serve a pre-emptive Statutory Nuisance notice (on the occupier if no one can be identified), then contact waste to arrange removal. If it is in office hours tel. 01908 378574; out of office hours Stand-by officer should call the Alarm Centre operator to pass on details to the Waste duty officer to arrange removal.

Dealing with organised bonfires related to festivals – mainly November 5th

In the absence of any MKC system for registering/authorising bonfires we should not take action against properly organised public displays (unless they are manifestly causing a gross nuisance) because they are safer to life, limb and the environment than ad hoc bonfires so we will tolerate the environmental pollution they cause. For future years I think we need to (1) ban all bonfires on MKC property; and (2) establish a system for registering other organised bonfires, and checking their organisation, safety etc. beforehand; and taking action against all unregistered bonfires.

Environmental Health requests to the Fire & Rescue Service

Very occasionally we may need to request Fire & Rescue Service attendance to extinguish a bonfire. This may be for one of two reasons:

(a) it may be that the responding EH officer judges the fire to be so dangerous to persons or property that it needs to be immediately extinguished and the persons responsible for the fire are unable to do so safely;

(b) it may be the case that the person responsible for a bonfire refuses to extinguish it even after an abatement notice has been served by EH. In both these cases, unless there was some overriding reason for not doing so, the Fire & Rescue Service should attend and extinguish the fire.

Notices

Abatement notices for (1) burning bonfires and (2) accumulations intended for bonfires have been produced and included in the Stand-by bag.

Appendix: Health effects of Wood smoke

Introduction to the issue

Biomass burning is a problem of long standing. Huge amounts of air pollution are produced world-wide by the annual burning of 3 billion metric tons of biomass such as wood, leaves, trees, grass and waste materials. Globally, biomass burning is estimated to produce 40 percent of the carbon dioxide, 32 percent of the carbon monoxide, 20 percent of the particulates, and 50 percent of the highly carcinogenic poly-aromatic hydrocarbons produced by all sources.

The ill-health effects of biomass burning are well established. Smoke from biomass burning is particularly dangerous since most of the particulates are smaller than 10 microns in size (PM10) and are easily able to travel deep into the lungs. Numerous studies have noted that increasing levels of PM10 (even if below air quality standard) can significantly increase levels of respiratory and heart problems and sudden death in susceptible people.

The composition of wood smoke

Wood consists primarily of two polymers: cellulose (50–70% by weight) and lignin (approximately 30% by weight). Other biomass fuels (e.g., grasses, wheat stubble) also contain these polymers, although their relative proportions differ. In addition, small amounts of low molecular weight organic compounds (e.g., resins, waxes, sugars) and inorganic salts are also present in wood. During combustion, pyrolysis occurs and the polymers break apart, producing a variety of smaller molecules. Biomass combustion is typically inefficient, and a multitude of partially oxidised organic chemicals is generated in biomass smoke.

The US EPA has estimated that burning a kilogram of wood in a new wood stove produces about 130 g of **carbon monoxide**; 51 g of **hydrocarbons** (including up to 10 g of carcinogenic benzene); 21 g of **fine particulates**; and about 0.3 g of PAH **polycyclic organic hydrocarbons**. (EPA Document - 450/4-85-012 1986; Larson, T. et al., EPA-453/R-93-046 1993). Wood burning also produces from 10 to 167 mg of carcinogenic **dioxins** per kg of fuel burning (Abelson, P. Sources of Dioxin. *Science*, October 21, 1994; 266:350-352).

N.B. burning wood in an old stove will produce even more toxic chemicals, as an old stove is less efficient. Likewise bonfires will produce more toxic chemicals and particulates as, in general, they burn very inefficiently. If anything other than untreated wood is burnt the amount of toxic material will greatly increase.

Thus smoke even from clean untreated wood contains a vast array of solid, liquid, and gaseous constituents that change, sometimes rapidly, with time, temperature, sunlight, and interaction with other pollutants, water vapour, and surfaces. This complex mixture contains thousands of chemical

compounds. Many of these are toxic or carcinogenic; such as dioxins, carbon monoxide, a whole range of volatile organic compounds (VOCs), aldehydes, phenols, cresols, nitrogen oxides, sulphur oxides, polycyclic aromatic hydrocarbons (PAHs), and ultra-fine particulate matter (microscopic dust). Cancer causing compounds in wood smoke include benzene, benzopyrenes, dibenzanthracenes and dibenzocarbazoles, 1,3 butadiene, formaldehyde.

Particulates in wood smoke

One of the major problems of wood smoke it contains large amounts of very fine particulate material which can be inhaled deep into the lungs and remain there for long periods, often months or more. Toxic compounds adhere to these particles and exacerbate the structural damage and chemical changes caused to the lungs.

Wood smoke particles are generally smaller than 1 μm , with a peak in the size distribution between 0.15 and 0.4 μm . As with other combustion mixtures, such as diesel and tobacco smoke, fresh wood smoke contains a large number of ultra fine particles, which condense rapidly as they cool and age. Indeed, such condensation processes have formed most of the particle mass in aged wood smoke. Fine particles in this size range efficiently evade the mucociliary defence system and are deposited in the peripheral airways, where they may exert toxic effects. Particles in this size range are not easily removed by gravitational settling and therefore can be transported over long distances. The transport of biomass combustion particles over hundreds of kilometres has been extensively documented.

Health effects of wood smoke

Exposure to wood smoke causes a decrease in lung function and an increase in the severity of any existing lung disease correlating with increases in smoke concentration or exposure time. It also aggravates heart conditions. The occurrence of respiratory illness in children also increases with increased exposure to wood smoke. This includes lower respiratory infections such as acute pneumonia, or bronchiolitis, which are major causes of disease and death in children. Wood smoke aggravates asthma, emphysema, pneumonia and bronchitis. It irritates the eyes and triggers headaches and allergies. Long term exposure may lead to emphysema, chronic bronchitis, arteriosclerosis and nasal, throat, lung, blood and lymph system cancers.

The threat of cancer from air pollution is a serious concern, particularly in those parts of the world where wood burning is common. Many substances on the US EPA priority pollutant list have been identified in wood smoke. This includes the human carcinogen benzo(a)pyrene which is relatively well known from tobacco smoke research in particular. Other suspected human carcinogens, co-carcinogens (cancer initiators or promoters) and cilia-toxic agents (poisonous to the hair-equipped cells which help to filter out particles from the respiratory tract) have been identified in wood smoke particles. However, many of the compounds in wood smoke have not been fully identified and even less is known about the toxic gases also released by wood burning which include carcinogens such as benzene, aldehydes, alkenes and numerous semi-volatile organic compounds.

Lifetime cancer risk from wood smoke

The US EPA estimates that the lifetime cancer risk from wood smoke may be 12 times greater than the lifetime cancer risk from exposure to an equal amount of cigarette smoke. This is not actual cancer risk but an estimate based on bacteria and animal studies comparing the potency of wood smoke to cigarette smoke and other better-documented carcinogens. Nevertheless it is significant statistic, easily understood by the general public, which indicates the severity of the risk to health from wood smoke. Of course if anything other than clean wood is burnt on a bonfire the risk is magnified.

Dr Steve Moorhouse, November 2008.