

**Evaluation of the 4th Report of the British Society for Ecological Medicine:
"The Health Effects of Waste Incinerators"**

1. This report was published by the British Society of Ecological Medicine in February 2006. The report discusses emissions from incinerators and the health effects of these emissions; evidence for increased ill-health around incinerators; evidence linking the incidence of disease to the presence of chemical pollutants; groups who are particularly at risk; past mistakes in dealing with chemical exposures; alternatives to incineration; the costs of incineration; ash disposal; incineration of radioactive wastes; incineration of waste in cement kilns; monitoring of emissions, environmental concentrations, and in-body levels of pollutants; risk assessment techniques; and public rights.
2. Enviros Consulting Ltd published a response to this report on 23 February 2006, which is appended to this note. A response was published by the authors of the BSEM review and made available via the BSEM website (www.ecomed.org.uk/pub_waste.php) – this is referred to as the "BSEM Enviros response". The reports authors were contacted with a view to discussing the issues arising from the original report and subsequent documents, but no discussion has yet taken place.

Overview

3. The BSEM Enviros response covers the following matters:
 - a. The need to consider and control pollution from incinerators to all media, not just to air
 - b. The UK's responsibilities under the Stockholm Convention to minimise the unintentional formation of persistent organic pollutants
 - c. The risks posed by airborne emissions from waste incinerators
 - d. Consideration of dose of pollution from waste incinerators
 - e. Emissions of ultrafine particulates (PM_{2.5})
 - f. Whether it is right to consider the risks posed by incinerators in the context of other sources of environmental emissions and health impacts
 - g. Interpretation of information on cancer rates
 - h. Accidental releases
 - i. The Precautionary Principle
 - j. The role of dispersion modelling
 - k. The policy of building incinerators in deprived areas
 - l. Alternative waste disposal methods

4. Pollution to all media

The BSEM Enviros Response is right to say that it is important to control emissions from industrial processes to all media. Incinerators do not simply transfer pollution from air to ash. Some substances (such as metals) are conserved in this way, and removal via air pollution control systems will result in higher levels in ash. However, organic substances in the feedstock (including dioxins and furans) are destroyed in the combustion process. Dioxins can be re-formed as the flue gases cool. While incinerators are designed to minimise this process, it does occur to some extent. The net effect is that incinerators are in some cases net sources of dioxins and furans, and in some cases net removers of dioxins and furans.

5. It is right to be concerned about potential exposure to dioxins and furans and other trace substances in breeze blocks. These concerns apply equally to breeze blocks manufactured from power station ash or from incinerator bottom ash. The BSEM review is right that incinerator fly ash should not be used for this purpose. The regulatory and control systems specifically ban the re-use of incinerator fly ash, and any instance of this occurring is a breakdown in regulation and control rather than an inherent shortcoming of incineration processes.

6. When deciding what action to take in the light of these concerns, we need to be aware of the consequences of our actions. Although there are measures in place to control the transportation and disposal of fly ash, it would be better if incinerators did not create fly ash which requires disposal. To avoid creating this material, we will need to find alternative and additional means of recycling, treating and disposing of waste. Enviro supports the development of alternatives (e.g. via the Defra supporter programme, www.defra.gov.uk/environment/waste/wip/newtech/supporter.htm), but it must be appreciated that these alternatives bring with them emissions to the environment, impacts and risks. These risks and impacts are in general less well understood and harder to manage than the impacts associated with waste incineration. These matters need to be taken into account when taking a policy decision relating to waste incineration.
7. **The Stockholm Convention**

The BSEM Enviro Response states that "... incinerators will create vast amounts of dioxins, particularly in the ash for periods of 20-30 years..." An incinerator accepting 100,000 tonnes of waste per year over 25 years will result in the production of approximately 25 grams of dioxins and furans in solid residues and approximately 1 gram in emissions to air (expressed as toxic equivalent).
8. For context, sources such as accidental fires, agricultural waste burning, industrial combustion and small-scale waste burning (e.g. on building sites) all give rise to a thousand times more emissions to air. Information on emissions in residues is harder to obtain, but landfill of household waste results in the production of more than one hundred times as much dioxin as would be contained in the ash from an incinerator. What can we conclude from this? The BSEM concludes that emissions at this level would constitute "tearing up" the Stockholm treaty. A more appropriate conclusion is that the UK should fulfil its responsibilities under the Stockholm treaty by dealing with sources such as those listed above. Enviro is working with the UK Government in this area. Preventing further development of waste incineration on these grounds risks diverting attention from much more important sources of unintentional persistent organic pollutants, and will make no detectable or significant difference to the unintentional production of dioxins and furans.
9. **The risks posed by airborne emissions from waste incinerators**

The BSEM review draws attention to our comment that "*No discernible benefit would be gained by any policy change relating to waste incineration, because the source is simply too small to be significant.*" It describes this as "unqualified," when the basis for the statement is set out clearly in the preceding text. To reiterate, "*For example, emissions of PM₁₀ from MSW incineration are approximately 100 tonnes per year, compared to 22,000 tonnes per year from electricity generation. Emissions of finer particles (e.g. PM_{2.5} and PM₁) and secondary particles would be expected to be in a similar proportion. If it is right to be concerned about fine particulate matter, then attention needs to be paid to controlling emissions from electricity generation, road transport, agriculture and domestic sources.*" Similar data could be provided for the other substances referred to – dioxins and furans, volatile organic compounds and metals.
10. The BSEM goes on to set out investigations which they consider should be carried out into body burdens, health effects, biochemical processes, cancer rates, and monitoring of pollutants. The BSEM concludes that without proper information on these matters, we cannot be confident that pollution from incinerators is too small to be significant. As set out in our previous response, we are not able to comment on the comments made regarding human toxicological response to chemicals. However, if the matters raised by the BSEM are of concern, there is little to be gained from preventing further waste incineration processes. Attention should instead be focused on controlling emissions from electricity generation, road transport, agriculture and domestic sources of pollution.
11. **Consideration of dose of pollution from waste incinerators**

The BSEM Enviro response draws attention to a lack of data on the levels of air pollutants with known adverse health effects. In the work that Enviro has carried out with regard to waste incineration, we have worked hard to ensure that levels of airborne pollutants and the associated health risks are understood and controlled. This is limited by our current scientific knowledge of atmospheric dispersion processes and understanding of the health effects of the pollutants of concern. It would also be subject to question if emissions were to take place outside permitted limits. This is discussed in Section 21.
12. Although there are some uncertainties in the available information on pollutant levels and health effects, we consider that sufficient information is available to enable us to make a rational assessment of the levels of airborne pollutants associated with waste incinerators. As a mature technology, considerably more information with less uncertainty is available for waste incinerator facilities than for any comparable industrial or waste management process.

13. Emissions of ultrafine particulates (PM_{2.5})

The BSEM suggests that an incinerator contribution to levels of PM_{2.5} of 20 µg/m³ “in certain conditions” would breach American air quality standards. In fact, the American air quality standards for PM_{2.5} are 15 µg/m³ as an annual mean, and 65 µg/m³ as a 24 hour mean. A process contribution of 20 µg/m³ in certain conditions would not breach this standard, unless the conditions prevailed for over half of the time.

14. Leaving aside this small misinterpretation, the fact remains that waste incinerators make a very small contribution to primary or secondary emissions of PM_{2.5} (see paragraph 9 above). Even in the near vicinity of a waste incinerator, the process contribution to annual mean levels of PM_{2.5} is likely to be 1% or less of the background level due to emissions from other sources. Under the very worst-case weather conditions, our experience is that the process contribution to PM_{2.5} could approach 5% to 10% of background levels in the immediate vicinity of a waste incinerator. As mentioned by the BSEM, these are the conditions under which dispersion models perform least satisfactorily. For this reason, we always ensure that there is a considerable “margin for error” in designing a waste incinerator facility. This is not an unusual situation for an individual source of pollutants, and many industrial facilities will make a more significant contribution to levels of PM_{2.5} and other pollutants.

15. Whether it is right to consider the risks posed by incinerators in the context of other sources of environmental emissions and health impacts

The BSEM criticise our approach to setting issues in context, saying that it is not appropriate to permit small amounts of pollution from some sources on the basis that higher levels of pollution are permitted from other sources. The BSEM raises valid concerns in this area, and it would not be right to give the impression that an additional number of deaths or an increase in ill-health is acceptable just because it is small compared to another impact. The BSEM describes this approach as grotesque.

16. However, whatever we do brings with it impacts and effects. As regards waste management, for example, if we reduce food packaging waste, this could increase the risk of cross-contamination of foods. Separating waste for composting and recycling increases odours and exposures to micro-organisms. Recycling waste materials creates pollution. Composting processes generate particulates and micro-organisms. New technologies such as MBT result in the production of larger amounts of materials requiring further treatment with uncertainty over their final use or disposal. Incinerating waste creates airborne pollution and ash containing hazardous materials. Landfills emit air and water pollution, and might be associated with a small increase in birth defects. The same is true for any sphere of human activity. We can't simply rule out an activity because it creates pollution or could increase risks to health – if we did that, we would have to stop all human activity. That is why we need to have control mechanisms such as the land-use and waste planning systems, and the integrated pollution prevention and control system. If they operate properly, these mechanisms ensure that the activities that we undertake to meet the needs of society (e.g. to re-use, recycle and dispose of its waste materials) are proportionate to our needs, well designed, situated in the most appropriate locations, and operated professionally. These mechanisms are designed to strike the best balance between the adverse impacts of our activities and the benefits that they bring.
17. This means that a proposed waste incinerator (in common with any other waste management facility) should be part of a coherent waste management strategy, and its impacts should be properly understood. Setting the adverse and beneficial impacts of the development in context is part of this process. This will enable a balanced view to be taken on whether the proposal should go forward. If we don't take this approach and simply rule out waste incineration, we run the risk of ending up with an inappropriate and less well tested suite of waste management facilities which may not meet our needs, and/or may have worse effects on health and the environment than the incinerators which we were afraid of.
18. Conversely, if we do adopt this approach and rule out waste incineration, we should also rule out other sources of pollution which bring much higher risks such as iron and steel manufacturing, electricity generation and road traffic. But we don't just rule out this type of activity – instead, we accept the impacts and risks posed by power stations, cars and lorries because of the benefits they bring to society as a whole. Our approach is to try to minimise their use (e.g. via improved energy efficiency, and public transport) while managing the risks and impacts. We should treat waste incineration in the same way.
- 19. Interpretation of information on cancer rates**
- We apologise for misrepresenting the BSEM's view on cancer rates. We accept that cancer rates are at an all-time high and increasing, and we support efforts to reduce exposure to carcinogens.

20. Again, it is important to be aware that a blanket ban on further development of waste incinerators as recommended by the BSEM would make no discernible difference to exposure to carcinogens. Indeed, a blanket ban could potentially result in an increase in health risks due to the alternatives that would need to be implemented to meet society's waste and resource management needs.
21. **Accidental releases**
The BSEM is right to highlight the fact that accidental releases do occur. The information from Greenpeace on accidental releases was accurately quoted by BSEM. This information has been previously subject to question, but we are not able to substantiate either the Greenpeace data or the claims of inaccuracy.
22. Leaving aside the reliability of the information, the BSEM is right to say that the more up to date records reported in the original Enviro response nevertheless give cause for concern. Techniques for continuous measurement of emissions to air are used to enable emissions of carcinogens such as cadmium and dioxins and furans to be controlled. This is achieved by ensuring low levels of substances such as particulates and hydrogen chloride in the emissions, and by controlling the combustion conditions. The use of continuous measurements in this way means that there is not the risk of persistent, ongoing, undetected emissions of carcinogens such as metals, dioxins and furans suggested by BSEM. Clearly, it would be more satisfactory if reliable, continuous measurements of these substances could be made. However, this is not technically feasible at present. The continuous measurement methods which are available and specified under the terms of operating permits give a good degree of confidence in emissions from waste incinerators, and it is our judgment that this gives satisfactory controls on the trace components of emissions. This is a matter of judgment, and we respect the different views which are reached by others.
23. Because incinerators are complex processes, problems do sometimes arise, resulting in increases in emissions. Occasional incidents involving short-term excursions above emissions limits are highly unlikely to pose a significant risk to health or the environment – this is one reason for ensuring that a sufficient “margin of safety” is built into the design of a waste incinerator. These incidents must be properly investigated and their recurrence prevented. Under the Environment Agency “OPRA” system, breaches of operating permit conditions result in an increased permit fee and increased frequency of inspections. Persistent occurrences should result in the prosecution of offenders, and if necessary the temporary or permanent closure of facilities so that significant effects on health or the environment do not occur.
24. **The Precautionary Principle**
Our basis of understanding the Precautionary Principle is set out in our original response. The Wingspread Statement cited by the BSEM states that: “*When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. In this context, the proponent of the activity rather than the public should bear the burden of proof.*” Our view is that the proponents of waste incineration have taken precautionary measures to deal with emissions to air of dioxins and furans and metals. Precautionary steps are taken in the disposal of incinerator fly ash by disposal in licensed hazardous waste landfill sites. These steps are effective in greatly reducing the risk of exposure to potentially harmful substances, although no measures will ever eliminate 100% of emissions or risks to the environment or health.
25. The research carried out for Defra by Enviro and the University of Birmingham found no convincing evidence for a link between the current generation of MSW incinerators and the incidence of adverse health effects. Adverse health effects have sometimes been observed around older incinerators and in industrial areas – this may correspond to the positive origin exposure-disease associations referred to in the BSEM Enviro response. These observations confirm the need for good, consistent, long-term control of waste incinerators, in common with other industrial facilities. As stated above, precautionary measures have been taken to reduce emissions and thereby reduce the risk of these effects to undetectable levels. Demonstrating the effectiveness of these controls is the responsibility of the process operators, and the clearest way to demonstrate this is by measurement and assessment of emissions to all media. Studies of the levels of pollution and the incidence of ill-health in the area surrounding waste incinerator facilities are helpful as back-ups to this approach, but cannot approach the sensitivity and usefulness of controls based on emissions measurement and control.
26. **The role of dispersion modelling**
The original BSEM report stated: “*Unfortunately modelling has a 30% confidence level – this means this technique has only a 30% chance of accurately predicting the ground level concentrations of pollutants - in other words less accurate than tossing a coin.*” The reference to 30% confidence level means that, provided information regarding a source is known to a sufficient degree of accuracy, model validation studies show that a model forecast is normally accurate to within 30% of a measured level. Our experience

is that individual measurements and model forecasts can vary more widely than this, but long period mean average concentrations can normally be forecast to an accuracy of $\pm 30\%$ or better. This should not be described as "less accurate than tossing a coin."

27. The BSEM is right to say that modelling is inherently inaccurate, and it is important to take account of these inaccuracies when using the models to design and assess the effects of emissions to air from a waste incinerator or any other industrial process. It is also important to be aware of the limitations of environmental monitoring as a tool for assessment and control of incineration emissions or emissions from any other industrial process. The complexities of environmental processes mean that interpreting the results of an environmental monitoring survey is complex, and frequently does not produce unequivocal findings. In this context, environmental monitoring surveys are best suited to operate as a check on the findings of other studies carried out using emissions monitoring and dispersion modelling methods. This is the approach adopted by Enviro in the work we are currently engaged with in relation to the Allington incinerator in Kent. As set out in our previous response, BSEM's recommendations 8 (b) and (d) are useful (monitoring levels of emitted substances in house dust, and measuring the body burden of key pollutants).
28. **The policy of building incinerators in deprived areas**
The BSEM is right to say that Enviro made no comment on "the present callous policy of building incinerators in deprived areas and areas of high mortality where their health effects are likely to be greatest" – indeed, such a claim is barely worth a response. Enviro has not come across such a policy. Enviro has worked with Government departments to develop the current policies on waste and land-use planning. We have worked with numerous local authorities across the country, and nowhere have we come across a policy to site waste facilities in such areas. Since 1998, Enviro has worked on approximately ten incinerator projects. These were located in rural areas (3 processes), suburban areas (2), industrial areas (4), and central urban areas (2) (note: one process counted as both industrial and central urban). There is no bias either towards or away from deprived areas – our work has covered relatively affluent areas of Kent and the Isle of Man, as well as relatively deprived areas of Hull and Huddersfield. In each case where we have been involved in site selection, urban deprivation was neither explicitly nor implicitly a factor in the site selection process.
29. **Alternative waste disposal methods**
The BSEM says rightly that the focus of its work was on waste incineration rather than on alternative waste strategies. However, by recommending that "no further waste incinerators be built," the BSEM is explicitly saying that we should recycle, reprocess or dispose of our waste in alternative ways. Enviro is fully supportive of BSEM's position, favouring waste prevention combined with re-use and recycling. We agree that higher diversion rates can be achieved. The use of incineration does not necessarily discourage a high proportion of waste prevention, re-use and recycling. For example, Denmark produces around 13 million tonnes of household, industrial, commercial and construction waste per year. 65% is recycled, energy is recovered from 26% by incineration, and 9% is landfilled.
30. The environmental and health risks of any new means of disposing of waste needs to be properly evaluated just as is the case for waste incinerators. Accepting that the BSEM report is not the place for an evaluation in detail, the issues should nevertheless be raised to allow a fair conclusion to be drawn. Further information on these matters can be found in the study carried out by Enviro and the University of Birmingham for Defra.¹

Conclusions

31. There is considerable common ground between the authors of the BSEM review and the views expressed in this note. For example, the BSEM is right to highlight the need for good regulation, the benefits of reduction, re-use and recycling, and the benefit of monitoring house dust and body burdens of released substances.
32. However, fundamentally different conclusions are reached regarding the acceptability of waste incineration. The BSEM review finds that no further waste incinerators should be built. In contrast, our view is that waste incineration processes need to be planned, designed, operated and regulated carefully and in detail, as part of an integrated waste management strategy. There is no reason in principle why waste incineration processes should not continue to operate and be built, provided these conditions are fulfilled.

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1. This report was published by the British Society of Ecological Medicine in February 2006. The report discusses emissions from incinerators and the health effects of these emissions; evidence for increased ill-health around incinerators; evidence linking the incidence of disease to the presence of chemical pollutants; groups who are particularly at risk; past mistakes in dealing with chemical exposures; alternatives to incineration; the costs of incineration; ash disposal; incineration of radioactive wastes; incineration of waste in cement kilns; monitoring of emissions, environmental concentrations, and in-body levels of pollutants; risk assessment techniques; and public rights.

Overview

2. The report's authors show detailed familiarity with research into the health effects of chemicals. The report also provides a fair review of some of the epidemiological research into the health effects of waste incineration facilities. Where the report falls down is in a failure to appreciate the significance of the issues they are dealing with. The report makes a number of unfounded and, in some cases, incorrect assumptions about waste incineration, perhaps arising from the authors' unfamiliarity with issues relating to environmental science and waste management. The result is that the report does identify a number of important issues which need to be addressed by the waste industry, regulatory authorities and planning authorities – a number of these issues are being addressed by the relevant bodies. It is unfortunate that these issues are submerged in an array of misdirected, inappropriate and inaccurate comments, which could detract from the valid points which are made.

Valid issues discussed in the report

3. The report does raise some important issues with regard to incineration. Because waste incinerators burn a mix of materials, the emissions have a wider range of constituents than would occur from burning of fuels such as natural gas or fuel oil. In view of this, the report's recommendation 8 (b) and (d) for monitoring levels of emitted substances in house dust, and measuring the body burden of key pollutants are sensible. This survey should be designed to include measurements at a control location so that the incineration contribution can be evaluated. The results of a survey of this nature could be used to focus an evaluation of synergistic effects, enabling attention to be focused on any substances which are found to be significantly influenced by incinerator emissions.
4. The report discusses some of the research carried out into the prevalence of ill-health in people living near to incinerators. The findings of this body of research do indicate a need to learn the lessons of the past, and reduce emissions of potentially harmful substances. These lessons have indeed been learnt, to the extent that emissions from waste incineration are now a fraction of what they were 20 years ago, but strict control and regulation is still needed to ensure that the past emissions are not repeated.
5. The report emphasises the need to consider alternatives to waste incineration, including innovative techniques such as Mechanical Biological Treatment (MBT) and gasification/vitrification. As the economics of the waste management industry change, a wider range of techniques are becoming cost-effective and available. These need to be fully considered, and implemented as appropriate. The report also calls for a reduction in exposure to harmful chemicals: it is indeed important to use less harmful rather than more harmful chemicals and to reduce use, wastage and emissions of these chemicals.
6. The report raises important issues with regard to human toxicological response to chemicals – in particular, identifying concerns regarding exposure of the foetus and breast-feeding infants. Sections 3, 5 and 6 of the report could form the basis of a useful review of this issue. This evaluation does not set out to judge the report's findings in this area, because they are largely not applicable to incineration emissions. This is discussed in the next section.

Critique

Context

7. The study makes the common mistake of identifying incinerators as a significant source of emissions of fine particulate matter, dioxins and furans, volatile organic compounds and metals. In fact, incinerators do not make a significant contribution to emissions of these substances. This means that, while the report may make valid comments about the risks to health associated with exposure to these substances, the conclusion should be to consider what needs to be done to deal with the main sources of these emissions. For example, emissions of PM₁₀ from MSW incineration are approximately 100 tonnes per year, compared to 22,000 tonnes per year from electricity generation.¹ Emissions of finer particles (e.g. PM_{2.5} and PM₁) and secondary particles would be expected to be in a similar proportion. If it is right to be concerned about fine particulate matter, then attention needs to be paid to controlling emissions from electricity generation, road transport, agriculture and domestic sources. No discernible benefit would be gained by any policy change relating to waste incineration, because the source is simply too small to be significant.
8. Similarly, incineration of MSW is estimated to result in emissions of 19 tonnes per year of volatile organic compounds, compared to 408,000 tonnes per year from road traffic, and 36,000 tonnes per year from domestic sources. And for dioxins and furans, MSW incineration is estimated to result in emissions of 1.9 grams per year, well below 1% of the UK total of approximately 360 grams per year.¹ Again, if it is right to be concerned about exposure to organic chemicals, and dioxins, then action should be taken to deal with emissions from road traffic and domestic sources. Any change to emissions from waste incinerators will have no discernible effect on public exposure to VOCs or dioxins and furans.
9. This conclusion is consistent with the report's findings that health outcomes such as cancer are increasing (Section 5.1). This increase in the incidence of cancer has coincided with a general decrease in emissions of substances such as dioxins and furans from waste incineration in recent years. This doesn't prove that incinerators have no influence on cancer, but does suggest that we need to look elsewhere to identify the causes of the increase in cancer incidence reported in the study.

Consideration of dose

10. Linked to this fundamental problem with the study is the lack of proper reference in the report to the dose of pollutants resulting from waste incineration emissions. For example, the report states "*As incinerators are effectively particulate generators and produce predominately the smaller particulates that have the biggest effect on mortality it is clear that incinerators have considerable lethal potential*" (page 11). The study repeatedly discusses emissions from incineration in this way, with no reference to dose, in a way which would not be expected of a responsible medical body. Vehicle exhaust emissions emit more than one hundred times as much particulate matter as waste incineration facilities, predominantly the smaller particles, and deliver a higher dose because emissions tend to take place at ground level, closer to where people are located. Proper consideration of dose would lead to very different conclusions to those drawn in the report.

Alternatives

11. As noted above, the study refers to some alternatives to waste incineration (Section 8). While it is important to consider alternatives to incineration (waste reduction; increased recycling; alternative treatment and disposal techniques), it is also important to be aware of the potential environmental effects of these alternatives. Considering the options discussed in the report in turn:
 - Mechanical Biological Treatment (MBT) requires waste to be shredded, which is subject to reliability problems. It is incorrect to say that MBT is "*virtually pollution free.*" Dust and micro-organisms can be generated during the pre-treatment of waste, and no ready controls are available for these emissions, in the way that they are available with a waste incinerator. These emissions can be enhanced during the composting process, depending on the controls applied.
 - Gasification/vitrification processes such as the Thermoselect process are subject to reliability problems, and come with a high energy cost. Burning syngas generates combustion products such as oxides of nitrogen and dioxins and furans. The measured emissions concentrations of dioxins and furans from the Thermoselect process reported on the company's website are 0.005 – 0.01 ng/Nm³. This is similar to the levels achieved by modern waste incinerators.

¹ Department for Environment, Food and Rural Affairs, "Review of Environmental and Health Effects of Waste Management: Municipal Solid Waste and Similar Wastes", Report prepared by Enviro Consulting Ltd and others

- Recycling brings benefits in terms of reductions in the use of natural resources, but can also have impacts on worker health and the use of resources such as energy and water in reprocessing.
12. The benefits and drawbacks of MBT, gasification, recycling and incineration need to be considered in a fair way alongside those of other waste management options, and the report fails to do this.

Accidental releases

13. The report reproduces inaccurate information relating to the numbers of pollution incidents associated with incinerators (section 11). More up to date information is that *“56 incidents of emissions outside permitted limits occurred at the 14 incinerators accepting MSW in the UK in 2003 ... Three quarters of the incidents related to increased emissions of carbon monoxide and hydrogen chloride, which would not be expected to result in any significant environmental effects. There were four incidents of dioxins and furans above permitted levels, and one incident of cadmium emissions above permitted levels.”*¹

Other matters

14. There are a number of other matters of concern in the report. For example, no consideration is given to the re-use of incinerator ash, although some 80% of ash is re-used.¹ The report incorrectly states that no studies of key issues have been carried out – for example, *“no official attempts have been made to assess the effects of emissions on long-term health.”* In fact, these issues have been studied. In section 12, the report reproduces a basic misunderstanding of model uncertainty.
15. The report indicates that incineration is a “violation” of the Stockholm convention, suggesting that the convention commits signatories to the elimination of pollutants including dioxins, furans and PCBs. In fact, the convention requires signatories to *“at a minimum take the following measures to reduce the total releases derived from anthropogenic sources of each of the chemicals listed in Annex C, with the goal of their continuing minimization and, where feasible, ultimate elimination.”* A number of steps are then listed. The UK is rightly focusing on the reduction of sources of dioxins such as domestic combustion sources, and to suggest that incineration is a violation of this treaty is incorrect. The report makes sweeping assertions about the risks to health associated with the landfill of incineration residues which are not supported by evidence – for example, that *“no adequate methods exist for the disposal of this ash”* [air pollution control residues]. The Environmental Protection Act 1990 is also misquoted.
16. The report cites the Precautionary Principle. This states that *“where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”*.² The application of this principle does not necessarily mean that incineration should be stopped, but that, if there are concerns regarding environmental degradation, it should be evaluated and measures taken to deal with the problem. This evaluation currently takes place via the waste planning, land use planning and IPPC processes. The evidence presented in the report by no means demonstrates that *“building municipal waste incinerators violates the Precautionary Principle.”*
17. The report authors have been contacted with a view to discussing these concerns.

Conclusions

18. The report contains some useful insights from the perspective of the British Institute for Ecological Medicine. The Institute’s concerns regarding exposure to chemicals (especially of infants) are set out clearly (these are not reviewed in this evaluation). Some helpful suggestions regarding consideration of alternative waste management options and monitoring strategies are made.
19. The report falls down badly in its understanding of incineration processes. It fails to consider the significance of incineration as a source of the substances of concern. It does not consider the possible significance of the dose of pollutants that could result from incinerators. It does not fairly consider the adverse effects that could be associated with alternatives to incineration. It relies on inaccurate and outdated material. In view of these shortcomings, the report’s conclusions with regard to the health effects of incineration are not reliable.

² Office for the Deputy Prime Minister, Planning Policy Statement 23, “Planning and Pollution Control,” 2004

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Enviros Consulting Ltd
23 February 2006

