

June 2002

The Basingstoke incinerator - poisoning food, risking health

The Basingstoke incinerator, which is due to be completed in October, will burn ninety thousand tonnes of household rubbish every year. It is one of three currently under construction in Hampshire and will burn municipal waste from the north of the county. It is owned and will be operated by French waste disposal company Onyx.

If allowed to start burning rubbish, the Basingstoke incinerator will release on a daily basis chemicals that have been linked to cancers, birth defects, heart disease and breathing illnesses.

According to the Food Standards Agency the Basingstoke incinerator "is in an area that is predominantly agricultural. The main risk to safety of the human food chain will be through deposition of persistent contaminants in areas of food cultivation...Even a well-operated modern incinerator that meets the emission limits defined in the Waste Incineration Directive will add to the overall burden of persistent pollutants such as dioxins in the environment."ⁱ

Dioxins are "known to cause cancer in humans" according to the World Health Organisation. They are unavoidable by-products of burning dustbin waste. The UK Government recently admitted a third of all adults and half of all babies and toddlers receive more dioxin than the Government considers safe^{v,vi}.

Dioxins are considered so dangerous the UK Government has signed an international convention agreeing to reduce dioxin levels with the aim of eliminating them altogether. Yet the Basingstoke incinerator will add to dioxin levels. By dispersing dioxins through its 60m chimney it will cause them to be deposited on crops and soil surrounding the plant. Because dioxins can travel many miles on air currents they can contaminate crops and pastureland over a wide area. The effects of the three new Hampshire incinerators, plus the 39 others currently planned for the UK and the 15 currently operating will multiply this effect.

Why do incinerators emit dangerous chemicals?

Matter cannot be created or destroyed, only transformed into other forms. It follows that incinerators do not destroy waste but transform it into ash and gases.

The high temperatures in an incinerator cause chemical reactions that produce and release many extremely dangerous chemicals. These chemicals are dispersed into the environment through the chimney, the residue collected in the pollution filters and the grate (bottom) ash. Disposal of these ashes can also lead to contamination of the food chain.

Some toxic chemicals are present already in the waste for example fluorescent tube light bulbs often contain mercury, PVC plastic may contain cadmium or organic tin. Electrical equipment and batteries can contain brominated flame retarding compounds as well as lead, cadmium and chromium. Some of these heavy metals are partially vaporised in the intense heat of the furnace and the chemical reactions can also cause volatile compounds containing the original metals to be formed. Some of these toxic gases are captured in the pollution control system but a proportion pass out through the chimney.

The heat in the furnace also causes many of the substances in the waste to react chemically and form dangerous new substances like dioxins. Dioxins are produced when

chlorine which is found in waste like PVC plastic or wood treated with certain preservatives combines with carbon, found in virtually all matter.

Even Government ministers have highlighted the dangers of incineration, Environment Minister Michael Meacher said, "*I repeat, the emissions from incinerator processes are extremely toxic. Some of the emissions are carcinogenic...We must use every reasonable instrument to eliminate them altogether.*"ⁱⁱⁱ

In May 2001, Greenpeace published *Incineration and Human Health*, a comprehensive review of all available scientific data on the impacts of incineration on human health and the effects of specific chemicals discharged from incinerators. The report reveals a wide body of evidence demonstrating negative health impacts of waste incineration, including a study published in 2000 showing that children living near incinerators were twice as likely to die of cancers. In May 2001, new medical research in the *Lancet* showed that toxic fumes from incinerators could be having alarming effects on the sexual development of children.

Poisons released by incinerators

Dioxins: Dioxin is classified by the World Health Organisation as a Group 1, known human carcinogenⁱⁱⁱ (cancer causing chemical). The Government recently recommended a five-fold cut in the recommended maximum limit for intake of dioxin, bringing the UK into line with international opinion.^{iv} However 30% of all people in the UK,^v and 50% of toddlers^{vi} currently exceed this safety limit.

Assuming the Basingstoke incinerator operates on a par with the most modern incinerators in the UK, it can be calculated that it will emit enough dioxins every day to give a quarter of a million people their maximum 'safe' daily dose, although not all this will come into contact with humans. The dioxins will be spread far and wide through the chimneystack, but because dioxins cannot be broken down by natural organisms much of it ends up in the food chain. 90% of dioxin intake is via the food we eat.

Dioxin emissions are poorly monitored in the UK. One study has found that 30 – 50 times more dioxin may actually be released by incinerators than is reported by UK measuring methods.^{vii} This is due to the sporadic nature of dioxin testing at UK – samples taken for a few hours, 2 to 4 times per year.

The UK Government Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment recently lowered the recommended "safe" limit for intake of dioxin to 2pg/kg of bodyweight per person per day. (that is 2 thousand trillionths of a gram per kg of weight per day). Current average daily intake for the UK population is very close to this 2 pg limit at 1.8 pg/kg. Many people already exceed the limit. Toddlers and babies are particularly vulnerable and breast feeding babies receive some of the highest doses of all as dioxin accumulated in the mothers milk is transferred to them. It is thought that infants may take in up to 12% of their lifetime exposure to dioxins through breast milk.^{viii}

The European Commission states that "a wide-range of non-cancer effects are thought to occur at extremely low levels of chronic exposure, including adverse effects on reproduction, impacts on development of the unborn foetus and associations with impaired mental ability".^{ix} The World Health Organisation says that general pollution from dioxins is already at the level where it may be having adverse effects on human health.^x

Acid Gases (hydrogen chloride (HCl), sulphur dioxide (SO₂), Nitrogen oxides (NO_x): Exposure to acid gases can cause respiratory problems. SELCHP reports emissions for

2000 of HCl 22.7 tonnes, SO₂ (no figure reported), NO_x 567.3 tonnes. They can also cause acid rain and NO_x contribute to both ozone depletion and global warming.

Heavy Metals Incinerators emit lead, cadmium, mercury, chromium, arsenic and other metals to air and land. Lead is associated with learning impairment^{xi} and behavioural problems in children^{xii}. High levels of cadmium are associated with lung cancer and a range of other effects, mercury exposure has been found to affect behaviour and lead to renal damage even at low levels.^{xiii} Hexavalent chromium is associated with cancer.

Particulate matter (dust): According to the European Commission "particulate matter in the atmosphere has been associated with large-scale chronic adverse effects on human health". A significant proportion of particulate matter from an incinerator will be very fine particulate matter (PM₁₀ or less). These microscopic particles can reach the deepest part of the lungs where evidence suggests they can cause respiratory and heart related illnesses. The European Commission is concerned that these sorts of particulate emissions may be having health impacts on local populations.^{xiv} It has been estimated that for every 10mg/m³ increase in PM₁₀ there is a 0.5 to 1.5% in daily mortality due to respiratory and heart disease.^{xv} The SELCHP incinerator in South London, often cited by the industry as one of its best examples of a modern incinerator, emits between 4 and 22 mg/m³ of particulate matter in its stack gas, a significant proportion of which is PM₁₀ or less. (This will of course be diluted as it leaves the chimney and is dispersed).

Incineration also leads to the generation and release of a number of other highly toxic and carcinogenic organic compounds such as benzene, phenols, polyaromatic hydrocarbons, benzo(a)pyrene, chlorinated organic compounds and soot.^{xvi}

Pollution Monitoring

Incineration pollution controls are not based on health:

"It is ...generally accepted that emissions standards are based on what can be *measured* and what is technologically achievable, rather than what is *safe*.... This point was accepted by the Environment Agency."

Department of Environment Transport and Regional Affairs Committee, March 2001, report HC 39-I, Delivering Sustainable Waste Management, Vol 1 paragraph 93.

Less than half a dozen substances emitted from an incinerator are continuously monitored by the plant's operators (generally only sulphur oxides, nitrogen oxides, carbon monoxide, hydrogen chloride and particulate matter). Poisonous metals like mercury, cadmium and lead are measured by point samples, generally once every three months by the operators. Dioxins are measured by point samples, at most once every three months by the operators.

The Environment Agency send in sampling contractors once or twice a year to take measurements. These checks take place within a specified "window" of time, normally two or so weeks, agreed between the agency and the operator.

When the public registers (available at certain Environment Agency offices) are examined it quickly becomes apparent that despite the enormous numbers of breaches reported for the substances, which are continuously monitored, there are virtually no reports of other substances exceeding legal limits. It is difficult to accept that this is the case in reality. Reported high levels of pollutants in the gases often indicate a malfunction in the system or poor combustion of waste. For example high levels of carbon monoxide reported would indicate poor combustion conditions under which

increased production of dioxins might be expected. Similarly high levels of hydrogen chloride may be the result of large amounts of chlorine in the system, which again are likely to increase dioxin formation. Any peaks in production of dioxin and other hazardous substances are however unlikely to be recorded by sampling undertaken only for a few hours, four or five times a year.

Under these circumstances, the best that could be expected is to find occasional breaches, discovered by chance when a breach occurs at the same time as "spot" monitoring is taking place. This is exactly what Greenpeace has found from examination of the limited data that is available to the public.

Energy from Waste? - A Waste of Energy.

The Basingstoke incinerator does not call itself an incinerator. It claims to be a "Energy Recycling Facility". Heat from the process is used to drive steam turbines, which generate electricity, and some of this is exported to the national grid.

Incinerators are an extremely inefficient way of generating electricity. Firstly they use the available heat at a very inefficient rate. More importantly they waste much more energy than they generate by destroying materials. The mining and processing required to re-acquire these materials far exceeds the energy recovered by burning them. For example the Aylesford paper recycling plant in Kent uses one third less energy to make paper than that needed for a virgin paper mill in Sweden. Energy savings also apply to aluminium, steel, glass, tyres and textiles.^{xvii}

One study has found that the reuse and recycling of 70% of the UK's municipal waste would lead to a saving of 14.8 million tonnes of carbon dioxide which is equivalent to taking 5.4 million cars off the road.^{xviii}

Aside from paper the highest sources of energy in municipal waste are plastics. Burning plastics is not only very polluting, but because they are made from oil, gives off global warming gases – it is in effect burning fossil fuels.

Britain already has some of the best resources for renewable energy like wind and wave power in the world. Investing in these genuine forms of green energy is essential if we are to tackle global warming.

The Government have recognised the environmental benefits of recycling. They have calculated that recycling has an average environmental benefit equivalent to £161 per tonne of waste. Incineration in which energy generated displaces average-mix electricity generation has an environmental cost of £10 per tonne.^{xix}

"We believe incineration will never play a major role in truly sustainable waste management and cannot, and should not, be classified as producing renewable energy"
Department of Environment Transport and Regional Affairs Committee
Press Notice 21st March 2001

The Solution

Both landfill and incineration of mixed waste are inherently polluting. The Government must instead set up modern waste management schemes and state of the art recycling and composting. This should involve:

- Door to door collection of three separate coloured bins – one for "dry" recyclable material, one for compostable material and one, small bin, for the rest.
- Intensive composting of all kitchen and garden waste in high tech, closed vessel composting units

- Mechanical Biological Treatment (MBT) of the remaining rubbish, known as residual waste. MBT uses mechanical means to extract recyclable materials and then neutralises the organic fraction so that it can be safely landfilled.

These solutions are already working in many places around the world: One thousand households in Wye, Kent, now produce only a quarter of the waste an average UK household generates. Wealton in East Sussex recycles 53% of its waste. The city of Edmonton in Canada has reduced its municipal waste by 70% using MBT, Canberra in Australia recycles 66%, Flanders in Belgium 59% of its waste and Milan in Italy separately collects and composts all kitchen food waste and has saved money in the process.

Hampshire has a recycling rate of 25% which is currently better than much of the UK but is put to shame by these examples around the world. Many more regions in the UK could reach 60% recycling in the next few years but this will not be an option for Hampshire. Three new incinerators in the county will mean they are committed to burning nearly 400,000 tonnes of rubbish every year for the next 20 years

For more information please contact Greenpeace Press Office on 0207 865 825

ⁱ Food Standards Agency (14 November 2001) response to Environment Agency consultation on application for a permit for the Basingstoke incinerator. No bj7786

ⁱⁱ Michael Meacher, Minister for the Environment, evidence to the House of Lords

Select Committee on the European Communities, 11th report, HL Paper 71, 15 June 1999, "Waste Incineration".

ⁱⁱⁱ TCDD, the most toxic and best studied of the dioxin group, is classified as a Group 1 known human carcinogen by the International Agency for Research on Cancer (Part of the World Health Organisation). Emissions from incinerators are reported in units of toxic equivalence to TCDD.

^{iv} Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment, COT/2001/07 October 2001

^v Food Standards Agency, news release 16th Nov 2001 <http://www.food.gov.uk/news/newsarchive/dioxindiet>

^{vi} Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment. Statement on dietary exposure to dioxins and dioxin-like PCB's. COT Statement 2000/03. August 2000

^{vii} R. De Fre, M Weavers (1998) Underestimation in dioxin emission inventories. Organohalogen Compounds Vol 36.

^{viii} Physicians for Social Responsibility (1994). Putting the Lid on Dioxins: Protecting Human Health and the Environment. 1101 14th St. NW, Suite 700, Washington DC 20005.

^{ix} European Commission proposal for a Council Directive on the incineration of waste 07/10/98 p. 6

^x WHO paper submitted to the Dioxin 98 conference, reported in ENDS 281 June 1998 p.5

^{xi} European Commission proposal for a Council Directive on the incineration of waste 07/10/98 p. 7

^{xii} see eg. The Independent 16th May 2000 p 11

^{xiii} European Commission proposal for a Council Directive on the incineration of waste 07/10/98 p. 7

^{xiv} European Commission proposal for a Council Directive on the incineration of waste 07/10/98 p. 7

^{xv} Pope III CA, Bates D and Raizenne M 1995. Health effects of particulate air pollution, in Env. Health Perspectives 103 (5): 472-480, and Schwartz 1994, Air pollution and daily mortality: a review and meta analysis. Environmental Research 64: 36 -52

^{xvi} European Environment Agency, Feb 2000 *op cit* p 18

^{xvii} R. Murray, Creating Wealth from Waste, Demos 1999, p.39

^{xviii} R. Murray, Creating Wealth from Waste, Demos 1999, p.39

^{xix} DETR. Waste Strategy 2000, part 2 p. 188