Pollution Prevention and Control Regulations 2000

Environment Agency

Consultation Paper

Proposals to Revise the Substitute Fuels Protocol for use on Cement and Lime Kilns

CONTENTS

1. Summary

In June 1997 the Environment Agency's Board approved a national policy on the burning of substitute fuels in cement and lime kilns. The policy sets out the principles that the Environment Agency will follow on substitute fuel trials in cement and lime kilns and a protocol, the Substitute Fuels Protocol, for managing them.

The Substitute Fuels Protocol sets out for the benefit of Environment Agency Officers, industry, statutory consultees and the general public, guidance on the procedures to be followed and the considerations to be given to the use of substitute fuels in cement and lime manufacturing installations. The Protocol supplements Environment Agency internal procedures.

Substitute fuel(s) means any material proposed for use as fuel in cement and lime manufacture which replaces conventional fuel(s) such as coal and petroleum coke.

This document sets out the Environment Agency proposals to revise further the Substitute Fuels Protocol ("the Protocol").

Section 2 of this document summarises the consultation arrangements. Section 3 sets out the background to this review, whilst Section 4 sets out the Environment Agency's proposals to revise further the Protocol. The Appendices include an explanation of "substantial change" under the Pollution Prevention and Control regime and an extant copy of the Substitute Fuels Protocol.

The main proposals are as follows:

- removal of the minimum calorific value (21MJ/kg) criteria for waste materials providing:

  i) the main purpose is the generation of heat;
  ii) the amount of heat generated, recovered and effectively used is greater than the amount of heat consumed in its use; and
  iii) the principal use of the waste is as fuel.

This gives the potential to increase the number of waste types that could be recovered as fuel, particularly in modern cement kilns that utilise preheater/ precalciner technology. Such kilns process the raw materials in a series of separate process stages (clinkering, pre-calcining and pre-heating) which operate at different process temperatures.

- to apply the standard statutory requirements for consultation (i.e. to cease to regard every use of substitute fuel as if a "substantial change" were involved), whilst retaining procedural flexibility, to invoke extended consultation in appropriate cases.

This could result in some variation applications, falling within the scope of the Protocol, being determined in the light of experience on substitute fuel trials,

without public consultation. The Agency recognises that such applications can result in considerable public concern, hence the need to retain procedural flexibility for appropriate cases.

- to require a detailed commissioning programme to demonstrate compliance with the requirements of the Pollution Prevention and Control regime and critical success factors identified for the trial.

A variety of credible operating scenarios shall be identified in commissioning plans so that appropriate conditions, including monitoring requirements, can be specified in permits. Operators will gather evidence for reporting on the performance of the commissioning programme against critical success factors. For existing cement and lime kilns a critical success factor for such commissioning programmes, as now, will be "no net detriment to the environment".

- to remove the exclusion of wastes containing wastes derived from the manufacture of pharmaceuticals, pesticides, biocides and explosives.

It is important to note that the removal of these exclusions does not necessarily mean such wastes will be utilised as fuels in cement or lime kilns, only that they may be considered.

- to revise the additional monitoring requirements specified for particular fuel types to require:

    a) assessment of the proposed fuel(s) and consider whether additional monitoring is required to demonstrate the fate of substances present in the proposed fuel in the process;

    b) characterisation of Volatile Organic Carbon (VOC) emissions to air (when the predicted environmental contribution (as benzene) is greater than 1% of the benzene air quality standard) and assess their environmental significance whenever the substitute fuel mix is formally changed; and

    c) monitoring of substances identified as a priority for control in local air quality assessments.

The requirement to characterise VOC emissions will safeguard against any significant changes which could be missed if reliance is maintained on a limited range of VOC substances. The combined effect of the additional monitoring proposals would be to target trial monitoring requirements on substances of concern that may be a priority for control.

2. Consultation Arrangements

This consultation paper proposes changes to the Environment Agency's position and policy on the use of substitute fuels in cement and lime kilns. It is aimed at a range of stakeholders including operators of cement kilns, lime kilns and incinerators, waste producers and waste managers who may be affected by these proposals, and groups or individuals who have an interest in the Environment Agency's regulation of the cement and lime industry.

Arrangements for Responses

Responses, requests for further copies (also available at www.environment-agency.gov.uk/yourenv/consultations), or queries regarding the scope or content of this paper should be made to:

Keith Brierley
Policy Advisor (Minerals), Process Industries Regulation
Environment Agency
Block 1, Government Buildings
Burghill Road
Westbury on Trym
Bristol BS10 6BF

Tel: 0117 914 2944
Fax: 0117 914 2827
E-mail: keith.brierley@environment-agency.gov.uk

Responses are requested by 18 June 2004.

Consultees should note that it may not be possible to consider responses which arrive after the deadline. In your response, please explain who you are and, where relevant, whom you represent, and include your name and address. The Environment Agency may wish to publish or otherwise make available responses to this consultation paper in due course. In this circumstance, all responses received will be published or made available unless a respondent specifically asks for his or her response to be treated as confidential. The gist of any confidential responses will, nevertheless, be included in any summary of comments received or views expressed.

Should consultees have any complaint or comment about how this consultation process is conducted they may direct them to:

Louise Wolfenden, Communications Delivery Manager, at the above address or e-mail: louise.wolfenden@environment-agency.gov.uk.

Next Steps

Following the completion of this consultation exercise, responses will be analysed before the Substitute Fuels Protocol is revised. We intend to revise the Substitute Fuels Protocol in summer 2004.

Code of Practice on Written Consultation

This consultation paper has been produced in accordance with the consultation criteria set out in the code of practice on written consultation published by the Cabinet Office.

The Consultation Criteria

1. Timing of consultation should be built into the planning process for a policy (including legislation) or service from the start, so that it has the best prospect of improving the proposals concerned, and so that sufficient time is left for it at each stage.

2. It should be clear who is being consulted, about what questions in what timescale and for what purpose.

3. A consultation paper should be as simple and concise as possible. It should contain a summary, in two pages at most, of the main questions it seeks views on. It should make it as easy as possible for readers to respond, make contact or complain.

4. Documents should be made widely available, with the fullest possible use of electronic means (though not to the exclusion of others), and effectively drawn to the attention of all interested groups and individuals.

5. Sufficient time should be allowed for considered responses from all groups with an interest. Twelve weeks should be the standard minimum period for a consultation.

6. Responses should be carefully and open-mindedly analysed, and the results made widely available, with an account of the views expressed, and reasons for decisions finally taken.

7. Departments should monitor and evaluate consultations, designating a consultation co-ordinator who will ensure the lessons are disseminated.

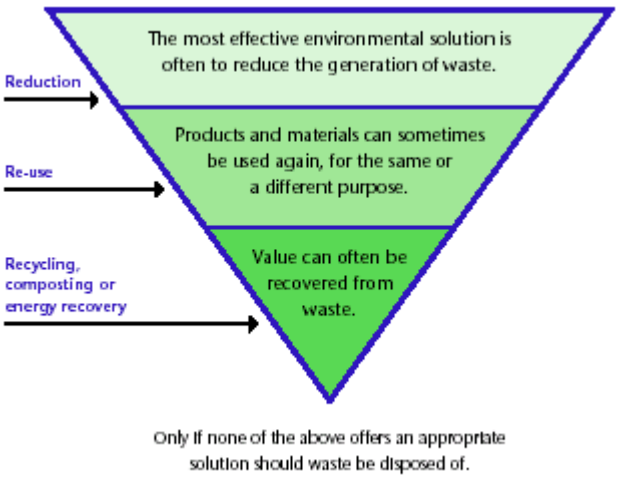
3. Background

3.1 Since the early 1990s the cement and some lime-making industries have been actively pursuing the use of substitute fuels as a replacement for conventional fuels such as coal and petroleum coke. They have been motivated by commercial pressures to reduce operational costs because fuel costs typically comprises 30-40% of production costs. Latterly the cement and lime industry sectors have entered into Climate Change Agreements (CCA) with Government in which the increased use of substitute fuel is a major element of the industries' plans to achieve its CCA targets. In addition operators are considering the implications of the planned implementation of the European Union's Greenhouse Gas Emissions Trading Scheme. The increased use of substitute fuels will lower the overall environmental impact of production, as well as having the potential to make a significant contribution to the way in which the UK manages its wastes.

3.2 Each year households, commerce and industry produce over 100 million tonnes of controlled waste in the UK. Finding the best ways to dispose of, or make use of, this huge mass of waste is a major challenge to society, the economy and the environment.

3.3 The Government's *Waste Strategy 2000: England and Wales* includes reducing waste production and recovering waste through re-use, recycling, composting, or use as a fuel, as they are higher up the waste hierarchy than landfilling.

3.4 The Environment Agency supports the 'waste hierarchy' as a general guide to selecting the best option for dealing with waste. We encourage cement and lime manufacturers to reduce their consumption of raw materials and minimise the amount of waste they generate, and to maximise their re-use and recovery of waste where this is environmentally beneficial.



3.5 There are a number of drivers that reduce the amount of waste that can be disposed in landfills. These include the Landfill Directive, which has a deadline of 15 July 2004 for ending the co-disposal of hazardous and non-hazardous waste. Cement kilns in particular, have the proven potential to use large volumes of some wastes as substitute fuels and raw materials.

3.6 The regulation of cement and lime kilns has been the subject of two House of Commons Select Committee inquiries in the last ten years, as well as being referred to in several others.

3.7 In 1997 the Environment Agency Board approved a national policy on the burning of substitute fuels in cement and lime kilns. It was published in response to the House of Commons Environment Committee Report on the environmental impact of cement manufacture that was published in February 1997. The national policy sets out the principles that the Environment Agency will follow on substitute fuel trials in cement and lime kilns and a protocol, the Substitute Fuels Protocol, for managing them.

3.8 The Environment Agency also undertook to consult on the Substitute Fuels Protocol, and undertake research into the international use of substitute liquid fuels[1], and to commission a life cycle assessment of substitute liquid fuels[2]. A revised version of the Substitute Fuels Protocol along with the research reports were all published August 1999. Subsequently, the Environment Agency has commissioned further research into the international use of solid substitute fuels[3]. A life cycle assessment for tyres is due to be published soon.

3.9 In 2001 an addendum to the Substitute Fuels Protocol was issued that simplified the permitting procedure for using tyres as a substitute fuel (the Tyres Protocol). In June 2003 the Substitute Fuels Protocol was revised again to incorporate the Tyres Protocol procedure for all substitute fuel trials and updated to reflect implementation of the Pollution Prevention and Control (PPC) regime and the Waste Incineration Directive. The key features of this revision are:

a) There has been a reduction from having to make two PPC applications (permission for trial and then permission to burn on a permanent basis) to one, for permission for permanent substitute fuel burning subject to satisfactory completion of a trial;

b) Three stages for enhanced consultation arrangements have been maintained. However the consultation stage on the Environment Agency's proposed decision has been replaced with a pre-application consultation carried out by the Operator. The three stages of consultation are:
   - pre-application consultation by the Operator;
   - consultation on the application by the Environment Agency; and
   - announcement of decision with explanation by the Environment Agency.

c) Changes to technical requirements including:
   - standardisation of reference conditions for Emission Limit Values from 11% oxygen to 10%oxygen in kiln exhaust gas emissions to air for cement kilns to reflect Waste Incineration Directive requirements;
   - dioxin/furan analysis to include analysis for dioxin-like polychlorinated biphenyls (PCBs);
   - due regard to the Waste Incineration Directive and guidance when setting

[1] International Use of Substitute Liquid Fuels (SLF) Used for Burning in Cement Kilns. Environment Agency R&D Technical Report P282, 2001. ISBN 1 857 05170 X

[2] Substitute Liquid Fuels (SLF) Used in Cement Kilns – Life Cycle Analysis. Environment Agency R&D Technical Report P274, 1999. ISBN 1 857 05079 7

[3] Solid Waste Derived Fuels for Use in Cement and Lime Kilns – An International Perspective. Environment Agency R&D Technical Report P4087, 2001, ISBN 1 857 05601 9

Emission Limit Values for burning controlled wastes. If required, a pro-rata calculation methodology is given in Defra Guidance on Directive 2000/76/EC on the Incineration of Waste for Waste Incineration Directive implementation;
- emissions monitoring techniques references updated; and
- identifying a priority list of Polycyclic Aromatic Hydrocarbons (PAHs) in the monitoring requirements.

3.10 The Waste Incineration Directive updates the requirements of the 1989 Municipal Waste Incineration Directives and, merges them with those of the 1994 Hazardous Waste Incineration Directive. There is therefore now a single piece of European legislation dealing with waste incineration. The Waste Incineration Directive upgrades the technical requirements to reflect technological advances, and broadens the scope of the waste incineration regime, to cover wastes that were not previously regulated. The Waste Incineration Directive sets stringent requirements that applied to all new waste incineration installations from 28 December 2002 and to all existing waste incineration installations from 28 December 2005. It specifies air emission limits that must not be exceeded. It also sets requirements concerning normal and abnormal operating conditions, water discharges from cleaning exhaust gases, ash recycling, plant control and monitoring, and public access to information. The Waste Incineration Directive also requires all incinerators and co-incinerators to have continuous monitors for certain pollutants.

3.11 The Waste Incineration Directive defines co-incineration plant as "any…. plant whose main purpose is the production of energy or production of material products and:
- where wastes are used as a regular or additional fuel; or
- in which wastes are thermally treated for the purpose of disposal"

3.12 Given the above, cement and lime kilns utilising wastes as a regular or additional fuel are classified as co-incineration plant under the Waste Incineration Directive.

3.13 The requirements of the Waste Incineration Directive have been transposed in England and Wales by the Waste Incineration Regulations, the Secretary of State's Directions under Part I EPA 1990 and the PPC Regulations. The Directions require Regulators to set conditions in permits that transpose the technical requirements of the Waste Incineration Directive.

3.14 The transitional provisions of the Waste Incineration Directive define existing plants as:

- A co-incineration plant which is put into operation before 28 December 2004;

- An incineration or a co-incineration plant which has an approval issued before 28 December 2002 and is put into operation before 28 December 2003;

- An incineration or a co-incineration plant which had submitted a duly made application before 28 December 2002 and is put into operation before 28 December 2004.

3.15 Consequently, existing cement and lime kilns which meet the above criteria are not to be treated as a new incineration installation until 28 December 2005.

3.16 Applications for a new PPC permit or a variation of the existing permit or

authorisation to include Waste Incineration Directive conditions must be made to the Regulator in the period 1 January 2005 to 31 March 2005.

3.17 Defra has issued guidance for the implementation of the Waste Incineration Directive[4].

3.18 The Environment Agency has reviewed further how it could best regulate the use of substitute fuels at present and in the future. The use of wastes as substitute fuels in cement and lime kilns around the world has been reviewed and the position of the Substitute Liquid Fuels (SLF) disposal route in the environmental hierarchy using Life Cycle Assessment methodology.

3.19 The Environment Agency has concluded that overall the use of substitute fuels in cement and lime kilns is beneficial in terms of reducing local ambient concentrations and emissions per tonne of cement produced. In addition, the use of substitute fuels contributes to the sustainable management of waste materials by substituting fossil fuels, thus contributing to resource conservation. An increase in the use of such fuels in kilns is likely to make a significant contribution to the achievement of targets identified in the Government's Waste Strategy. Experience has shown that the use of substitute fuels has resulted in no net detriment to the environment (using H1[5] methodology) when compared to operation with conventional fuels such as coal and petcoke. The major reduction is in the principal process pollutant – oxides of nitrogen, particularly in cement kilns that do not utilise preheater/ precalciner technology.

3.20 This consultation paper details a number of proposals that have the potential to reduce the environmental impact of kilns and secure wider environmental benefits such as resource conservation whilst still ensuring high levels of protection of human health and the environment as a whole.

[4] Defra Guidance on: Directive 2000/76/EC on the Incineration of Waste. www.defra.gov.uk

[5] H1: Environmental Assessment and Appraisal of BAT, Horizontal Guidance Note IPPC V6, Environment Agency, 2003

4.0 Proposals to revise the Substitute Fuels Protocol

4.1 The Environment Agency proposes to modify its policy on the use of wastes as substitute fuels in cement and lime kilns to:

- reduce the environmental impact of kiln operations;
- reduce regulatory barriers to the recovery of wastes;
- increase the recovery of a wider range of wastes;
- divert waste from waste disposal options such as landfills; and
- contribute to the sustainable management of wastes by moving materials up the waste hierarchy.

Minimum calorific value for substitute fuel(s)

4.2 The Environment Agency's current policy of a minimum calorific value (21MJ/kg)[6] for substitute fuel needs to change in the light of three recent European Court of Justice (ECJ) judgments,[7] the implementation of the Waste Incineration Directive and to reflect the extensive experience of the use of substitute fuels.

4.3 The Court's judgments have clarified the principles to be applied in determining if the use of wastes as a fuel (including in cement kilns or municipal waste incinerators producing energy) should be considered a waste disposal operation (D10 Incineration on land) or a waste recovery operation (R1 Use principally as a fuel or other means to generate energy) for Waste Framework Directive purposes. Reclamation of heat, as a secondary effect of an operation whose principal objective is the disposal of waste, will not of itself be sufficient to classify that operation as a waste recovery operation. The Court's judgment was that to be classified as a waste recovery operation it is necessary for the following conditions to be met:

- the main purpose of the operation must be to enable the waste to be used as a means of generating energy;
- the conditions in which that operation is to take place must give reason to believe that it is "a means to generate energy"; and
- the waste must be used principally as a fuel or other means of generating energy.

4.4 In practice the distinction between 'recovery' and 'disposal' of waste must be based on an assessment of the characteristics of the proposed waste and its use. The utilisation of waste as a substitute fuel that generates useful heat will be considered to be recovery provided that the use of the waste is principally as a fuel.

4.5 These judgments are important in considering the relationship between the Waste Incineration Directive and the Substitute Fuels Protocol. The Waste Incineration Directive explicitly applies to the thermal treatment of wastes in cement and lime kilns and requires that the technical requirements and strict emission limit values are complied with.

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[6] The Environment Agency's Response (June 1997) to the House of Commons Environment Committee Report on the Environmental Impact of Cement Manufacture (5 March 1997)

[7] C-228/00 (Commission v Germany) 13 February 2003; C-458/00 (Commission v Luxembourg) 13 February 2003; and C-116/01 (SITA EcoService) 3 April 2003.

4.6 However, a cement and lime kiln would be defined as an incineration plant for the Waste Incineration Directive if its main purpose were the disposal of waste, and not energy generation or material product production. It is therefore important, when adapting the Environment Agency's position on calorific value, to ensure that "disguised disposal" (making the kiln a Waste Incineration Directive "incineration plant") is not allowed.

4.7 Therefore the Environment Agency **proposes to amend the Substitute Fuels Protocol to enable the recovery of wastes (as fuel), which satisfy the following criteria**.

iv) **the main purpose is the generation of heat;**
v) **the amount of heat generated, recovered and effectively used is greater than the amount of heat consumed in its use; and**
vi) **the principal use of the waste is as fuel.**

Note: The above criteria are based on the recent ECJ judgments.

4.8 The above proposal should be considered in the context of having full regard to the requirements of the Waste Incineration Directive and PPC regime. These regulatory controls will ensure human health and the environment are protected.

4.9 The removal of the minimum calorific value (21MJ/kg) criteria for waste materials has the potential to increase the number of wastes that could be recovered as fuel, particularly in cement kilns[8]. For example, modern cement kiln designs have separate clinkering, pre-calcining and pre-heating stages with different operating conditions. Operators will be able to select appropriate wastes as substitute fuels for each process stage providing the requirements of the Waste Incineration Directive (subject to transitional provisions) and the PPC regime are complied with.

4.10 As appropriate, Operators will be required to demonstrate that their proposals comply with the Waste Incineration Directive requirements, which include (*inter alia*) the following combustion requirements:

> Co-incineration plants *(such as cement and lime kilns)* shall be designed, equipped, built and operated in such a way that the gas resulting from the co-incineration of waste is raised in a controlled and homogeneous fashion and even under the most unfavourable conditions, to a temperature of 850°C for two seconds. If hazardous wastes with a content of more than 1% of halogenated organic substances, expressed as chlorine, are co-incinerated, the temperature has to be raised to 1100°C.

4.11 The Waste Incineration Directive provides for derogation from the above operating conditions if certain plants cannot meet the combustion requirements for temperature and or residence time. However, this is only allowed when as a minimum the plant can comply with the Annex II emission limit values (ELVs) in general *and in particular* Annex V ELVs for total organic carbon (½ hourly and daily average) and carbon monoxide (10 minute or ½ hourly; and daily average) as well as any other applicable requirements of the Directive. The Annex V requirements are likely to prohibit derogation for cement and lime kilns.

[8] The scope to recover wastes in lime kilns is limited due to product quality constraints.

4.12 The Waste Incineration Directive also requires plant to have and operate an automatic system to prevent waste feed:

- at start up (until the given temperature has been reached)
- whenever the given temperature (see above) is not maintained
- whenever the continuous measurements required by the Directive show that emission limit values have been exceeded.

4.13 However, should Operators seek to utilise wastes as a fuel which does not meet the criteria as set out in paragraph 4.7, the Environment Agency would not consider this to represent the recovery activity 'use of waste as a fuel' and is doubtful that such a proposal could be considered to represent Best Available Techniques (BAT).

4.14 If the waste is used in such a way that the main purpose of the plant is not the production of material products but rather the disposal of waste by thermal treatment the kiln would be required to be regulated as an incinerator plant to comply with the additional Waste Incineration Directive requirements.

4.15 The Environment Agency's proposal to change its policy on the minimum calorific value for substitute fuels has the potential to widen the range of UK generated wastes that could be recovered as fuel in cement and lime kilns.

4.16 The potential impact on transboundary shipments of waste has been considered. Some high calorific value wastes are imported for use as fuels. This is regarded as a recovery operation. The import of these wastes for energy recovery is currently subject to restrictions on calorific value and other criteria set out in the United Kingdom Management Plan for the Exports and Imports of Waste ("the Plan"). The UK plan is legally binding and the current criteria it contains, including those on calorific value, will remain in force until the Plan is revised. The Government intends to complete the review of the Plan once a review of the Waste Shipment Regulations 1994 is complete.

4.17 The Environment Agency's proposal to revise its policy on minimum calorific value, if adopted, could also potentially impact on the High Temperature Incineration (HTI) industry by diverting some wastes from disposal in incinerators to recovery, primarily in cement kilns. The HTI sector, along with other waste managers and key stakeholders are invited to comment on these proposals, as they have implications for UK Waste Plans for the disposal and recovery of wastes.

Views are invited on the above proposals.

Consultation on proposals to burn substitute fuel(s)

4.18 Once an Operator has a PPC permit, it must advise the Environment Agency whenever it proposes a change in operation of the installation. If that change is "substantial", additional consultation requirements apply to the permit variation process. Appendix B provides further explanation on the meaning of **"substantial change**".

4.19 The current Substitute Fuels Protocol (Appendix C`) has the following procedural requirements for consultation.

> 3.2 In the case of an application for variation of a PPC permit to allow the use of substitute fuel(s), Officers must also decide whether or not a substantial change is involved. Where a substantial change is concerned, the PPC Regulations impose additional consultation requirements. According to the PPC Regulations a **"substantial change"** 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". Whilst each case must be decided on its merits in accordance with the statutory criteria, it is considered unlikely that such applications will entail a substantial change. However, the Agency has as a matter of policy determined that variation applications which come within the scope of this Protocol will be subject to the same statutory consultation arrangements as if a substantial change were in fact involved (using its powers under paragraph 4(2), Part 2 of Schedule 7 to the PPC Regulations).

4.20 Article 4 of the Waste Incineration Directive requires incineration and co-incineration plant to obtain a permit. This is without prejudice to the IPPC Directive's requirements. The permit requirements of the Waste Incineration Directive are therefore additional to those under the PPC regime.

4.21 The Waste Incineration Directive also adds to the PPC definition of "substantial change", to include existing cement and lime kilns, that already burn non-hazardous waste, and which envisage a change of operation involving burning hazardous waste for the first time.

4.22 The Environment Agency considers, in the light of accumulated data on the use of substitute fuels, that in most cases (whether in terms of the Waste Incineration Directive or the broader context of PPC) the request to use a substitute fuel for the first time or as an additional fuel does not warrant the automatic status of "substantial change", as the proposals are not likely to entail significant negative effects for human beings or the environment.

4.23 It is therefore **proposed to revise the Protocol to apply the standard statutory requirements for consultation and to cease to regard every use of substitute fuel as if it were a "substantial change".**

4.24 Each application will be treated on its own merits to determine whether, in the opinion of the Environment Agency, it may have significant negative effects on human beings or the environment.

4.25 The result of this proposal is that many variation applications falling within the scope of this Protocol could be determined without public consultation. Nevertheless, the Environment Agency recognises that **such applications can result in considerable public concern and that procedural flexibility should be retained, to use extended consultation in appropriate cases.**

Views are invited on the above proposal.

Requirement to trial new substitute fuel(s)

4.26 The current Substitute Fuels Protocol is primarily aimed at existing cement and lime kilns. It needs to be amended to address explicitly the use of substitute fuels on new kilns and existing kilns that undergo a significant upgrade, and incorporate, as appropriate, the requirements of the Waste Incineration Directive. In its review, the Environment Agency has identified an opportunity to streamline the approval process for use of new substitute fuel(s).

4.27 For existing cement and lime kilns, the Waste Incineration Directive must be fully implemented by 28 December 2005 (but the Operator and the Environment Agency may have agreed early implementation).

4.28 It is envisaged that in a few cases Operators may wish to become subject to the Waste Incineration Directive early, by combining an application for a Waste Incineration Directive permit with another application which they are making for operational reasons (e.g. an application for variation under the PPC Regulations). In such a case the Operator may obtain the Environment Agency's consent to its submission of the Waste Incineration Directive application information specified in paragraph 1B of Schedule 4 to the PPC Regulations (as inserted by the Waste Incineration Regulations) as part of that other application. The Environment Agency may then exercise the power, which is provided in the directions to regulators, to include conditions which meet the requirements of the Waste Incineration Directive ahead of the time at which they would otherwise need to be included in the permit. (If this occurs, the Environment Agency will be able in early 2005 to accept a Waste Incineration Directive variation application (required under regulation 3(1) of the WI Regulations[9]) which simply records that the Waste Incineration Directive requirements have already been met by way of the determination of that previous application.)

4.29 Most new cement kilns are being designed to operate with a variety of substitute fuels from start of operation. In light of the technical and scientific knowledge now available, such proposals are likely to be considered BAT, as the use of substitute fuels is recognised as a primary technique for the minimisation of oxides of nitrogen, the principal process pollutant.

4.30 The application of the current Substitute Fuel Protocol, requires the Operator to demonstrate within the application for a PPC permit that the use of substitute fuels represents BAT for the new kiln(s) and during the commissioning phase the Operator

[9] The Waste Incineration (England And Wales) Regulations 2002, SI 2002 No. 2980

must follow the technical requirements, as laid out in Section 4 of the Protocol.

4.31 On existing cement and lime kilns, the position is different. For applications for new substitute fuels the Substitute Fuels Protocol requires a comparative environmental assessment of baseline operation with maximum fuel substitution by means of a trial. On completion of a trial the burning of the new fuel mix is stopped until the trial data is fully evaluated. There are a number of examples where there are at least 2 to 3 different substitute fuels already being used to fuel a particular kiln. As this has already been established as BAT for such kilns, this must be taken to be the baseline. However, reverting to baseline operation while the trial data is evaluated may result in an increase in emissions compared with operation with the new fuel mix. .

4.32 Therefore, for applications for new fuels on existing cement and lime kilns, it is **proposed that applications should be submitted with a detailed commissioning programme to demonstrate compliance with the requirements of PPC and critical success factors identified for the commissioning phase.** The latter will include the requirements of the Waste Incineration Directive subject to the transitional provisions of the Directive.

4.33 A variety of credible operating scenarios will need to be identified in commissioning plans so that appropriate conditions including monitoring requirements can be specified in permits. For existing cement and lime kilns a critical success factor for such commissioning programmes, as now, will be "no net detriment to the environment" (using H1 methodology, ref.5) resulting from the change of fuel mix.

4.34 The Operator should gather evidence for reporting on the performance of the commissioning programme against the critical success factors. During the commissioning phase the Operator should be encouraged to keep the public informed on the progress via regular reports. If at any stage, non-conformance with critical success factors becomes apparent the commissioning programme with new substitute fuels should be stopped. Under such circumstances the Environment Agency will have to decide whether the commissioning programme can recommence and, if so, whether more consultation should be undertaken in light of the suspension. In some cases the permit allowing the commissioning programme may need to be further varied: the Environment Agency will need to show in the Decision Document that all the relevant issues have been considered at each stage.

4.35 In the light of experience the Environment Agency considers the current Protocol requirement for existing cement and lime kilns to suspend the burning of a new fuel mix until the trial results have been fully evaluated, to be unnecessary. This is because the principal process emissions will be continuously monitored, thus providing sufficient data to determine "no net detriment to the environment" for existing kilns during the course of the commissioning programme. If the above proposal is adopted, it will further streamline the approval process for the continuous use of new substitute fuel(s).

Views are invited on the above proposal.

Waste exclusions

4.36 The present version of the Substitute Fuels Protocol has the following waste exclusions:

> 4.1.4 Specification and Testing of Substitute Fuel(s)
>
> Only substitute fuel(s) that can meet a specification agreed in advance with the Agency will be permitted to be trialled. No substitute fuels to which the following substances have been deliberately added should be trialled:
>
> - PCBs;
> - PCP;
> - radioactive material or radioactive waste;
> - pharmaceuticals;
> - pesticides;
> - biocides;
> - explosives; and
> - iodine compounds.
>
> Although each case must be considered on its merits, trials of substitute fuel containing the following substances should not be permitted:
>
> i) radioactive material or radioactive waste as defined in Sections 1 and 2 respectively of the Radioactive Substances Act 1993; and
>
> ii) explosives including: propellants, cartridges, or bombs, or explosive material extracted from them or explosive-contaminated material from their manufacture or decommissioning.
>
> Officers should seek to avoid the blending of waste streams into substitute fuel which do not contribute to its performance as a fuel. In addition, for SLF, solids content should generally be less than 20%.

4.37 The technical requirements of the Waste Incineration Directive reflect the distinction between hazardous and non-hazardous waste and are based principally on the properties of waste prior to incineration or co-incineration but not differences in emissions. The Waste Incineration Directive requires strict emission limit values should apply to the incineration or co-incineration of hazardous and non-hazardous waste. However different techniques and conditions of incineration or co-incineration and different monitoring measures upon reception of waste should be retained. Emission limit values (ELVs) for cement and lime kilns co-incinerating wastes are set in accordance with Annex II of the Waste Incineration Directive. However, if hazardous waste is burned at a rate of above 40% thermal substitution or any untreated municipal waste is thermally treated the incinerator limits as specified in Annex V of the Waste Incineration Directive will apply i.e. incinerator ELVs.

4.38 The application of the Waste Incineration Directive technical requirements to the use of all wastes falling within the scope of the Directive ensures a high level of protection for human health and the environment, particularly when coupled with PPC requirements for storage and handling of raw materials (including fuels). The

Environment Agency has therefore reviewed its policy on waste exclusions in the Protocol and has concluded that excluding wastes containing certain substances from use as fuel in cement and lime kilns is no longer justified.

4.39 The Environment Agency **proposes that the current exclusion of wastes containing waste materials derived from the manufacture of pharmaceuticals, pesticides, biocides and explosives, should be removed from the Substitute Fuels Protocol.**

4.40 Exclusions for polychlorinated biphenyls (PCBs), pentachlorophenol (PCP), iodine compounds and radioactive material or radioactive waste as defined in Sections 1 and 2 respectively of the Radioactive Substances Act 1993 will remain.

4.41 Operator applications will be required to demonstrate that proposed fuel specifications have been evaluated with respect to plant emissions performance and set out in detail the adequacy of the control measures for storage and handling of these materials.

4.42 For hazardous wastes, the Waste Incineration Directive (Article 4.5) requires that the following requirements are specified in permits:

(a) a list of the quantities of the different categories of hazardous waste which may be used;
(b) specify the minimum and maximum mass flows of those hazardous wastes, their lowest and maximum calorific values and their maximum contents of pollutants, e.g. PCB, PCP, chlorine, fluorine, sulphur, heavy metals.

4.43 These proposals, if adopted, have the potential to widen the range of wastes that could be recovered as fuel in cement and lime kilns. However, burning these wastes is unlikely to have any effect on emissions (except perhaps to reduce the most environmentally significant ones), due to the characteristics of cement and lime kilns employing high temperatures, long residence time, alkaline environment, thermal inertia, ash retention in clinker and continuous operation. Note also that removal of these exclusions does not necessarily mean such wastes will be utilised as fuels in cement and lime kilns, only that they may be considered.

Views are invited on the above proposals.

Additional monitoring requirements

4.44 In the recent review of the Protocol (version 4, dated 27 June 2003), various aspects of the monitoring requirements have already been amended to reflect in part the requirements of the Waste Incineration Directive and directions to regulators, e.g. reporting requirement for Waste Incineration Directive specified heavy metals, dioxin-like PCBs and priority PAHs. Also where appropriate, additional monitoring requirements have been specified for substitute fuels such as Meat and Bone Meal (MBM) and Over Thirty Months Scheme (OTMS) Tallow.

4.45 The Environment Agency proposes to amend further the monitoring requirements to take account of a wider range of wastes that could be recovered (as fuel) and include priority substances identified in assessments of local air quality.

4.46 The current Protocol has the following additional monitoring requirements for specified wastes:

4.2.8 Additional Monitoring Requirements Specific to Particular Fuel Types

Specific additional determinands are required in relation to trials involving particular substitute fuel types, as detailed below. In general, this is because of the possible presence of particular substances in such fuel inputs, and the need to demonstrate their fate in the process. These substances should be measured in the substitute fuel and in the representative samples of all outputs (unless stated otherwise) under baseline conditions and at least at the maximum proposed substitution level.

Substitute Fuel	**Additional Monitoring**
Substitute liquid fuel	Pentachlorophenol Hexachlorocyclohexane (all isomers) DDT (all isomers)
Tyres (whole or chipped) (or detailed specification)	Zinc Polycyclic Aromatic Hydrocarbons (Anne Benzene Butadiene Styrene,HBr, Chloromethane (all - stack emissions only)
Refuse-derived fuel	Zinc
Wood chips and sawdust	Pentachlorophenol Hexachlorocyclohexane (all isomers) Tributyl tin compounds
Dried sewage sludge pellets	Zinc
Dried sewage sludge	Zinc
Waste photographic emulsions e.g. X-ray film	Silver
Commercial (paper, cardboard, rags etc)	Zinc
Any material containing organophosphates	Total phosphorus compounds
OTMS Tallow	Refer to OTMS Tallow Protocol[v]
MBM	Refer to IPC Technical Guidance Note S2 5.01, Amplification Note No.1, Animal Remains Incineration

4.47 Given the Environment Agency proposal to amend the waste exclusions from the Protocol, **it is proposed that the additional monitoring requirements specified for particular fuel types should be revised to require:**

a) assessment of the proposed fuel(s) and consideration of whether additional monitoring is required to demonstrate the fate of substances present in the proposed fuel in the process;

b) characterisation of Volatile Organic Carbon[10] (VOC) emissions to air (when the predicted environmental contribution (as benzene) is greater than 1% of the benzene air quality standard) and assess their environmental significance (using H1 methodology); and

c) monitoring of substances identified as a priority for control in local air quality assessments.

4.48 The requirement to characterise VOC emissions that do not meet the H1 screening criteria for insignificance, will safeguard against any significant change in VOC emissions that could be missed if reliance is maintained on a limited range of VOC substances.

4.49 Substances such as PAHs have already been identified for monitoring irrespective of the substitute fuel mix. For other substances such as benzene and 1,3 butadiene, these substances may be of local concern identified in Local Authority assessments of air quality. The Environment Agency will need to demonstrate that site specific factors such as local air quality have been taken into account when specifying additional monitoring requirements.

4.50 The combined effect of the above proposals would be to target monitoring requirements during commissioning on substances of concern that may be a priority for control.

Views are invited on the above proposals

[10] H1 requires VOC emissions to be conservatively assessed by assuming the mass emission rate to be benzene. The H1 test of insignificance requires the predicted maximum ground level concentration to be compared with the air quality standard for benzene. If the process contribution is greater than 1% it may not be insignificant and further assessment of the potential impacts should be undertaken.

Appendix A

Glossary of Terms

BAT	Best Available Techniques
Defra	Department for Environment, Food and Rural Affairs
Dioxins	A generic term for all polychlorinated dibenzo-p-dioxin and furans which form a group of 210 closely related compounds
EPA 1990	Environmental Protection Act 1990
H1	Environmental assessment and BAT appraisal methodology
HBr	Hydrogen bromide
IPPC	Integrated Pollution Prevention and Control
MBM	Meat and Bone Meal
OTMS	Over Thirty Months (Slaughter) Scheme
O_2	Oxygen
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PCP	Pentachlorophenol
SLF	Substitute Liquid Fuel
TOC	Total Organic Carbon
VOC	Volatile Organic Compounds

Appendix B

Extracts from "Integrated Pollution Prevention and Control: A Practical Guide", Edition 2, Detr, published June 2002

"SUBSTANTIAL CHANGE"

According to Regulation 2(1), a "substantial change" as "in relation to an installation or mobile plant, a change in operation which, in the opinion of the regulator, may have significant negative effects on human beings or the environment."

This definition means that whether any particular change proposed by an Operator would constitute a "substantial change" is something that can only be determined given the facts of the case. This requires consideration of all impacts of any proposed change rather than just the net environmental effect. Therefore, the potential impacts of proposals on all possible receptors should be examined to inform a judgement on whether, either in combination or in any individual case, there may be a significant negative effect. Such judgements should take account of not only releases of polluting substances, but also other pollutants (heat, noise and vibrations) as well as alternative types of potential impacts such as increased waste production, energy consumption or the risk of accidents.

Some changes bringing about net benefits may have some constituent negative effects. For example, changing a fuel may lead to reductions in some releases but increases in others. If any potential negative effect is identified, the Regulator must consider whether it judges this "significant". Regulators should make this judgement by considering whether the effect is of such significance that it justifies requiring the Operator to submit proposals that will be subject to consultation with the public and statutory consultees. This should be assessed having regard to:

a) the extent of the potential impact (including geographical area and size of the affected population);

b) any effects on specifically protected areas, species or other assets of particular significance;

c) the transboundary nature of the impact;

d) the magnitude and complexity of the impact;

e) the probability of the impact; and

f) the duration, frequency and reversibility of the impact.

RELEASES OF SUBSTANCES

IPPC is concerned with a range of environmental impacts, all of which must be considered in determining whether there may be a substantial change. However, changes of releases in polluting substances are the most likely causes of substantial changes. In this regard, Regulators should consider changes in:

a) The substances released. If a new substance were to be released, consideration should be given to whether this would have a significant negative effect. However, if this new release were to be accompanied by a reduction in releases of another substance, then it would be appropriate to consider any similarity of effects between the two substances. If the effect of the new substance would be broadly similar to that now reduced from the old substance, then the change would not be substantial.

b) The level of releases of any particular substances. An increase in releases would give rise to a substantial change only if it would significantly increase the negative environmental effect. The test of significance should not be based on the relative increase in releases from the site but on the absolute effect those releases will have on the environment. For example, a small factory might seek to increase its capacity by two or three times, yet this would constitute a substantial change only if the resulting increase in releases may cause a significant negative effect. The absolute increase in substances to be released would not in itself be considered significant.

c) The nature of releases of any particular substance. Beyond increases in levels of releases, other changes could include changes in temperature, pressure, viscosity, appearance, phase, size and shape of particle, colour and density. The possibility of such changes having a significant negative effect should be considered. For example, a change in particle size which does not enter a different environmental pathway is unlikely to be a substantial change, unless it becomes so ultra-fine that it starts to have a different uptake.

Finally, it is important to stress that whether or not a change is substantial is a judgement for the Regulator to make. Regulators should be able to demonstrate that their decisions are reasonable based on the facts of the case and the standard of common sense.

Appendix C

Substitute Fuels Protocol (version 4)