1. INTRODUCTION

The Department of the Environment, Heritage and Local Government has published on its website a public consultation related to a new waste policy:

- http://www.environ.ie/en/Environment/Waste/PublicConsultations/

As part of this consultation reference is made to a Strategic Environmental Assessment report completed by the UK company Eonomia on behalf of the Department related to a policy direction for a proposed cap on incineration capacity. This document does not reflect either proper technical and scientific facts or proper application of EU legislation on waste management. Its sole function is to justify a populist anti-incineration approach of the Green Party Minister for Environment, who has made no secret of his total opposition to incineration.

The Directive on Strategic Environmental Assessment (2001/42/EC) is implemented into Irish Law by S.I. No. 435 of 2004 and S.I. No. 436 of 2004. As the recital (4) to the Directive states:

- "Environmental assessment is an important tool for integrating environmental considerations into the preparation and adoption of certain plans and programmes which are likely to have significant effects on the environment in the Member States, because it ensures that such effects of implementing plans and programmes are taken into account during their preparation and before their adoption".

In essence Strategic Environmental Assessment leads to a structured manner in the development of plans and programmes by the Administration, which has to include public participation. As the recital (14) further states:

- "Where an assessment is required by this Directive, an environmental report should be prepared containing relevant information as set out in this Directive, identifying, describing and evaluating the likely significant environmental effects of implementing the plan or programme, and reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme".

This report then forms part of the public consultation process. The report and the opinions expressed by the relevant authorities and the public have to be taken into account during the preparation of the plan or programme and before its adoption or submission to the legislative procedure.

It is therefore clear on how critical it is that the environmental report prepared for compliance with the Strategic Environmental Assessment is clear and accurate. Indeed the provisions of the environmental report are clearly expressed in Article 2 (Definitions), Article 5 (Environmental Report) and Annex I of the Directive. In addition, the environmental report must be subject to consultation as provided for in Article 6 and 7; it must be taken into account during the preparation of the plan or programme (Article 8) and, when the plan or programme is adopted, information must be made available on how this was done (Article 9); and it must be of sufficient quality to meet the requirements of the Directive (Article 12).

2. FAILURE TO PROPERLY INFORM THE PUBLIC OF EU LEGISLATION RELATING TO WASTE MANAGEMENT

The EU common environmental policy is based on the precautionary and preventive action principles, on the principle that environmental damage should to the extent possible be rectified at source and on the principle that the polluter should pay. However, it is important to realise that EU Environmental Legislation is not based on zero impact but on consideration of the costs, benefits, impacts and alternatives available. An overriding principle of EU Legislation is the Principle of Proportionality, which requires that the extent of the action must be in keeping with the aim pursued. When applying the general principle of proportionality, the European Court of Justice frequently states that the principle requires an act or measure to be “suitable” to achieve the aims pursued, or it rather concludes that a decision is disproportionate because it is “manifestly inappropriate in terms of the objective which the competent institution is seeking to pursue”.

Indeed the Treaty of Lisbon establishes that Environment is a shared competency between the Union and the Member States, while Article 5 of the Common Provisions requires that the institutions of the Union shall apply the principle of proportionality as laid down on the application of the principles of subsidiarity and proportionality. The Protocol on the Principles of Subsidiarity and Proportionality is clear in that draft legislative acts shall take account of the need for any burden, whether financial or administrative, falling upon the Union, national governments, regional or local authorities, economic operators and citizens, to be minimised and commensurate with the objective to be achieved. Furthermore each institution shall ensure constant respect for the principles of subsidiarity and proportionality, as laid down in Article 5 of the Treaty on the European Union.

This principle is clearly adopted in the Waste Framework Directive 2008/98/EC. This Directive establishes the legislative framework for the handing of Waste in the European Community and defines key concepts such as waste, recovery and disposal and puts in place the essential requirements for the management of waste. It also establishes major principles such as an obligation to handle waste in a way that does not have a negative impact on the environment or human health, ***an encouragement to apply the waste hierarchy*** and, in accordance with the polluter-pays principle, a requirement that the costs of disposing waste must be borne by the holder of the waste, by previous holders or by the producers of the product from which the waste came.

Recital (6) of the Directive is clear in that waste policy should aim at reducing waste and favour the ***practical*** application of the waste hierarchy. Furthermore Recital (7) states that waste prevention should be the first priority of waste management, and that re-use and material recycling should be preferred to energy recovery from waste, where and insofar as they are the best ecological options. Recital (25) states that is appropriate that the costs be allocated in such a way as to reflect the real costs to the environment of the generation and management of waste. According to Recital (31) ***the waste hierarchy generally lays down a priority order of what constitutes the best overall environmental option in waste legislation and policy, while departing from such hierarchy may be necessary for specific waste streams when justified for reasons of, inter alia, technical feasibility, economic viability and environmental protection.***

Article 4 of the Waste Framework Directive deals specifically with the Waste Hierarchy and specifies that:

"The Following waste hierarchy shall apply as a priority order in waste prevention and management legislation and policy:

(a) Prevention.

(b) Preparing for re-use.

(c) Recycling.

(d) Other recovery, e.g. energy recovery; and

(e) Disposal.

When applying the waste hierarchy referred to in paragraph 1, Member States shall take measures to encourage the options that deliver the best overall environmental outcome. This may require specific waste streams departing from the hierarchy where this is justified by life-cycle thinking on the overall impacts of the generation and management of such waste.

Member States shall ensure that the development of waste legislation and policy is a fully transparent process, observing existing national rules about the consultation and involvement of citizens and stakeholders.

Member States shall take into account the general environmental protection principles of precaution and sustainability, technical feasibility and economic viability, protection of resources as well as the overall environmental, human health, economic and social impacts, in accordance with Articles 1 and 13".

According to Annex A.1.2 of the Environmental Report on the Section 60 Cap on Incineration, Directive 2008-98-EC is:

- The underlying policy guiding Irish Waste Management policy and is highly relevant to the Policy Direction.

The Waste Framework Directive is also mentioned in Section 5.0; Table 13 on Environmental Objective and Relevant Policies, in that *with caveats* it has the objective of:

- Promoting treatment of Municipal Solid Waste at the highest possible tier of the waste hierarchy.

No description of the caveats referred to in Table 13 is provided.

Directive 2001/42/EC is clear in Annex I that the information to be provided in the Environmental Report contains among others:

- (a) An outline of the contents, main objectives of the plan or programme and the relationship with other relevant plans and programmes.
- (b) The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme.
- (e) The environmental protection objectives, established at international, community or Member State level, which are relevant to the plan or programme and the way in those objectives and any environmental considerations have been taken into account during its preparation.

Despite this in the Environmental Report on the Section 60 Cap on Incineration:

- There is a failure to provide a proper outline of the plan and contents. As is stated in Section 2.0 of the Environmental Report on the Section 60 Policy Direction; *the Government is committed to introducing Mechanical and Biological Treatment (MBT) as one of a range of technologies to be utilised.* No description of this technology and its environmental impacts was provided. Furthermore the first objective of the Proposed Determination is to ensure that; *incineration capacity does not reach a level such that waste is drawn to incineration which could have been dealt with by prevention, reuse, recycling, composting/AD of source segregated biowaste, MBT or other methods higher up the waste hierarchy.* No evaluation of the waste hierarchy was completed in the Environmental Report, indeed it is stated that MBT is higher up the hierarchy, this is certainly not the case according to the principles of the Waste Framework Directive, see next Section. Furthermore no mention of the ***technical feasibility and economic viability*** of the proposed methods in the Proposed Determination were provided.
- In Section 3 of the Environmental Report: “Alternative Policy Options to be considered” and Section 6.5 on Evolution of the Environment, no attempt to provide a quantified assessment of the likely evolution of the current state of the environment without the implementation of proposed Section 60 Cap is provided.
- The Report does not provide a description of the environmental protection objectives established in the Waste Framework Directive 2008/98/EC and the how they have been taken into account during the preparation of the Section 60 cap and the Environmental Report supporting it.

Furthermore Directive 2001/77/EC on the promotion of electricity from renewable energy sources in the internal electricity market identifies ten renewable non-fossil energy sources, which includes biomass. Biomass is defined in the Directive as:

- The biodegradable fraction of products, waste and residues from agriculture (including vegetal and animal substances), forestry

and related industries, as well as the biodegradable fraction of industrial and municipal waste.

European Environment Agency Report on "Diverting Waste from Landfill"

As the above reports states with regard to other EU Instruments:

- The Renewable Energy Directive (2001/77/EC) obliges EU Member States to set national indicative targets for the amount of gross electricity consumption to be supplied from renewable sources by 2010. Because incineration of biodegradable municipal waste with energy recovery is considered a renewable energy source, the directive provides an additional incentive to divert biodegradable waste from landfill.

This EU Directive is of course highly relevant to the proposed Section 60 Cap on Incineration, yet it is not mentioned in the Environmental Report produced by Eunomia. It is worth pointing out that the heat and power output of 77 municipal incinerators in Germany is equivalent to an additional annual reduction of almost 4 million tonnes of carbon dioxide equivalent, equal to the emissions of about 1.6 million cars. This comes from the fact that 50% of municipal waste is of biological origin and the combustion of this in a municipal incineration plant can be seen as climate neutral, i.e. renewable. From a financial perspective, the heat and power output of the German incinerators is also of significance, being sufficient to provide the energy needs of a large city, such as Berlin. German recycling rates at 62% are the second highest in the EU, only Austria at 64% reporting higher values.

3. THE WASTE HIERARCHY AND THE ROLE OF MECHANICAL BIOLOGICAL TREATMENT (MBT)

Mechanical / Biological Treatment (MBT) systems are seen as the 'Green' solution. Volume is reduced through composting (rotting) and the material is mechanically sorted to remove various fractions, such as plastics, bottles, etc. Admittedly it does bring a stabilisation and minimisation of the risk potential, together with a significant weight and volume reduction through biological decomposition, which could count towards the diversion of biodegradable waste from landfill. The European Environment Agency report highlighted above, states with regard to MBT in Section 10.5.4:

- "Mechanical-biological treatment (MBT) is usually used to treat mixed municipal waste. Materials suited for incineration or recycling are separated and biological treatment is then used to reduce the volume and organic content of the remaining fraction. The quality of the biologically treated waste fraction is usually poor and therefore it is landfilled or used as low quality compost, e.g. as landfill cover".

Not only does MBT not provide a proper treatment process for the waste, but there is no energy gained in the process. It's also highly unattractive from the perspective of odours and biological spores (human health). Even as far back as 1999 the Swiss Environment Agency (BUWAL) was stating:

- "The problem is that the fractions obtained are generally of poor quality which makes their recycling somewhat difficult. The compost, for instance can often not be used for agricultural production. The combustible fraction is rarely of good quality. Its incineration in cement works or industrial boilers is, therefore, rarely possible. In addition, working conditions on sorting lines (industrial sorting can never become totally automatic) presents health and ethical problems. Finally, however well the sorting is carried out, there always remains a fraction (or residue), frequently highly polluted, which needs to be incinerated or landfilled".

There are no MBT plants in Switzerland.

JASPERS is the Joint Assistance to Support Projects in European Regions, the partners being the European Commission, EIB, EBRD and KfW. They have produced a report in March 2010 by their Solid Waste and Energy Division on Mechanical Biological Treatment Plants [(1)]. This report further clarifies that:

- "Under the assumption that recyclables could be extracted from a mixed waste stream it could be argued that MBT is an alternative option to establishing separate collection systems for recyclable materials. However, experience tells us on the one hand that only a limited portion of the recyclables present in a mixed waste stream not subject to separate collection could be

[1] http://www.jaspers-europa-info.org/attachments/117_StaffWorkingPapers-MBT.pdf

extracted in an MBT, and on the other hand that the quality of such recyclables would be of an inferior quality to recyclables collected in separate collection systems. From material recycling point of view, MBTs should therefore only be viewed as a complement to separate collection systems, aiming at retrieving recyclable materials remaining in the residual waste stream after separate collection. Since all EU countries have to meet demanding recycling targets for paper, glass, metal, plastic, etc, upstream separate collection and recycling is an important first step that can be complemented, but not replaced by MBTs".

The JASPERS report is clear in that MBT is only a pre-treatment method requiring handling / disposal of outputs and residues. There is limited / restricted market for potential outputs and a potentially additionally high cost for handling of the outputs. There is a limited reduction in mass / volume of waste outputs to be landfilled and it is difficult to reduce / handle volatile emissions / odours.

In a nutshell then, if we have a properly developed collection system for recyclable materials, which is specified in the Waste Framework Directive, what is MBT providing for the residual waste? While the composting process is stabilising and reducing the volume of the organic fraction, there are essentially two outputs; a combustible fraction, which goes to incineration or co-incineration and a low quality compost, which is suitable for little else than landfill.

The Directive on Strategic Environmental Assessment (2001/42/EC) is clear in Annex I that the Environmental Report must include:

- (f) "The likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors".

With regard to human health, this is also clearly part of the Waste Framework Directive (2008/98/EC) and as highlighted in the previous section forms part of the waste hierarchy. Indeed Article 13 of this Directive clearly states that:

- "Member States shall take the necessary measures to ensure that waste management is carried out without endangering human health, without harming the environment and, in particular:
  (a) Without risk to water, air, soil, plants or animals;
  (b) Without causing a nuisance through noise or odours; and
  (c) Without adversely affecting the countryside or places of special interest".

The Framework Directive on Safety 89/391/EEC has been followed by twenty two Individual Directives (or Daughter Directives), which elaborate on specific details and requirements related to certain sectors or activities. Directive 2000/54/EC is one such Individual Directive on the protection of workers from risks related to exposure to biological agents at work. Biological agents are classified into four risk groups, according to their level of risk of infection:

1. Group 1 biological agent means one that is unlikely to cause human disease.
2. Group 2 biological agent means one that can cause human disease and might be a hazard to workers; it is unlikely to spread to the community; there is usually effective prophylaxis or treatment available.
3. Group 3 biological agent means one that can cause severe human disease and present a serious hazard to workers; it may present a risk of spreading to the community, but there is usually effective prophylaxis or treatment available.
4. Group 4 biological agent means one that cause severe human disease and is a serious hazard to workers; it may present a high risk of spreading to the community; there is usually no effective prophlaxis or treatment available.

Working with waste fractions that contain organic fractions that are biodegradable is associated with Group 1 and Group 2 biological agents. It is known that there is a significant association between exposure to bioaerosols and health effects, such as bronchitis. In municipal incineration plants the waste is delivered in sealed trucks and is tipped into a sealed bunker system prior to combustion. The bunker and the truck unloading area are kept under negative pressure, with the air drawn into the furnace chamber. However, in composting and MBT plants the waste is subject to open handling and a rotting process, which generates and releases bioaersols.

Studies have shown that employees from workplaces in waste processing, which have bioaerosol contamination, suffer from more frequent complaints of the upper respiratory tract and the conjunctiva and also more frequently suffered from eye and throat inflammations than a control group without this contamination. Occupational health studies have shown a dose-effect relationship between the concentrations of moulds and bioaerosols in the air and the occurrence of toxic related symptoms. A number of Member States have therefore established work place concentration limits for such moulds and bioaerosols.

In German a series of technical regulations relating to biological agents (TRBA) has been prepared, these implement the Directive on Biological Agents and including one on waste handling and sorting plants [(2)]. This states clearly that:

- "Fundamentally the operating process is to be designed, such that in areas where hazards through biological agents occur, e.g. delivery, material preparation, composting and post composting, that no permanent working positions arise. With occasional working in these areas, suitable personal protective equipment (*breathing protection, such as a particle filter*) is to be worn".

Indeed with regard to the organisational measures related to operation of composting systems it is stated that:

- "The turning over of the composting materials should be implemented as much as possible in still wind conditions, such

[2] Available in German at: http://www.baua.de/cln_135/de/Themen-von-A-Z/Biologische-Arbeitsstoffe/TRBA/TRBA-214.html

that the biological agents, which are thereby released, cannot lead to contamination of the personnel in other working areas".

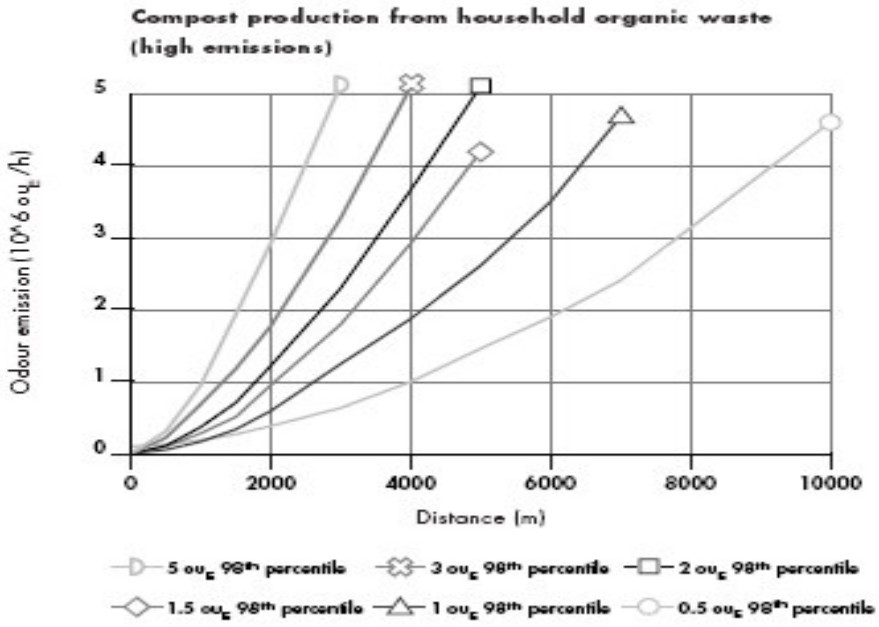
Elevated concentrations of bioaerosols have been widely reported in the literature at distances beyond 200 m from composting plants. The German Institute of Worker Protection (BGIA) published in 2009 the results an overview of 1,1,72 measurements of bioaerosol concentrations in ambient air. Note such concentrations vary due to geographical and climatic conditions. The experience with the health of the population in the vicinity of MBT and composting plants is still under investigation. In one plant in Hessen in Germany, which had had high ambient concentrations of moulds and bioaerosols, the same health problems as have been experienced with the workforce were encountered in the surrounding population. Normally much lower concentrations are found in the vicinity of composting plants, such that allergy problems only arise with sensitised people when the concentrations are elevated. Where the composting plants result in low bioaersol emissions, no health related problems can be determined in the surrounding inhabitants.

There is also a very significant impact relating to odour associated with MBT and composting. As the JASPER report states:

- "Since a MBT facility handles and treats a waste stream containing kitchen waste there is always a need to consider and manage volatile emissions / odours generated in the different processes. Location at sufficient distances from inhabited areas is a first and important measure".

Odours do not generally give rise to direct physical health effects, but they are a source of extreme annoyance and are therefore related to psychological health. Considerable work has been done in the Netherlands on odour nuisances, as this region is characterised by its dense population and prevalence of both industry and intensive livestock farming. The graph below shows the considerable distances that are required in order to separate such waste facilities from the surrounding population. This has a huge significance in terms of land use planning.

Figure 2 **Distances to contour lines representing 0.5, 1.5, 3 and 1.5 ou_E/m^3 as 98th percentile in the case of various odour nuisance levels in the range 0–5 (10^9 ou_E/h)**



Odour data taken from Netherlands' Emissions Guidelines to Air (NeR) for composting plants. The 1.5 OU/m^3 contour is the point at which an odour nuisance occurs. If you live within a kilometre of an MBT plant, be prepared to have it pong.

Annex I is clear that the content of the Environmental Report should include:

- The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme.

The proper implementation of MBT is strongly dependent on land use planning, such that adequate buffer zones can be implemented to protect the population from negative health and odour impacts. As the JASPER report states:

- "Certain MBT facilities might require a land use development plan, where the provisions of Article 3 (5) of the Directive on Strategic Environmental Assessment are relevant".

If we consider the Eunomia report on the Section 60 Cap on Incineration:

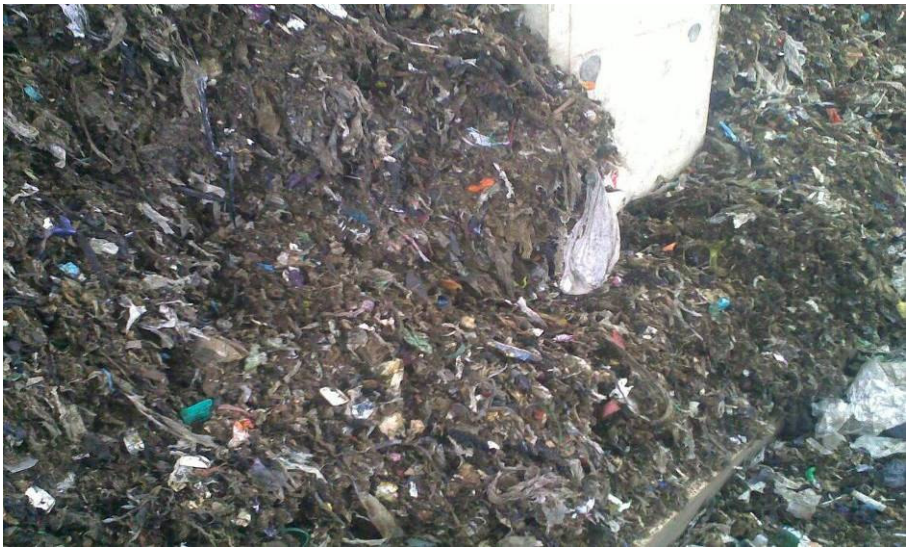
- Section 6.5.8 on Human Health simply does not mention the health impacts related to biological agents due to the operation of MBT and composting facilities, which are inherent to the workforce and potentially also to the surrounding population.
- Section 6.5.4 on Soil simply states: "Conversely increased use of treatment routes such as composting, and subsequent application of the compost to land may bring benefits in terms of

improved soil structure". No mention is made of the fact that (a) the compost from MBT plants is so poor that it is only suitable for landfill cover and (b) composting operations always struggle to produce good quality compost. As the European Environment Agency's report referenced earlier states: "The countries and region studied stressed that if composting is to play a role in diverting waste from landfill then a well-functioning market for compost is needed. This in turn necessitates that the products of biological treatment of biowaste are of good quality. This report finds that the quality of the compost derived from separately collected biodegradable waste is not always sufficient".

- No mention of the impact of odours is made, such as in Section 6.5.2 on air. Indeed in A.5.1.2 odours is addressed only in the context that it was an omission from the analysis.
- In Section A.7.2 on Open Air Windrow Composting of Waste it is stated that: "It is assumed within the current study that appropriate siting and management of the composting facility will result in negligible impacts associated with the emission of bioaerosols". No mention is made of the critical necessity to incorporate MBT and Composting facilities into proper land use planning guidelines, which certainly falls with the scope of Sections (a) and (g) of Annex I of the Directive on Strategic Environmental Assessment 2001/42/EC.

However, by far the greatest failing of the Environmental Report on the proposed Section 60 Cap on Incineration is that it is clear in that the use of MBT is further up the waste hierarchy than incineration with energy recovery. This is false. Incineration of non-separated waste is simply not allowed under EU and National Legislation. Indeed Directive 2001/77/EC on the promotion of electricity from renewable energy sources is clear in that; "The incineration of non-separated municipal waste should not be promoted under a future support system for renewable energy sources, if such promotion were to undermine the hierarchy". Diverting residual waste remaining after practical levels of recycling have already been implemented from incineration to MBT is only serving to pre-treat it so that the resulting outputs only go to incineration or landfill cover. Furthermore there are associated health impacts, odour impacts and a loss in the potential to recover energy. This step is clearly not further up the hierarchy as defined in Article 4 of Directive 2008/98/EC.

In fact the proposed policy is not based on EU Environmental Legislation and involves disseminating false information on the environment to the Irish public:



Compost produced by an MBT plant. On the 23rd February 2010 the Irish Independent reported on Minister Gormley turning the sod for Ireland's first MBT plant in Navan. "It will treat 250,000 tonnes of municipal waste into a coal substitute for cement production and compost for agricultural use. Mr Gormley said the plant was an "outstanding example" of the type of environmentally sustainable development he wants to bring in".

4. ASH RESIDUES

About 20% of the mass fraction of municipal waste that goes to a municipal waste incinerator ends up as bottom ash, which is classified as non-hazardous. About 1 to 2% of the mass fraction of waste is fly ash, which is classified as hazardous. In realty the incinerator acts as a 'separator'. Municipal waste contains hazardous fractions, such as used nickel cadmium batteries. These hazardous components then end up in the fly ash. If an alternative process was utilised, such as MBT, there would still be the same hazardous fractions in the inputs and these would be reflected in the outputs.

Unfortunately the Eunomia Environmental Report fails to address this. Instead there is a concerted effort made to convince the reader that bottom ash from incineration is hazardous and the resulting environmental impacts are significant, in particular in Section 7.9.3.

Bottom ash from municipal incinerators has been extensively investigated in other Member States, in particular the German LAGA-Mitteilung 19 Merkblatt über die Entsorgung von Abfällen aus Verbrennungsanlagen für Siedlungsabfälle (German Authorities' Standard for the disposal of waste from municipal incinerators). Through a combination of ash ageing, metal separation and controlling the inputs, such as lead, in the municipal waste, these values are being maintained. Indeed much work has been completed in Europe on separate collection systems, in particular for hazardous materials; this is even mentioned in page 18 of the Eunomia Environmental Report. The resulting bottom ash meeting the German LAGA standards is suitable for use as a construction material in road building with a specific code developed for this purpose (Merkblatt über die Verwendung von Hausmüllverbrennungsasche im Straßenbau (M

HMVA)). See also Section 3.3 on the German Federal Environment Agencies position paper on Municipal Waste Incineration [(3)].

It is clear that as a minimum an Environmental Report according to Directive 2001/42/EC has to address relevant alternatives. Nowhere is the successful experience with bottom ash in other Member States presented in the document. Indeed some of the statements made are highly dubious, such as quoting an unnamed “official from the Environment Agency”. This certainly is not the official position of the UK Environment Agency.

Pat Swords BE CEng FIChemE CEnv MIEMA

10 Hillcourt Rd

Glenageary

Co. Dublin

Biography: Pat Swords is a Fellow of the Institute of Chemical Engineers and a Chartered Environmentalist. Since graduation from University College Dublin in 1986 Pat has worked in developing the high technology manufacturing industry in Ireland. His work experience has also included projects in over a dozen other countries throughout Europe and North America. Since 1999 he has worked extensively on EU Technical Aid Projects in Central and Eastern Europe helping to implement EU Industrial Pollution Control and Control of Major Accident Hazards legislation.

[3] http://www.umweltdaten.de/publikationen/fpdf-l/3872.pdf