July 2005

Friends of the Earth

# Briefing

# Burning waste in cement and lime kilns

**A cement kiln is a furnace that heats limestone, clay and sand to make a compound called clinker, which is then cooled and mixed with gypsum to become cement. A lime kiln is a kiln used to produce quicklime through the calcination of limestone.**

**In the process of cement and quicklime manufacture, kilns are permitted by the Environment Agency (EA) to burn substitute fuels in place of the traditional fuels, such as coal. Substitute fuels which include hazardous wastes[1] are permitted because they can reduce the use of fossil fuels, for example coal[2], which are polluting and contribute to climate change. Applications to burn substitute fuels in cement and lime kilns have proven to be very controversial and the source of considerable public concern. The Substitute Fuels Protocol (SFP) that governs the use of substitute fuels has recently been revised by the EA. Friends of the Earth has significant concerns about the revisions.**



**Friends of the Earth, 26-28 Underwood Street, London N1 7JQ**
**Tel: 020 7490 1555 Fax: 020 7490 0881 Email: info@foe.co.uk Website: www.foe.co.uk**

Friends of the Earth Limited company number 1012357
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## Friends of the Earth is concerned that the recent revision of the SFP:

- Devalues community influence by weakening requirements for consultation when an operator seeks to burn a substitute fuel.
- Allows greater air emission limits (known as emission limit values), on NOx and particulates than would be permitted in incinerators (Annex 1).
- Makes it easier to burn hazardous waste, threatening hazardous waste reduction by providing a cheap and easy disposal route.
- May conflict with the proximity principle[3] when waste has to travel long distances, first to be processed into a fuel and then from the processor to the kilns.

**This briefing outlines some of the changes introduced by the revision of the SFP (in February 2005) and offers guidance on the consultation process for local campaigners who are concerned that industrial operators will be applying to burn hazardous wastes in their local area.**

# Substitute Fuels Protocol (SFP)

The SFP sets out the principles and practices in England and Wales for the use of substitute or waste fuels- such as tyres and sewage sludge. It specifies how fuel trials should be undertaken and the requirements for detailed monitoring. It also states the procedure and conditions for public consultation when applications to burn waste fuels are submitted to the Environment Agency.

In 2005 the Environment Agency revised the SFP, broadening the range of substitute fuels that can be incinerated by removing a previous ban on burning certain hazardous wastes (box 2). It also removed the requirement for a minimum calorific value – a value below which materials were not previously allowed to be burnt. Controversially it has also removed the automatic statutory consultation on any application to burn waste. This has taken away an important means by which kiln operators, the Environment Agency and local communities could debate the important issues around burning waste fuels.

### Box 1 Energy recovery

The use of waste fuel in a kiln has been classified by the European Union (Waste Incineration Directive (2000/76/EC)) as a form of energy recovery. Energy recovery from waste is the term applied to waste treatment processes that use the energy held in waste to generate power and/or heat. Energy recovery is higher up the waste hierarchy than disposal so, as a general rule, is considered to be preferential in waste management. However, many feel that the changes in the SFP actually mean that vast quantities of waste material with little energy will be burned in kilns - referred to as “sham recovery.”

# Major changes to the SFP

### Range of wastes that can be burnt

The range of wastes that can be burnt in kilns have been broadened to include hazardous waste originating from the manufacture of pharmaceuticals, pesticides, biocides and explosives. This provides a substantial new disposal route for industries producing hazardous waste, dis-incentivising operators to reduce, re-use or recycle their waste, which is best practice under the waste hierarchy[4].

## Box 2 Hazardous waste

In July 2004 changes brought in by the Landfill Regulations 2002 meant the end to the 'co-disposal' of hazardous with non-hazardous waste in landfill. As a result, many landfill sites will no longer accept hazardous waste, and those that do will need to conform to tighter restrictions. Hazardous wastes are so called because of their potentially toxic and dangerous nature. Examples include asbestos, lead-acid batteries, used engine oils, oil filters, oily sludges, solvent-based paint and ink, solvents, chemical wastes and pesticides.

### Calorific Value

The removal of a minimum calorific value for substitute fuels (previously set at 21 MJ/kg, which is equivalent to coal) further encourages the disposal of waste in kilns. It is believed that the lack of minimum calorific will mean that materials unsuitable for use as fuels, because they produce little energy - such as contaminated soils and meat bone meal– will now be used as a fuel.

Both the extended range of fuels and loss of calorific value mean that the amount of hazardous waste burnt in cement kilns will increase, as they increasingly become a cheap and easy route for waste disposal.

### Loss of automatic consultation

The new SFP gives local people less say in the amount and type of hazardous waste burnt in their community. If a kiln wants to operate it must have a PPC permit[5] (box 3). Previously any new PPC permit or variation to an existing PPC permit would be deemed a "substantial change[6]" in operation and trigger a consultation. The new SFP ceases to regard every application to use a substitute fuel as if it were a "substantial change"[7] e.g. if an operator wanted to increase or change (within the same category, box 4*)* the substitute fuel burnt, then this would not be a "substantial change".

## Box 3 PPC

The Pollution Prevention Control (PPC) regulation is an environmental approach to the regulation of certain industrial activities such as cement manufacture. This means the emissions to air, water and land plus a range of environmental effects must be considered before kiln permits are approved. A new kiln will require a new PPC permit. If operators wish to burn a new substitute fuel within an existing kiln, an application is made as a variation to the existing PPC permit.

# Consultation with the community

The process by which the Environment Agency makes decisions on applications from companies to burn substitute fuels in cement kilns is complex. Here we set out the main parts of the process and the opportunities for local campaign groups and the public to get involved.

## The company's consultation

Any company wishing to burn a substitute fuel is required to conduct a pre-application consultation. The procedures "are designed to encourage public comment". When the application is submitted, the company must also place an advertisement in the local press.

The company may decide to go further, and consult parish & town councils or hold a public meeting or discussion surgery, but this is not a requirement.

Make sure the company knows your concerns. You have 28 days to respond to the

application. You should copy your letter to the Environment Agency. 28 days is not long, but because the Environment Agency "strongly encourage[s] operators to consult local people in advance of making an application for any permit variation" you have the opportunity to put your views to the company before it submits its application to the Agency.

In either case, you should try and persuade as many local residents as possible to respond to the pre-application consultation within 28 days. Signed pro-forma letters are not as effective as individually written submissions, but they do give a strong indication of public concern, as do petitions. The purpose of these responses is to record the nature of your concerns.

### Critical success factors (CSFs)

One of the important things for local campaigners to influence is the list of Critical Success Factors proposed by the company – these are the specific factors or benchmarks by which the success (or otherwise) of using substitute fuels can be judged. They will normally include things such as, no breaches of emission limit values; the amount of waste produced won't increase; and there is no net environmental detriment to the local environment. It is particularly important to secure a Critical Success Factor in relation to emissions of Particulate Material (PM), both in terms of the diameter of the particle and its chemical composition. Particles are a good indicator of the cleanliness or dirtiness of emissions.

### The trial

Permission to burn a substitute fuel will be subject to a satisfactory completion of a commissioning trial. Throughout the duration of the trial the Operator is encouraged to keep the public informed on the progress of the trial eg in newsletters weekly reports etc. Furthermore the Operator should gather evidence for reporting on the performance of the trial against the CSFs.

There are certain yardsticks which should be used to assess a substitute fuel trial which members of the public need to focus on, and require the Environment Agency to inform them of. These are:

- The atmospheric emission levels for the various substances concerned e.g NOx, PM, metals etc.
- The Health Studies being done by the Environment Agency and the Primary Care Trust.
- The ambient air monitoring regime, and the ambient soil monitoring regime.
- It is important that the studies above are referenced to baselines. Local campaigners should ask questions on how the baseline has been determined and if the monitoring during the trial is conducted in the same way the baseline was established, e.g. is like being compared with like?
- There should be regular meetings with the public during the trial, involving the company and local council.
- The design of the trial, the operation of the trial, and the evaluation of the trial should be made clear to the public by the Environment Agency.

## The Environment Agency's consultation

At the same time as the company advertises its application to burn a substitute fuel, the Environment Agency decides one of the following:

- that its own statutory consultation is not necessary
- that a statutory consultation is necessary
- that an extended consultation is necessary.

## Statutory consultation

In a statutory consultation, the Agency does not have to consult the public. It only has to consult statutory bodies such as the relevant local authority; the Primary Care Trust (the Local Health Board in Wales); the Food Standards Agency; and English Nature (Countryside Commission for Wales). It may also decide to involve others in the consultation e.g. MPs, MEPs, special interest groups, local residents associations and so on.

A statutory consultation by the Environment Agency will be triggered if the Operator is:

1. Applying for a new permit to burn waste fuel in a new kiln – in which case the usual PPC permit process will be carried out, including public consultation.
2. Applying to vary its PPC permit to burn a substitute fuel and the Agency decides it invokes a "substantial change" (see footnote 6). The Agency considers that most applications to vary the PPC permit will not entail a substantial change (except where they are applying to burn hazardous waste for the first time).
3. Seeking permission to burn a new category of substitute fuel (box 4) for the first time at a plant. Though in some cases the Environment Agency may point to evidence from other kilns and choose not to perform a statutory consultation.

If the Agency decides not to carry out a statutory consultation, you can still submit your views to the Agency and ask them to reconsider. It will help if you can use their criteria to say why you think this proposal requires an Agency consultation e.g. why there might be a significant negative effect on the environment or human health.

It might be difficult to demonstrate that there will be clear negative impacts. However by talking to other campaigners round the country with experience of fighting waste fuel applications, you will get some idea of what the likely problems are. National Friends of the Earth can put you in touch with experienced local campaigners.

You should also ensure that your political representatives on the statutory consultees - for example your local councillors and the chair of the Environment Committee - are aware of your concerns, so they can represent these in their own responses to the Agency's consultation.

Even if the Agency does not have to do a statutory consultation on the grounds listed above (in points 1-3) it may still decide to consult. It will do this on a case-by-case basis when it judges that there has been inadequate engagement of stakeholders appropriate to the circumstances of any proposed change. So if you think your views have not been taken into account properly by the company during the company's consultation, you can write to the Agency and ask it to do its own consultation on these grounds.

The more signatures on petitions, lively public meetings and letters to the local paper you can generate, the harder it will be for the Environment Agency to decide that there are no grounds for doing their own consultation.

If the Agency does decide to consult it will issue a consultation document at the same time as the company advertises its application to burn waste in the local press.

## Box 4 Category types of substitute fuels

Substitute fuels are categorised according to their similar technical and combustion properties. Although not set out in statute these are:

Category 1, Tyres

Category 2, Liquid fuels e.g. waste oil, mixed solvents

Category 3, Solid fuels e.g. plastic, paper

Category 4, Animal derived fuels e.g. tallow, meat bone meal (MBM)

Category 5, Sewage sludge

Other – assessed on a case by case basis

### Extended consultation

The Agency may decide to run an extended consultation (which will go beyond the requirements of the statutory consultation). However, the Agency says: "It is anticipated that extended public consultation will only be undertaken in exceptional circumstances." The Agency has failed to make it clear on what grounds an Officer would make this decision. If the Agency does decide to run an extended consultation it will take place at the same time as the company advertises its application.

As with the statutory consultation, the Agency will normally consult other councils in the area of the relevant local authority. It may also consult MPs, MEPs, local resident associations, special interest groups, local chambers of commerce and trade and local businesses.

The major difference from the statutory consultation is the involvement of the public. Members of the public "will be encouraged to make written submissions." The Agency should send letters to residents in the vicinity, issue a press release and use local radio and articles in newspapers to engage the public and other interest groups in discussions. A public meeting may be held and other suggestions for consulting with the public are suggested in Annex 1 of the revised SFP[8].

The consultation period remains the same as for statutory consultations: 28 days from the date of the advertisement of the application to burn waste. But "every effort should be made to consider any material representations received within a reasonable period".

During an extended consultation, your role should be to encourage as many members of the public to respond as possible, as their voice will count much more than in the statutory consultation. Make it easy for members of the public to respond, for example by providing concise information about the environmental impacts and suggesting points that they might make in their own letters. Make sure you reach out to members of the public through street stalls, public meetings and so on.

Further guidance on organising a local campaign can be found in: How To Campaign Against Incinerators, available from Friends of the Earth publications.

# Case Study: Lafarge Cement UK

The cement works at Westbury, Wiltshire, is owned by Lafarge Cement UK. When the facility sought permission to trial the use of waste chemical solvents known as Recycled Liquid Fuel (RLF) as a fuel, concerned local residents sought an extended consultation.

In order to get the extended consultation local campaigners needed to bring the application to the attention of the local community. It was important to get local elected representatives involved, which they did by lobbying the local council to form a community review group (a district council committee which looked at aspects of the trial) and the local Primary Care Trust. To reach the local community they produced leaflets, sent letters to local papers, spoke on local radio, organised petitions and public meetings. In a show of public concern a march was organised from Westbury town centre to the cement works. The march which received considerable press coverage was attended by 500 people and addressed by the local MP.

Local campaigners focused on a number of arguments to raise public concern. They called for a proper evaluation of the health risks, and demonstrated the hazardous nature of the fuel - in this case solvents - asking questions about whether the local community would be adequately protected from the facility's emissions[9].

The activists were successful at ensuring the trial use of RLF was postponed. Nevertheless, Lafarge has said it remains committed to the use of RLF and also wants to use municipal waste as a fuel, known as Refuse Derived Fuel (RDF).

In determining the net environmental benefit or detriment from using the substitute fuel, two key questions were identified and asked by local campaigners:

1. Does the use of these substitute fuels resulted in cleaner atmospheric emissions from the chimney (the test of "net environmental benefit"), and
2. Is the integrity of the cement product undamaged ie would the new fuel result in a weakened or toxic cement product.

The important question whether the particulate emissions are contaminated by the hazardous elements present in the fuel (both the RDF and RFL) remain unanswered as the RLF trial has been postponed. The effect on the integrity of the cement product also remains an unanswered question.

It should be noted that the important question as to whether the particulate emissions are contaminated by the hazardous elements present in the fuel (an issue common to nearly all substitute fuels) remains unanswered as the RLF trial has been postponed. The effect on the integrity of the cement product also remains an unanswered question.

# Contacts

If you would like to get in touch with campaigners who have experience campaigning against the use of substitute fuels in local cement kilns please contact Friends of the Earth.

# Annex 1:

## Difference in atmospheric Emission Limit Values between incinerators and cement kilns.

An 'emission limit value' is the amount of pollutant which must not be exceeded in emissions from incinerators (including cement kilns) over a specified period. Limits for ELVs are set out in the Waste Incineration Directive 2000/76/EC. Cement kilns have been permitted higher limits for total dust and NOx emissions (than incinerators).

**Table of Emission Limit Values[10]**

| Pollutant | Incinerator | Cement Kiln |
|---|---|---|
| Particulates (total dust) | 10[a] | 30 |
| Volatile Organic Compounds (VOCs) | 10 | 10[b] |
| Hydrogen Chloride (HCl) | 10 | 10 |
| Hydrogen Fluoride (HFl) | 1 | 1 |
| Nitrogen Oxides, existing plants ($NO_x$) | 400[c] | 800[d] |
| Nitrogen Oxides, new plants ($NO_x$) | 200 | 500 |
| Sulphur Dioxide ($SO_2$) | 50 | 50[e] |
| Carbon Monoxide (CO) | 50 | 0[f] |
| Cadmium and Thallium (Cd and Tl) | 0.05 | 0.05 |
| Mercury (Hg) | 0.05 | 0.05 |
| Other Metals (see list below) | 0.5 | 0.5 |
| Dioxins and Furans | 0.1 | 0.1 |

All Emission Limit Values are daily average values, and are measured in $mg/m^3$, except for dioxins/furans which are $ng/m^3$. This information is sourced from Annex II and Annex V of Directive 200/76/EC.

*<u>Other Metals</u>: Arsenic (As), Lead (Pb), Chromium (Cr), Copper (Cu), Nickel (Ni), Zinc (Zn), Manganese (Mn), Antimony (Sb), Tin (Sn), Cobalt (Co), Vanadium (V).*

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[a] Existing incinerators may be granted an emission limit for particulates of 20 $mg/m^3$ until 1st January 2008.

[b] Cement kilns may be granted an exemption from the VOCs and $SO_2$ emission limits when the emissions do not result from the incineration of waste (i.e. emissions are due to the raw materials required to make cement clinker). However $SO_2$ emission limits under these circumstances should not exceed 400 $mg/m^3$ under the BREF standard.

[c] Existing incinerators with a capacity of greater than 6 tonnes per hour may be granted an exemption permitting nitrogen oxide emissions at a level not above 400 mg/m3 until 1st January 2010. If the incinerator's capacity is greater than 16 tonnes per hour then this same exemption can be granted until 1st January 2008. Beyond these dates the limit of 200 $mg/m^3$ applies.

[d] Existing wet process cement kilns may be granted an exemption for nitrogen oxide ($NO_x$) emission limits until 1st January 2008 provided the limit does not exceed 1200 $mg/m^3$.

[e] See footnote b above

[f] Carbon Monoxide (CO) emission limits for cement kilns are to be set by the competent national authority, but should not exceed 500 $mg/m^3$ under the BREF standard. Carbon monoxide emissions tend to rise when combustion of the fuel is incomplete, and are therefore a good indicator of stability in the kiln. Also, when carbon monoxide in the exhaust stream reaches a critical level the electrostatic precipitators (dust filters) have to be turned off in order to prevent an explosion. Under these circumstances, emission limits are suspended.

# Annex 2:

## Pollutants from incinerators

The table below[11] shows a number of air pollutants which can be found in incinerator emissions. The hazard shown is usually very much related to the dose so it cannot be assumed that emissions of low levels of the substances will result in measurable health effects, although the precautionary approach means that increases in levels of persistent toxic chemicals should be avoided.

| **Pollutant** | **Health hazard** |
|---|---|
| Nitrogen oxides | Respiratory effects (and is a pre-cursor of ozone, which also contributes to respiratory problems) |
| Sulphur oxides | Respiratory effects |
| Particulates/PM10s | Respiratory effects; no known safe threshold |
| Dioxins | Class 1 Carcinogen *(as TCDD).* Affects development and reproduction; Highly toxic, persistent, bioaccumulative. Can contaminate the food chain. |
| PAHs (polycyclic aromatic hydrocarbons) | Some are carcinogens |
| PCBs | Properties similar to dioxins |
| Carbon monoxide | Reduces oxygen in the blood |
| Hydrogen chloride | Acid, irritant to tissue including respiratory tract |
| Hydrogen fluoride | Irritant, affects bone formation |
| Cadmium | Class 1 carcinogen |
| Chromium III<br>Chromium VI | Type VI is a Class 1 Carcinogen |
| Thallium | May affect several organs and nervous system |
| Mercury | Kidney function |
| Arsenic | Class 1 carcinogen |
| Cobalt | Class 2B carcinogen |
| Lead | Class 2B carcinogen |
| Manganese | Neurological effects |
| Nickel | Class 1 carcinogen (as compounds of nickel) |
| Vanadium | Respiratory effects |
| Antimony | A number of effects, including respiratory |

# Endnotes

[1] Hazardous wastes are defined in the Hazardous Waste Directive ("HWD") 91/689/EC and listed in The European Waste Catalogue 2002 (EWC 2002): http://europa.eu.int/comm/environment/impel/pdf/ewc_a_en.pdf .

Please also see Environment Agency 'Hazardous Waste' info: http://www.environment-agency.gov.uk/netregs/275207/276351/?version=1&lang=_e

[2] Community Recycling Network (CRN) research showed that it is important to identify which fuel is being displaced by using waste to produce energy. If coal – a dirty fuel – is being displaced (as assumed by the Environment Agency's model WISARD), then burning waste comes out better in terms of climate change impacts then burning a cleaner fuel eg gas. The research findings for Community Recycling Network are summarised in a Friends of the Earth briefing: 'Maximising recycling rates – tackling residuals', September 2002 (please see p5). The full report is available on the Community Recycling Network website: www.crn.org.uk

[3] The Proximity Principle exists in European law (Waste Framework Directive 1975, amended 1991) and states that waste should be disposed of in one of the nearest appropriate installations. This limits the environmental impact of transporting waste long distances and helps to ensure that communities take responsibility for their own waste rather than dumping it on others.

[4] The Waste Hierarchy is a pyramidal approach to waste management with reduction (the preferred method) at the top and disposal (the least preferred) at the bottom.

[5] Details of the PPC regime (SI 2000/1973 Pollution Prevention and Control (England and Wales) Regulations 2000) can be found here: http://www.defra.gov.uk/environment/ppc

[6] A substantial change according to the revised SFP (p10 section 3.2) means "in relation to an installation, a change in operation, which in the opinion of the regulator may have significant negative effects on human beings or the environment." The revised SFP can be found here http://www.environment-agency.gov.uk/commondata/acrobat/revised_sfp_01_02_05_964920.pdf

Guidance on "substantial change" is given in Integrated Pollution Prevention and Control: A Practical Guide, Edition 3, Defra, 2004. http://www.defra.gov.uk/environment/ppc/ippcguide/pdf/ippcguide_ed3.pdf

[7] See the revised SFP p10, sections 3.2- 3.3 http://www.environment-agency.gov.uk/commondata/acrobat/revised_sfp_01_02_05_964920.pdf

[8] See the revised SFP p33, Annex 1http://www.environment-agency.gov.uk/commondata/acrobat/revised_sfp_01_02_05_964920.pdf

[9] Key to this was obtaining the list of annual emissions from cement kilns published by EA in the UK pollution inventory. As a result it was possible to say what and how much pollutant the facility was emitting and predict the increase in emissions if the application went through. The EA pollution inventory can be found here http://maps.environment-agency.gov.uk/wiyby/dataSearchController?topic=pollution&lang=_e?lang=_e

[10] As set out in Annex II and Annex V of Directive 2000/76/EC. http://www.defra.gov.uk/environment/ppc/wasteincin/pdf/wid_guidance_pb8005.pdf

[11] Taken from Friends of the Earth Briefing, Incineration and Health Issues, 2002, p 3, To view in detail visit http://www.foe.co.uk/resource/briefings/incineration_health_issues.pdf