Friends of the Earth
Cyfeillion y Ddaear

FoE Cardiff
South-East Wales FOE Waste Group

OBJECTIONS TO APPLICATION 08 / 2816
(PROPOSAL OF VIRIDOR WASTE MANAGEMENT TO BUILD AN INCINERATOR IN CARDIFF BAY)

This objection is from both the following Friends of the Earth (FOE) groups:
(1) Cardiff FOE Group (2) The South-East Wales FOE Waste Group

The Cardiff group is one of over twenty local FOE groups in Wales working with FOE Cymru for better environmental solutions. The South East Wales Friends of the Earth (SEW FOE) Waste Group was formed in August 2007 to work on waste issues and policy affecting South East Wales. The group is made up of members of Cardiff FOE, Abergavenny & Crickhowell FOE, Chepstow FOE and Barry FOE.

In the light of the large size of the Environmental Statement and the range of technical issues covered we are seeking advice from other experts and reserve the right to make further submissions and seek further information from the applicants at a later stage.

The grounds for objection are:

1. **The proposed incinerator will, during the long period of its contract, contravene the requirements laid down in the Waste Hierarchy to**
   - **secure every possible recovery of materials by re-use, recycling or composting before burning;**
   - **obtain the minimum efficiency standards needed to qualify as energy recovery.**
2. **The proposed incinerator is not demonstrated to be a Best Practicable Environmental Option, particularly with respect to climate change impact;**
3. **There is justifiable Public Concern that the proposed incinerator will constitute a health risk because hazardous substances produced, for example ultra-fine particle emissions from the stack, are not monitored or controlled;**
4. **Pollution produced by the proposed incinerator would potentially damage the Severn Estuary Special Protection Area (which is also a Ramsar site and possible Special Area of Conservation);**
5. **Non compliance with TAN 21 concerning minimisation of transport movements and the Proximity Principle.**
6. **Pre-application public consultations were not well publicised or attended, contrary to requirements for effective involvement of the public at an early stage – especially with a proposal likely to raise strong public concerns.**

Objection 1: Non-compliance with Waste Hierarchy

We object to the application on the grounds that the proposed incinerator will, during the long period of its contract, contravene the requirements laid down in the Waste Hierarchy to:

- **secure every possible recovery of materials by re-use, recycling or composting before burning;**
- **obtain the minimum efficiency standards needed to qualify as energy recovery.**

1.1 POLICY CONTEXT

1.1.1 TAN 21 identifies the Waste Hierarchy as indicating best practice in waste management: *"The UK Government and the National Assembly for Wales subscribe to the waste hierarchy as a general guide .....**it is one of the central pillars to advise decisions on waste management options**."* (Technical Advice Note 21, Waste, 2001, Section 3.5, Welsh Assembly Government).

The New EU Waste Directive 2008/98/EC confirms this principle and restates the Waste Hierarchy as in Figure 1 below. Article 4 in the Directive states that the waste hierarchy shall apply as an order of priority in waste management legislation and policy. The Directive came into effect in December 2008.

1.1.2 Wise about Waste: The National Waste Strategy for Wales (2002) says that ***'energy from waste' is only to be resorted to when all possible materials recovery has already taken place.*** It states as one of its overarching objectives "to make Wales a model for sustainable waste management including maximising the use of unavoidable waste as a resource and minimising where practicable the use of energy from waste and landfill***".*** This objective is restated in The Regional Waste Plan 1st Review Recommended Draft (March 2008), Non-Technical Summary, Section 26.

Future Directions for Municipal Waste Management in Wales (2007) (discussion paper under consultation in connection with revised National Waste Strategy) identifies Recycling as ***"the preferred way to manage unavoidable waste."***

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PREVENTION

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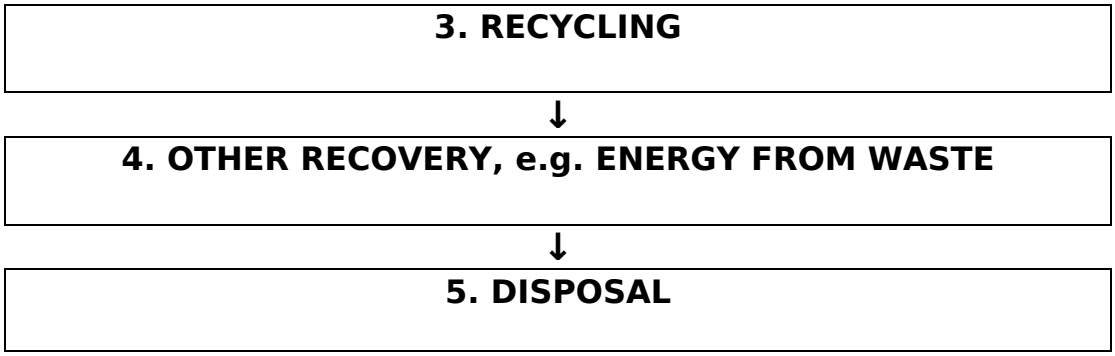

Figure 1: The Waste Hierarchy.
(TAN 21, modified by the new Waste Directive 2008/98/EC)

1.1.3 TAN 21 agrees that Composting and Recycling has precedence over Recovery of Energy from Waste. "Recovery of raw materials can be achieved by recycling materials or composting and every possible opportunity should be provided to maximise such recovery to meet the demanding EU targets" (TAN 21, Section 3.8); and that "Energy stored in waste resources is the next option in the waste hierarchy. ***Where recovery of materials is not possible, the waste resource can be used to recover energy."*** (TAN 21, Section 3.9).

Article 10 of the Waste Directive 2008/98/EC requires member states to take the necessary measures to ensure that waste undergoes recovery operations in accordance with Articles 4 and 13.2, [and] where necessary, if technically, environmentally and economically practicable, waste shall be collected separately and shall not be mixed with other waste or other material with different properties.

1.2 JUSTIFICATION OF OBJECTION

1.2.1 Policies in Section 1 state that Recovery of Energy from Waste (Stage 4 of the Hierarchy) should only be resorted to where further recovery of materials by recycling or composting is not possible. This section will demonstrate that the proposed incinerator would fail to meet this condition.

1.2.2 prejudicing recycling

1.2.2.1 On the balance of probabilities, Cardiff and the other LAs would strive less hard to achieve a rapid increase in their rates of recycling and composting if the 'easy solution' was available of an incinerator.

Although supporters of incineration deny any such connection between incineration and restraints on recycling / composting, government statements clearly indicate it can happen. Future Directions for Municipal Waste Management in Wales suggests capping incineration rates at 30%, and warns that "***there is a danger that initially higher [than 30%] levels of energy from waste will subsequently prove difficult to reduce, thus potentially crowding out increases in recycling.***[1] DEFRA has also warned that "care must be taken to ensure that [incinerator] contracts are sensitively designed to avoid 'crowding out' recycling." [2]

1.2.2.2 Examples of the negative effect of incineration on composting and recycling rates include:

•Regional data for household waste from **Denmark** in 2005 [3] shows that 67% of total waste arisings were recycled in 2005, an increase from 2004. However, only 18% of domestic waste was recycled, with 81% incinerated and about 1% land-filled, and the report admits that "too much domestic waste is still being incinerated and land-filled relative to the targets, and too little recycled". Also, regional data for household waste clearly shows that regions with higher incineration have lower recycling whereas regions with lower incineration do more recycling:

Region	Recycling	Incineration	Landfill
Hovedstaden	21%	77%	2%
Nordjyllnad	29%	63%	8%
Sjælland	31%	59%	10%
Midtjylland	40%	53%	7%
Syddanmark	41%	52%	6%

Figure 2. Recycling and Incineration data from Denmark 2005.

•Cases in the UK can be quoted where Councils locked into long contracts to supply minimum volumes of waste to incinerators have experienced an adverse effect on recycling rates:

1) In 1995, Cleveland County Council signed a contract to supply waste for incineration. A 12,000 tonnes 'shortfall' in the first year led to penalties of £147,000. The Associate Director of Environmental Services at Stockton Borough Council was quoted as saying "essentially we are into waste maximisation… constrained from doing even a modest amount of recycling." [4]

2) It was reported in the Guardian in 2006 that East Sussex County Council was "so worried it may not be able to fulfil its contract that it has now capped Lewes and Wealden's recycling levels - effectively penalising them if they recycle more than about 30% of their waste". [Guardian newspaper, Wednesday 9th August 2006.]

3) "Project Integra" in Hampshire has three new incinerators (built since 2003). The majority of local authorities in Hampshire are now failing to meet their recycling targets, with incinerators absorbing virtually all residual waste in the region. In 2006, it was reported that Project Integra contractor Veolia was topping up its Hampshire incinerators with recyclables from household waste recycling centres to help meet shortfalls in intake of "black bag" household waste. "We do take material from household waste recycling centres if there is a shortfall of black bag waste" admitted Project Integra Director, Steve Read.[5]

1.2.2.3 As seen in section 1.2.2.1, DEFRA advises that such conflicts can be avoided by ensuring "that [incinerator] contracts are sensitively designed to avoid 'crowding out' recycling." Examination of the Viridor application, however, reveal several ways in which the plant proposal would undermine recycling / composting rates:

1) Viridor overestimate future waste arisings, with the result that more waste would be taken in and burnt than necessary. Figure 6.2 in their Environmental Statement gives a figure of 481,160 tonnes for MSW arisings in the Prosiect Gwyrdd Local Authority areas in the year 2006 / 7. Section 6.7 then anticipates a total of 545,000 MSW arisings in 2013. That represents an increase of 63,840 tonnes per annum or 13% over the period, a growth that they say was based upon estimates received from the five Prosiect Gwyrdd local authorities. However, waste data showed a decline in total household waste for the 12 months from Sept 07 to Sept 08 of 1.5% for Cardiff and 3.41% for all-Wales, and there is every reason to expect this decline to continue with government measures to secure improvements in Waste Prevention (highest level of the Waste Hierarchy).
2) Secondly, Viridor, following Welsh Assembly guidance, calculate their waste intake as 30% of MSW waste arisings, which assumes a 70% recycling / composting rate being achieved. But what if, during the course of the long (typically 25-year) incineration contract, the recycling / composting rate was able to exceed 70%? [6] Any such increase of recycling / composting over 70% would be blocked by the incinerator's contract demanding a guaranteed minimum intake of 30% of waste. Alternatively, the plant would have to take more commercial and industrial waste, which if brought in from a wider region would be contrary to the Proximity Principle.

3) Thirdly, in the perhaps more likely eventuality that the Prosiect Gwyrdd authorities would <u>not</u> reach the high MSW recycling / composting targets, or take longer doing so, the proposed incinerator provides a ready escape route:
   - Aided by the inflated estimates of growth in waste arisings, Viridor would be able to take in and burn the MSW waste that hadn't been recycled / composted. Furthermore, if the 175,000 tonnes of MSW and 175,000 tonnes of commercial & industrial waste is merely a notional 50% / 50% split, the plant could at any time take in more of MSW and less of commercial & industrial waste.
   - This would be particularly likely to happen in the early years of the contract when the 70% recycling / composting rate may not be immediately achievable. 'Future Directions' (2007) suggests using 'a higher proportion of landfill in the earlier years to fill the gap not filled by recycling'. But Cardiff, at least, may not have this possibility, having abandoned its search for new landfill in favour of an 'energy from waste' solution [7] – i.e. its excess waste would be burnt in Viridor's incinerator.

4) Fourthly, the plant would produce large quantities of bottom ash, estimated by Viridor at approximately 25% of input material and 75,000 tonnes per annum (Supporting Statement, section 3). It assumes that substantial use will be found for of it in the building and road construction industry, and counts this as "recycling". We are sceptical of the claim, because in the UK at present only about a half finds such use; [8] thus much will have to landfilled.[9] But however much of the 75,000 tonnes per annum Viridor can get rid of in this way, if allowed to qualify as recycling it would take away a corresponding need to recover other materials, and so in effect lower recycling and composting targets to 60 / 65%. The UK government excludes incinerator bottom ash from "recycling" and this should be the position in Wales. [10]

1.2.3 Recycling at the plant

Viridor state throughout their application that they will only take in materials that cannot be recycled / composted – for example in their Supporting Statement (section 3) "the facility will manage municipal waste which can not be segregated for recycling and composting". But apart from the negative influences on recycling described in Section 1.2.2 above, ***the Viridor plant would have no facility to inspect / test incoming waste for presence of recyclables and would itself carry out no recovery of materials prior to combustion***. Apart from some low-grade metals recovered from the bottom ash following combustion it would not recover any recyclables at all – unlike MBT or Autoclave plants, for instance. Viridor's claim to be carrying out recycling in fact almost entirely rests on their argument that finding a use for some of its bottom ash would count as such.

1.2.4 Energy Recovery Status

Our submission in Section 1 so far has demonstrated that the proposed plant would not meet the condition of the Waste Hierarchy that Recovery of Energy from Waste (Stage 4 of the Hierarchy) should only be resorted to where further recovery of materials by recycling or composting is not possible. However, the Viridor application gives no proof that it would meet the 65% efficiency criteria to qualify for "energy recovery" under the conditions set out in Annex II of the Waste Directive 2008/98/EC (see Section 2.1.4 and 2.2.1.2), and is exceedingly unlikely to do so. Hence, unable to qualify as Energy Recovery (stage 4) it would be classified as Disposal (stage 5 of the Hierarchy.)

1.2.5 *We object to the application on the grounds that the proposed incinerator will, during the long period of its contract, contravene the requirements laid down in the Waste Hierarchy to:*

- ***secure every possible recovery of materials by re-use, recycling or composting before burning;***
- ***obtain the minimum efficiency standards needed to qualify as energy recovery.***

Notes:

1. Future Direction of Municipal Waste Management in Wales – A Paper for Discussion (2007).

2. DEFRA, *Waste Strategy 2000,* Part one, section 2.23.

3. http://www2.mst.dk/common/Udgivramme/Frame.asp? http://www2.mst.dk/Udgiv/publications/2007/978-87-7052-581-7/html/helepubl_eng.htm .

4. ENDS Report 1996: *Emission deadline heralds new era in municipal incineration*.

5. News item in: www.letsrecycle.com/info/waste_management/news.jsp?story=5549.

6. The WLGA report by Eunomia (Enviros Consulting, Oct. 2008) concludes 80% recycling / recovery is feasible. Cardiff could be aiming at 90% with future technology.

7. Cardiff Council carried out studies in 2006 and 2007 to identify and assess potential landfill sites within the City, but decided in an Executive Business Meeting of 5th July 2007 that *"at present no further technical work on investigating potential new landfill sites is advanced. The reasons for this are:*
    - *The analysis* [of potential sites] *concludes that within the required timescales there is no realistic prospect of identifying a new site suitable for developing and operating landfill within the City boundaries. Establishing a new landfill site can take 5-10 years.*
    - *It is recommended that Prosiect Gwyrdd, discussed below, is taken forward to deliver the alternative residual waste treatment solution by 2013; but the position be kept under review depending how Prosiect Gwyrdd progresses ……"*
8. 40% of incinerator bottom ash was thus used in 2002: *Solid Residues from Municipal Waste Incinerators in England and Wales.* Report of the Environmental Agency (2002).

9. Assuming that Viridor would only get 50% of its bottom ash accepted by the construction industry, over 35,000 tonnes per annum would have to be sent to landfill.

10. The UK Government has decided to maintain its position on incinerator bottom ash, that is, incinerator residues and its components such as glass and metals are excluded for the purposes of calculating waste performance indicators. The Government's aim is to encourage a movement up the waste hierarchy with a view to achieving a more sustainable approach to waste management, including encouraging the segregation and collection of the various components of household waste for recovery. The recovery of materials from incinerator residues is not consistent with these aims. www.defra.gov.uk/environment/localgovindicators/documents/laa/laa-qanda. Pdf>:

Objection 2: Not the Best Environmental Option

We object to the application on grounds that the proposed incinerator is not demonstrated to be the Best Practicable Environmental Option, particularly with respect to climate change impact.

2.1 POLICY CONTEXT

2.1.1 TAN 21 Waste (2001), Annex H, sets out ways by which Local Authorities can establish, in determining a planning application for a given waste facility, whether it represents the "Best Practicable Environmental Option" (BPEO).

The BPEO assessment consists of a twelve-stage process:
•Stage 2 lists the "national criteria that have been defined for waste management decision-making in Wales". The listing includes 'economic', 'social' and 'practicability' as well as 'environmental' headings, and the environmental criteria include such diverse considerations as 'cultural heritage' and 'local amenity' alongside 'air, land and aquatic environment' and 'global climate change.';

•Stage 3 "should define an initial range of options for future management of household and commercial waste to form the starting point for developing a shortlist of preferred options for waste management." ;
•Stage 4 "should appraise the options defined in Stage 3 against the decision criteria in Stage 2.";
•Stage 5 "should use the appraisal results (Stage 4) to select two or three household and commercial waste options from the initial set which perform best on balance across the Decision Criteria."

It admits that "assessment of BPEO is not straightforward and is evolving through ongoing research".

2.1.2 The South East Wales Regional Waste Plan 1st Review (Recommended Draft, *Foreword & Non-Technical Summary March 2008)* recommends a short-list of seven options, as listed in Figure 3.

The RWP Technology Strategy

High source segregated recycling and composting levels with all remaining residual wastes, where possible, being managed by:

1. *high levels of Pyrolysis (sub-Option 2a);*
2. *high levels of Incineration with energy recovery (sub-Option 2c);*
3. *MBT followed by Pyrolysis (sub-Option 3a);*
4. *MBT followed by Gasification (sub-Option 3b);*
5. *MBT followed by Incineration with energy recovery (sub-Option 3c);*
6. *MBT followed by RDF to off-site energy use (sub-Option 3d);*
7. *Autoclave followed by RDF to off-site energy use (sub-Option 4d)*

(RDF – Refuse Derived Fuel)

Figure 3. The seven short-listed options listed by the South East Wales Regional Waste Plan.

2.1.3 European, UK and Wales policies are increasingly highlighting ***'impact on Climate Change'*** as a vital factor in considering new developments.
•A report "Building a Low Carbon Economy" published by the new UK Committee on Climate Change in December 2008 identified the need for waste technologies ***that will reduce greenhouse gas emissions in the UK***.
•The South East Wales Regional Waste Plan lists among its sustainability objectives:

Sustainability Objectives	**Sustainability Indicators**
To reduce greenhouse gas emissions	Greenhouse gases emitted

•The Cardiff LDP Preferred Strategy (2007) identifies the need to "respond to urgent global problems like climate change" (Section 4.9), and to "reduce emissions of greenhouse gases that cause climate change" (Section 4.10).

2.1.4 Chapter V of the EU Waste Directive (2008), Section 1, Article 19, states: "It shall be a condition of any permit covering energy recovery that the recovery of energy is to take place with a high level of energy efficiency".

Annex II 'Recovery Operations', states clearly that the energy efficiency of facilities dedicated to processing municipal sold waste should be at least 60% for installations in operation and permitted in accordance with applicable Community legislation before 1 January 2009, [and] ***65% for installations permitted after 31 December 2008".***

2.2 JUSTIFICATION OF OBJECTION

2.2.1 Climate Change Impact

2.2.1.1 Waste incinerators typically emit between 0.7 and 1.3 tonnes of CO2 per tonne of waste, depending on waste composition.[1] For example the incinerator in Stoke, which has a contract with Staffordshire County Council to burn 180,000 tonnes of waste per year, is calculated to have released 209,000 tonnes of CO2 in 2006. The proposed incinerator in Cardiff would have over twice the capacity and thus could release over 400,000 tonnes of CO2 per annum.

Hogg (2006) shows that "if energy from waste incineration generates electricity only .....the emissions (of CO2 from fossil carbon) from incinerators are actually greater than those from conventional gas-fired power stations." He adds "the position improves considerably if the incinerator operates in CHP mode, or where it generates heat only at high efficiencies, but in both cases, the performance relative to gas is still only marginally better. It should be noted that in both cases, it is assumed that the majority of heat generated is put to good use, and this has not always proved possible at incinerators outside areas where the demand for heat is much higher (than here), such as in Scandinavia." [2]

2.2.1.2 Viridor aims to supply heat to buildings in the locality of its proposed plant. It states "the amount of heating likely to be generated by the facility is around 70MW" and argues that such a substantial supply of heating in addition to the 30MW electricity generated, by displacing heat energy and electricity that would otherwise be supplied by burning of fossil fuels, would result in a 'positive carbon footprint'.

We question their assumptions on two main grounds:

(1) They will be unable to supply the immense quantity of heat claimed, and hence will not displace the burning of fossil fuels on the scale stated;
(2) Displacement during the contract life of the incinerator will increasingly be of renewable not of fossil-fuel sourced energy.

Viridor have contacted many potential users of heat, but have not apparently agreed any contracts. Nor have they indicated in Appendix 7 firm plans of infrastructure, such as construction of heat pipes, a back-up source to relay heat when the incinerator is down, or heat storage to fit diurnal-varying demand, or proposals to cope with large

seasonal variation in demand for heat. The immense supply of heat might only viable with the availability of a major industrial user in the immediate vicinity.

Additionally in its contacts with potential users, Viridor found the following problems (Appendix 7, Environmental Statement):

- that "the outputs which were considered the most viable were those situated within close proximity to the site and which used fairly large amounts of heat, preferably with 24 hour demand" – finding such users in the immediate proximity of the incinerator would not be easy;
- that to relay the heating, it is observed that "the cost of pipeline can be up to £1,000 per metre";
- that "the cost and ease of retro-fitting" was an issue and that "the preferred option is the integration of a CHP scheme into a new development as it is being built";
- that key issues raised by respondents ..... included "the provision of the associated infrastructure, particularly with regard to cost, maintenance and relationship with existing infrastructure".

Viridor's mention of "involvement of the public sector to act as a catalyst for implements to the scheme" is transparently a plea for the local authority to help fund its heating programme. It indeed appears very likely that Viridor would be unable to realise its heating plan without facilitation / subsidising by Cardiff Council, which could spend rate-payer's money on reducing carbon footprint much more productively on schemes such as encouraging energy conservation and micro-generation, rather than in aiding a greenhouse-gas emitting incinerator.

2.2.1.3 Viridor should give details in the Environmental Statement of heat-supply agreements it has definitely concluded with clients and demonstrate that these are sufficient in quantity to raise the efficiency of the incinerator to the minimum 65%. (See Section 2.1.4 above). FOE is informed that, apart from Sheffield, few if any incinerators in the UK are in a position to meet these new EU energy efficiency criteria. If Viridor cannot assure Cardiff Council that their incinerator would meet the 65% efficiency required without aid from the Council, it cannot satisfy the Waste Directive Requirement and should not be permitted.

2.2.1.4 The combustion of waste itself produces damaging greenhouse gas emissions. (See Section 2.2.1.1 above). By 2025, approximately the half-way stage of Viridor's proposed incineration contract, Wales aims to be producing 100% of its electricity through renewable sources. Increasingly therefore, the Viridor plant would be "replacing" energy generated from renewable and not fossil fuel sources. Viridor's calculation of net carbon benefit (even if it can supply heat on the scale claimed) would thus be eroded. The incinerator would be a damaging greenhouse gas and high carbon emitter at a time of increasingly critical climate change and escalating carbon costs.

2.2.1.5 The assumption that incineration has a positive climate change impact is given a detailed rebuttal in a Eunomia Research & Consulting and EnviroCentre study (2008),[3] which finds that:

- "Scenarios using incineration were amongst the poorest performing" (See Table

in Figure 4, below) "and were considerably worse than the best performers. This is largely due to low levels of recycling along with significant emissions from wholesale combustion of plastics, which negates the benefits of emission savings from energy generation." (Op. cit., Summary, Section 2.1.1.)

•"In terms of greenhouse gas emissions, waste management scenarios using mechanical biological treatment (followed by anaerobic digestion) and gasification (followed by autoclave), coupled with hydrogen fuel cell technologies were the best performing. Pending the commercialisation of hydrogen fuel cells technologies, scenarios using MBT, AD and gasification linked to CHP gas engines are the best performing on reducing greenhouse gas emissions." (Op. cit., Summary, Section 3.)

•***"The incineration scenarios modelled were amongst the worst performing on greenhouse gas emissions, with all but one of the scenarios being a net contributor to climate change.*** This could be improved if the burning of plastics no longer takes place and there is provision for good quality combined heat & power." (Op. cit., Summary, Section 3.)

Table A: Ranking of Scenarios under Central Assumptions

Rank	Scenario Number	Scenario Description	Net Externality (£s)
1	11	MBT (AD and maturation) with output to landfill and export of biogas for conversion to H_2 for use in vehicles	4.48
2	21	Plasma gasification (following autoclaving) with export of syngas for conversion to H_2 for use in vehicles and plastics to reprocessing	4.83
3	13	MBT (AD and maturation) with output to landfill and export of biogas to H_2 fuel cell for stationery power generation (CHP)	5.25
4	12	MBT (AD and maturation) with output to landfill and export of biogas to H_2 fuel cell for stationery power generation (electricity only)	5.45
5	5	Gasification (following autoclaving) with export of syngas for conversion to H_2 for use in vehicles and plastics to reprocessing	5.75
6	9	MBT (AD with maturation) with CHP, output sent to landfill and plastics to reprocessing	6.01
7	14	MBT (AD with maturation) with output to landfill and compression of biogas for use in vehicles	6.21

8	10	MBT (AD with maturation) with CHP, output to landfill and plastics sent for pyrolysis to synthetic diesel	6.47
9	20	Plasma gasification (following autoclaving) with export of syngas to H_2 fuel cell for power generation (CHP) and plastics to reprocessing	6.50
10	6	Gasification (following autoclaving) export of syngas to H_2 fuel cell for stationery power generation (CHP) and plastics to reprocessing	6.90
11	15(b)	Gasification (following autoclaving) using a gas engine (CHP) and plastics sent for reprocessing	7.35
12	16b)	Gasification (following autoclaving) using a gas engine (CHP) and plastics sent for pyrolysis to synthetic diesel	7.53
13	17	'Biomass' boiler (following autoclaving) using a steam turbine (CHP) and plastics sent for reprocessing	7.67
14	19	Plasma gasification (following autoclaving) using a gas engine (CHP) and plastics sent for reprocessing	7.98
15	15(a)	Gasification (following autoclaving) using a steam turbine (CHP) and plastics sent for reprocessing	8.38
16	16(a)	Gasification (following autoclaving) using a steam turbine (CHP) and plastics sent for pyrolysis to synthetic diesel	8.57
17	8(b)	Gasification (following MBT biodrying and maturation of rejects) using a gas engine (CHP)	9.01
18	7	MBT (biostabilisation) with output sent to landfill	9.55
19	3	Incineration (with CHP)	10.21
20	8(a)	Gasification (following MBT biodrying and maturation of rejects) using a steam turbine (CHP)	10.71
21	18	Incineration (following MBT biodrying and maturation of rejects) using a steam turbine (electricity only)	10.97
22	2	Incineration (with electricity only)	11.45
23	4	Incineration (with heat only)	11.66
24	1	Landfill (with electricity only)	31.90

Figure 4. Incineration options are found to be the worst performing in climate change impact.

2.2.2 Alternative Technologies

2.2.2.1 In Section 2.1.1 above, we noted that TAN 21 admits that "assessment of BPEO is not straightforward and is evolving through ongoing research" (Annex H**)** and we are entitled to deduce from this that conclusions are uncertain. This is perhaps inevitable given the diversity of criteria employed. Four different headings are listed: 'Environmental', 'Economic', 'Social' and 'Practicability'. Which headings and which criteria within each heading are to be given the most weighting? And what are the assumptions that are to be used in the assessments?

2.2.2.2 Stage 5 of BPEO procedure states that applicants "should use the appraisal results (Stage 4) to select two or three household and commercial waste options from the initial set which perform best on balance across the Decision Criteria." Viridor does not do so. It merely compares the climate change impact of its proposed incinerator with that of landfill. (Sections 6.9 and 17 of their Environmental Statement). As can be seen in Figure 4 above, it is merely comparing what would be a very bad climate change impact alternative with the worst one. [4]

2.2.2.3 If, as Viridor claim, they are relying on the BPEO exercise carried out in the South East Wales Regional Waste Plan Strategy (RWP), which identified a short-list of six technical options, then Viridor should at least compare the environmental performance of its incinerator with some or all of the other six.

We believe, in fact, that Viridor should compare its incineration not with the SEWales RWP but with the technical options listed by Eunomia Research & Consulting and EnviroCentre (2008) as seen in Figure 4 above, which found that "the incineration scenarios modelled were amongst the worst performing on greenhouse gas emissions, with all but one of the scenarios being a net contributor to climate change."

2.2.2.4 The SEWales RWP shortlists incineration as a BPEO. It does so by employing a new WRATE tool of analysis that was being used for the first time and should therefore be assumed to be imperfect and 'evolving'. (See Section 2.2.2.1 above).[5] The RWP offers no explanation of the methodology, or makes explicit the assumptions, which were used in this WRATE analysis. We believe that the assumptions used concerning incineration were false: incinerator efficiencies, referenced to an incinerator at Coventry, took idealized rather actual figures.[6] Thus, the RWP recommendation of 'high levels of incineration' is flawed and – if no further valid supporting data can be supplied – should be withdrawn.

2.2.2.5 Whether, however, one looks at the RWP list in Figure 3 above, or at the Eunomia & EnviroCentre (2008) list in Figure 4, it is evident that there are several residual waste treatment alternatives to incineration [7], many of which would carry out more recycling & composting than the proposed incinerator, would generate "energy from waste" more efficiently and would (according to the Eunomia & EnviroCentre 2008 study) be less damaging with respect to climate change.

2.2.2.6 In December 2008, the 'Building a Low Carbon Economy' report from the newly appointed UK Committee on Climate Change identified Anaerobic Digestion and Mechanical Biological Treatment technologies as having "significant potential" to reduce greenhouse gas emissions in the UK, stressing the need for "decarbonisation of

electricity production." Incineration, as mentioned in section 2.2.1.1 above, unless high levels of efficiency are achieved, is a big emitter of greenhouse gases.

Anaerobic Digestion (AD), used to treat separately collected food-waste or other organic waste streams, has the double benefit of producing 100% renewable energy and a valuable compost. DEFRA and WRAP have concluded that AD has the greatest greenhouse gas reduction benefits for the management of food waste over in-vessel composting and incineration with energy recovery,[8] while a recent study of food-waste anaerobic digestion systems used extensively across Europe indicates that it is "a mature technology that has significant benefits, particularly the production of a renewable fuel / energy." [9]

2.2.2.7 Whatever the choice of residual waste treatment options, there is a need for flexibility – for modular units able to respond to changing future volumes and content of waste by downsizing or adding treatments as the situation requires. New waste management technologies are emerging which are flexible in this way, including Anaerobic Digestion, MBT, Autoclaving, Pyrolysis and Gasification (including Plasma Arc Gasification) . Incineration is not, requiring guaranteed intakes of waste over its contract period (typically 25 years) and an inflexible burn-all treatment. It will therefore not best meet the long-term needs of Cardiff or Prosiect Gwyrdd.

2.2.3 ***We object to the application on the grounds that the proposed incinerator is not demonstrated to be a Best Practicable Environmental Option, particularly with respect to climate change impact***.

Notes:

1. Burnley, S. J. (2007). "The use of chemical composition data in waste management planning - A case study." Waste Management **27**(3): 327-336.

2. Hogg, D. (2006). *A Changing Climate for Energy from Waste.* Eunomia Research and Consulting Ltd, (section. 2.2.0).

3. Eunomia Research & Consulting and EnviroCentre (2008). Greenhouse Gas Impacts of Waste Management Technologies, Report for the Greater London Authority. http://www.london.gov.uk/mayor/environment/waste/climate-change/greenhousegas.jsp

4. Land-fill, if of waste stabilised by Mechanical and Biological Treatment, would in fact have considerably lower greenhouse gas emissions than incineration.

5. The Waste and Resources Assessment Tool for the Environment (WRATE) software tool was developed by the Environment Agency for comparing different management systems and technologies treating Municipal Solid Waste (MSW) over the lifetime of the treatment option. The software was released in 2007 and the review of the RWP was 'the first ever project to be delivered using WRATE (Environment Agency, 2008).'

6. The Coventry default incinerator assumed in WRATE is known to be wrong – instead of the actual heat supply to the Peugeot motor works, it took a fictitious figure. Even with

this fictitious figure, the efficiency comes to 49%, far below the 65% requirement for energy recovery. Apart from such assumptions, the WRATE analysis has the fundamental flaw of ignoring bio-carbon. This is appropriate for Kyoto accounting, but not for real assessments of carbon footprint. The Eunomia study for the GLA follows the IPCC recommendations to take the full carbon (equivalent) emissions into account for the various waste options, to derive the Table in Figure 4 above. This approach is sounder than WRATE and should be preferred.

7. Even back in 2001, TAN 21 referred to "relatively new techniques for energy recovery such as gasification, pyrolysis, anaerobic digestion or fluidised bed combustion, (section 4.4).

8. Environmental Benefits of Recycling, WRAP (2006). www.wrap.org.uk/document.rm?id=2838 AD produces: (1) a biogas some of which can be used to generate energy on-site heating and power, and the remainder exported to the grid and (2) a digestate that could be used as a high-nutrition compost in place of conventional fossil-fuel derived fertilizers.

9. Monson, K.D., et al (2007). *Anaerobic Digestion of Biodegradable Municipal Wastes: A Review.* University of Glamorgan, Pontypridd, Wales. ISBN 978–1-84054–157-1.

Objection 3: Concern over possible health impact

We object to the application on grounds that there is justifiable Public Concern that the proposed incinerator will constitute a health Risk because hazardous substances produced, for example ultra-fine Particle emissions from the stack, are not monitored or controlled.

3.1 POLICY CONTEXT

3.1.1 The EU Waste Directive 2006/12/EC, Article 4, states that "member states should take the necessary measures to ensure that waste is recovered or disposed of without endangering human health".

3.1.2 TAN 21 (2001) states:
- that waste management should "enhance the overall quality of the environment and avoid risks to human health" (Section 1.10);
- that "the key physical environment issues that local planning authorities must consider in the development of their BPEO and their SWMO [include] the minimisation of local air quality impacts (Section 3.18);
- that "reducing hazardous waste is a priority because its treatment, transport and disposal need careful management and demands high level of resources in view of the potential to pollute the environment" (Section 11.4).

3.1.3 The South East Wales Regional Waste Plan 1st Review (Recommended

Draft *Foreword & Non-Technical Summary March 2008)* states that one of its aims is "to minimise adverse impacts on the environment and human health" (Section 5), and includes the following among its sustainability objectives (Section 21):

Sustainability Objective	**Sustainability Indicators**
To minimise adverse impacts on air quality and public health	Emissions which are injurious to public health Emissions contributing to air acidification Dioxin emissions

3.1.4 The Cardiff LDP Preferred Strategy (2007) identifies as an environmental priority of particular relevance to the LDP "to promote sustainable development and a clean environment" (Section 4.9), and as a sustainable development objective "to maintain and improve air quality." (Section 4.10.)

3.2 JUSTIFICATION OF OBJECTION

3.2.1 Modern incinerators are a good deal cleaner than the older ones. Nevertheless, the process of combustion still produces numerous toxic substances harmful to human health – dioxins, for example, that are not present in the waste but are created during the incineration process.

Enough doubt exists over the capacity of incinerators' pollution control systems to reliably prevent the escape into the environment of toxic substances produced during combustion to justifiably constitute grounds for public concern.

3.2.2. While the Environment Agency is responsible for authorisation under pollution control legislation, Local Authorities are responsible for overall waste planning and waste management and should respond to public concern if there should be any doubt about possible risks to human health. TAN 21 states that "the potential issue of toxins ..... from proposed waste management facilities are matters of major public concern. Such matters are normally controlled under pollution control legislation or permit conditions, both the responsibility of the Environment Agency,.... [but] ***air quality issues will normally be raised at the planning stage and can be a material planning consideration*** as well as a pollution control issue." (Section C7).

3.2.3 Toxic emissions into the air

3.2.3.1 Advocates of incineration say that these are negligible and Viridor themselves claim "the emissions from the facility are clean prior to release, preventing pollution to the environment." (Viridor Supporting Statement, Section 3.) But even a modern, 'state-of-the-art' MSW incinerator releases toxic pollutants in its stack gases and residues, some of which (for example dioxins), are not only highly toxic but also persistent and bio-accumulative.

3.2.3.2 Such is the concern over Persistent Organic Pollutants (POPs), including toxic dioxins and furans, that several countries including the UK have signed up to the

Stockholm Convention on Persistent Organic Pollutants. The aim of the convention is to *reduce and eliminate* the production of persistent organic pollutants.

Far from helping to eliminate them, waste incineration *produces* persistent organic pollutants, which are then emitted into the air and water, and are present in incinerator ash. This poses the question whether policies or planning permissions that lead to the creation of more waste incinerators, with contracts for typically 25 years, are (a) legal or (b) within the spirit of the Stockholm Convention.

3.2.3.3 It is true that levels of dioxin emissions have improved with latest incinerators, but there are serious caveats:

- filtering devices age and break down; [1]
- emissions are not tested continuously;
- tests are only typically carried out twice a year;
- they are usually scheduled rather than a spot-check, so that facility engineers can ensure all equipment is in optimum working condition;
- emission levels are neither tested nor controlled during start-up and shutdown;
- only 17 out of a possible 5,100 halogenated dioxins are measured.

Tests for presence of POPS such as dioxins are therefore suspect in both their thoroughness and scope. The House of Commons Environment Select Committee observes: “concern about impacts of emissions from incinerators upon human health" cannot be assuaged or dismissed while "***emissions standards are based on what can be measured and what is technologically achievable, rather than what is safe… Health effects which result from an incinerator's emissions are not yet fully known…...*** .” [House of Commons (2001), *Delivering Sustainable Waste Management.*]

3.2.3.4 In March 2005, the Environment Agency reported that during routine emissions sampling of the Eastcroft Incinerator in Nottinghamshire, the level of dioxins released into the atmosphere were found to exceed their authorised amount by 900 %. Given that dioxins are usually only measured every six months, the question arises whether emissions were nine times higher over the entire six months since the previous test.

It is obvious that unless emissions are monitored continuously, the operator, the regulator and the public are often unaware of breaches that occur. It also means that the public could not be warned at the time of an “incident” to take precautionary measures

De Fré and Wevers (1998) have shown how spot measurements do not give a representative indication of the actual emissions over a period: ***continuous monitoring over a period showed that actual emissions could be 30 to 50 times higher than spot measurements.***[2]

3.2.3.5 Concerning emissions during start-up and shut down of incinerators, Tejima et al (2007) tested a modern Japanese incinerator equipped with better dioxin abatement than UK incinerators. It was found that just a single incinerator start-up released more dioxins to air than operating the incinerator in steady state conditions non-stop for over 2 months. Contamination levels of ash were also increased.[3]

> Dioxin concentrations from municipal waste incinerators in Japan and elsewhere often show low concentrations that comply with legal limits.....However, such data is usually generated under normal steady state operational conditions, and there has been little investigation of releases occurring during start-up and shutdown. ....The present study aimed to examine dioxin emissions of a continuously operated incinerator at start-up and shutdown.....Dioxin concentration at the stack under steady state conditions was a very low level, while those at start-up and shutdown were higher.

Any intention of Viridor to operate discontinuously is particularly worrying on this evidence. Nightly and weekend shutdowns lead to dioxins forming in the flue during the cooling period, which are then emitted on start-up. Such emissions could be 100 times more than during mid-operation. Because the UK regulations ignore start-up and shut-down emissions, the claims that dioxin emissions would be "strictly monitored and controlled" have little value.

3.2.3.6 In May 2004, a DEFRA report on the environmental and health effects of waste management compared figures for emissions of various substances by the various types of waste management operations and found that incineration resulted in the highest emissions of nearly all of the substances including nitrogen oxide, particulate matter, arsenic, hydrogen chloride dioxins and furans as compared with other waste management options. [4]

3.2.3.7 Pollution abatement equipment is designed to capture PM10 particles which are covered by air pollution regulations. Emissions of PM 2.5 fine and ultra fine particulate matter ("nanoparticles") are substantially un-regulated. Nanoparticles produced by the combustion process penetrate through lung tissue into the blood system and organs and are strongly suspected to be a cause of negative health impacts such as cardiovascular disease, pulmonary disease and cancer and of oxidative stress that potentially affects several of the body's biochemical systems. No data on < PM2.5s emissions and capture are given by Viridor in their application.

Cormier et al (2006) warn that fine and nanoparticles escape incinerator stack pollution filtering devices: [5]

> "Combustion of hazardous wastes results in pollution that exists in a gaseous, liquid, and/or solid particle state suspended in air. A crude characterization of suspended pollutants uses the mean diameter of the suspended particles and varies from a few nanometers to several micrometers." .....
>
> "Combustion.....typically generates smaller PM < 2.5 μm in diameter".....
>
> "Nanoparticles are not efficiently captured by air pollution control devices, are transported over long distances, and penetrate deep into the respiratory system, all of which enhance the potential negative health impacts" .....
> "we have ..... found that persistent free radicals are present in combustion-generated fine and ultrafine particulate matter and that these radicals induce DNA damage" .....
> "PM_{10} deposits mainly in the upper respiratory tract and may be cleared by mucociliary actions. $PM_{2.5}$ and $PM_{0.1}$ penetrate the alveolar regions of the lung, where the ultrafine PM rapidly penetrates the epithelium (Oberdorster 2001).

3.2.3.8 A recent study (Aboh, et al. 2007) that looked into a medium-sized city in south-western Sweden, identified their new modern incinerator as the single most significant source of PM2.5s.[6]

Another recent study (Mao, et al. 2007) found that the concentrations of PM2.5 and PM10 in the study area located downwind of the incinerator were significantly higher (between 220% and 700% higher) than the study area upwind of the incinerator. The study indicated that the air had "significant contamination by air pollutants emitted" from a waste incinerator, representing a public health problem for nearby residents, despite the facility being equipped with a modern air pollution control system.[7]

3.2.3.9 ***It is not necessary for us to be able to assert that health damage has indisputably occurred – harm that may be suspected may not be proven or there may be long latency periods. It is enough to have demonstrated:***
(1) that particulate matter, especially $PM_{2.5}$ & $PM_{0.1}$ particles, can escape an incinerator's pollution control equipment;
(2) that such ultra-fine particulate emissions from incinerators are not substantially monitored or regulated in the UK;
(3) that such ultra-fine particulate matter can be carried several miles into populated areas, and
(4) can be hazardous to human health via inhalation or ingestion.

Communities particularly in Cardiff Bay and east and central Cardiff would be at risk.

Public concern is a material planning consideration and has been cited as a reason for planning applications being refused, including applications for incinerators for example one at Kidderminster.[8] And whereas the actual duty of monitoring incinerator air pollution and other outputs falls on the Environment Agency, we have shown that the monitoring concerned at present in the UK lacks thoroughness (e.g. not continuous and not during start-up / shut down) and completeness (e.g. not capturing all air emission toxic substances such as $PM_{2.5}$ & $PM_{0.1}$ particles).

3.2.3.10 The following three studies find correlations between residence near older incinerators and adverse effects on human health:

- Staessen et al (2001) carried out a study of adolescent children who lived near two incinerators. Their findings included: elevated levels of PCBs, dioxins and metabolites of volatile organic compounds in the children's blood; and delayed sexual maturation – delayed breast development in girls being positively correlated with serum concentrations of dioxins and delayed genital development in boys with serum concentrations of PCBs; [9]
- Fabre et al (2008), in an epidemiological study of 2.5 million people in France, found evidence of clusters of cancers among people living in the vicinity of incinerators.[10]
- Bianchi et al (2007) investigated infant mortality in an epidemiology study of approximately 250,000 infants under 1 year of age with residence near incinerators. The study found incinerators with a burning capacity of >50,000 tonnes per annum showed a higher mortality excess compared to municipalities with incinerators of < 50,000 tonnes per annum.[11]

3.2.3.11 A study carried out by Arden Pope, III et al (2009) highlights the danger posed by fine particulate matter whatever its source. Focusing on "PM 2.5" pollution, it found a link between exposure to ambient fine-particulate air pollution and life expectancy in the United States.[12]

3.2.3.12 Such studies show that emissions that do escape are potentially harmful to health. Dioxins have received the most attention, but should be taken as indicative of a wider range of household chemicals and toxic metals emitted by incinerators that include incompletely combusted PCBs and VOCs. Such pollutants will be added to by new consumer chemicals, for example from brominated flame retardants BDE-209 and HBCD which are used in large quantities in the UK for TVs, carpets, upholstery etc.

3.2.4 Hazardous Fly Ash

3.2.4.1 Fly Ash is hazardous waste, due to presence of high alkalinity and toxic substances such as dioxins and heavy metals. According to Viridor, fly ash recovered from the stacks represents about 3% by mass of the waste feedstock – calculated as approximately 10,500 tonnes per annum at Trident Park. (Viridor Supporting Statement. Section 3). This fly ash is classified as hazardous, and is usually disposed of either by transportation to a special hazardous waste tip (the option proposed by Viridor) or by vitrifying it.

3.2.4.2` A recent Dioxin, PCBs and Waste Working Group of IPEN (International Persistent Organic Pollutants Elimination Network) Report demonstrates that waste incineration fly-ash and air pollution control residues contain not only persistent organic pollutants listed under Annex C of the Stockholm Convention (dioxins, PCBs and hexachlorobenzene) but also high levels of other Persistent Organic Pollutants, such as PFOs and BDEs not listed under [the] Stockholm Convention.

3.2.4.3 Since there is not a hazardous waste tip in the region, the toxic fly ash has to be transported outside it, possibly to a site at Wingmore Farm, near Cheltenham in England. Viridor say it will be “handled and stored in fully enclosed systems on the facility” so that “the potential for human exposure .....either by site personnel or by uncontrolled release to the environment is therefore minimal” (Viridor Supporting Statement, Section 8) and will finally be “disposed of safely (by enclosed tanker) to a designated hazardous waste landfill”. (Supporting Statement, Section 3). We dispute that no risk is posed to human health. Apart from the risk of such mishaps as fire or flooding at the plant or accidents during transportation, there is evidence from the Wingmore Farm site that the fly-ash blown around reaches local residents.[13]

To accord with the EIA Regulations, Cardiff Council should require Viridor to show how they propose to abate and control these hazards.

3.2.5 Bottom Ash

3.2.5.1 Incinerator bottom ash from the combustion process at the proposed plant would, according to Viridor, amount to approximately 25% of input material – about 75,000 tonnes per annum. (Viridor Supporting Statement. Section 3.)

3.2.5.2 Viridor states that such bottom ash (IBA) is inert. This is not correct. Incinerator bottom ash contains toxic metals that readily leach out, and leaching data supplied by the Environmental Agency (EA) show many samples of bottom ash failing the H14 toxicity criteria. France and the USA already require testing and toxicity classification of bottom ash, and the EA in the UK have since December 2008 instituted new policies whereby all waste producers have a Duty of Care to accurately characterise their wastes.[14] One could assume thereby that most samples of incinerator bottom ash would be assessed as hazardous under the H14 ecotoxic criterion.

3.2.5.3
In 2007 a study initiated by the Environmental Services Association (ESA) to identify a protocol for the ecotoxicity testing of Incineration Bottom Ash (IBA) using a direct testing method on IBA[15] reported that "almost certainly, zinc will be present in IBA, commonly as zinc oxide amongst other zinc substances. The recent revision to the Approved Supply List (ASL) (version 8) introduced an ecotoxic classification for zinc oxide (H14 by R50/53 'very toxic to aquatic organisms and may cause long term effects in the aquatic environment'). The substance was not classified as ecotoxic in previous versions. The assessment of the H14 status of IBA has historically been dependent on the level of 'total' lead substances in the sample. However, the recent amendment to the ASL means that zinc substances need to be considered in addition to lead and other ecotoxic heavy metals. ***Levels of lead and zinc in a number of isolated compliance monitoring samples have exceeded the hazardous waste threshold for H14****".*

3.2.5.4 Lapa et al (2002) have found that MSW incineration bottom-ash samples collected in five countries (Belgium, France, Germany, Italy and the United Kingdom) were ecotoxic. Their study within the EC Valomat project concluded ***"all bottom ashes should be classified as ecotoxic materials."*** [16]

3.2.5.5 In view of the new requirements to test bottom ash and classify for toxicity, Viridor should state exactly, with respect to the 75,000 tonnes produced per year:
- how they will store it; incinerator bottom ash for re-use is commonly left to "mature" in stockpiles of 10-20,000 tonnes, but if in the open air, it will be subject to wind blow;
- what facilities they will provide for testing it for hazardous content;
- if sent to landfill, to what kind of landfill site (hazardous or non-hazardous) and what pre-treatment it will receive.

A potential health risk arises if bottom ash is sent to ordinary land-fill, because of the possibility of the leaching of toxic substances into ground water

3.2.5.6 Viridor claim that they will 'recycle' their 75,000 tonnes of bottom ash by finding uses for it in building and road construction having "entered into initial discussions with building material manufacturers". (Viridor Supporting Statement. Section 3.) The claim is unsustainable on two accounts:

1) Until recently, the incinerator industry has succeeded in finding construction uses for only about a half of incinerator bottom ash. (See Section 1.2.2.3 (4) above and footnote).[17] Viridor presents no evidence as to how much of bottom ash they will be able to find a use for, nor do they state how and where they would get rid of the

bottom ash for which they cannot find a market, nor if land-filled whether existing and planned landfill capacity in the Prosiect Gwyrdd area would be able to accommodate it.
2) Viridor should take account of the H14 criterion and new WM2 testing requirements that may classify all or part of the bottom ash as hazardous. Hence most of their 75 000t/yr bottom ash might have to go to a hazardous waste site, in addition to the 10 000t/yr of fly-ash.

3.2.6 We believe that the Viridor application fails to supply adequate information to comply with the EIA Regulations (1999) Schedule 4 Part 1 (mandatory), in particular: an estimate, by type and quantity, of all expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the proposed development and a description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment. Supply of such information is mandatory.

3.2.7 ***We object to the application on grounds that there is justifiable Public Concern that the proposed incinerator will constitute a health risk because hazardous substances produced, for example ultra-fine particle emissions from the stack, are not monitored or controlled.***

Notes

1. There are as yet few good data showing the levels and frequency of releases during combustion upsets but the emissions are likely to be significant and potentially very high. As an example - some testing of the 1983 Columbus Ohio incinerator in the early 1990s showed that absolutely enormous quantities of dioxins can be released when operations went wrong. This single incinerator released more dioxins to air than were produced by the entire UK according to our dioxin inventory at that time.
1.
2.
3.
4.

2. De Fre, R. & Wevers, M. (1998). *Underestimation in dioxin emission inventories.* In: Organohalogen Compounds. Vol. 36.

3. Tejima, Hajime et al, 2007. "Characteristics of dioxin emissions at start-up and shutdown of MSW incinerators." In *Chemosphere*, vol 66, no6, pp.1123-1130).

4. DEFRA, 2004, *Review of Environmental and Health Effects of Waste Management: of Municipal Solid Waste and Similar Wastes.* http://www.defra.gov.uk/environment/waste/research/health/index.htm

5. Cormier, S. et al.,2006. "Origin and Health Impacts of Emissions of Toxic By-Products and Fine particles from Combustion and Thermal Treatment of Hazardous Wastes and Materials. " Environmental Health Perspectives, Volume 114. http://www.ehponline.org/members/2006/8629/8629.

6. Aboh, J., et al (2007). *Elemental contents in a medium-sized Swedish city dominated by a modern waste incineration plant.* Paper presented as part of a special issues of papers from the 2006 European X-ray Spectrometry Conference, Paris, France. Paper presented

as part of a special issue of papers from the Jun 2006 European X-ray Spectrometry Conference, Paris, France, 19-23 June.

7. Mao.I., et al (2007). *Airborne particle PM 2.5 / PM 10 mass distribution and particle-bound VAH concentrations near a medical waste incinerator.* In: Atmospheric Environment, Vol 41, Issue 11, pp. 2467-2475.

8. The proposal for a 150,000 tonne incinerator in Kidderminster was rejected by Worcestershire County Council in April 2001 on the grounds of visual amenity, effect on nature, canal conservation, loss of playing fields ***and public concern***.

9. Staessen et al., 2001. Lancet 357:1660-1669.

10. Fabre, Pascal et al , 2008. "Etude d'incidence des cancers à proximité des usines d'incinération d'ordures ménagères". *Document Internet. Auters moraux*: Institut de Veille Sanitaire (INVS), Saint Maurice, France.

11. Bianchi, F. et al. 2007 *Infant deaths in 27 Italian Municipalities with sold waste Incinerators.* In: Epidemiology, Volume 18 (5) SupplSepember p S125

12. Arden Pope, III, C., et al. 2009. *Fine-Particulate Air Pollution and Life Expectancy in the United States.* In: New England Journal of Medicine, Volume 360: 376-386.

13. Macleod, C., et al. 2006. *Modeling human exposures to air pollution control (APC) residues released from landfills in England and Wales*. In: Environment International 32: 500–509;
Macleod, C., R. Duarte-Davidson, et al. (2007). *Erratum to "Modelling human exposures to air pollution control (APC) residues released from landfills in England and Wales*. Environment International 32 (2006) 500-509. In: Environment International 33(8): 1123-28.

14. The process for testing whether a waste is hazardous or not is set out in technical guidance WM2 . Environment Agency (2007):
http://www.environment-agency.gov.uk/subjects/waste/1019330/1217981/1384 307

15. http://www.environment-agency.gov.uk/research/library/position/41219.aspx

16. Lapa, N., et al. 2002. *Ecotoxical assessment of leachates from MSWI bottom ash.* In: Waste Management 22(6), pp 583-593.

17. Project Integra in Hampshire is reported to be expecting to use one third of the Portsmouth incinerator bottom ash as aggregate and one third for landfill engineering after extracting courser material.
www.portsmouthcc.gov.uk/media/env20080408r2_PCC_sub-strategy_2008.pdf

Objection 4: Concern over potential damage to a nature conservation site

We object to the application on the grounds that the pollution produced by the proposed incinerator would potentially damage the Severn Estuary Special Protection Area (which is also a Ramsar site and possible Special Area of Conservation).

4.1 POLICY CONTEXT

4.1.1 EU Waste Directive 2006/12/EC, Article 4 states that Member States shall take necessary measures to ensure that waste is recovered or disposed of..... without adversely affecting the countryside or places of special interest.

4.1.2 TAN 21 Waste (2001) states:
- that 'the land use planning system has an important role to play in facilitating sustainable waste management and should... ***have special regard to the need to protect areas of designated landscape and nature conservation*** (Section 1.10);
- that 'the key physical environment issues that local planning authorities must consider in the development of their BPEO and their SWMO [include] ***protection of habitats and species"*** (Section 11.4).

4.1.3 Cardiff LDP 2006-2021- Preferred Strategy Report (2007) states:
- that " the wide range of biodiversity and nature conservation interests in Cardiff includes 15 sites of Special Scientific Interest (SSSIs), including two sites also designated for their international importance - ***the Severn Estuary Special Protection Area (which is also a Ramsar site and possible Special Area of Conservation)*** and Cardiff Beech Woods Special Area of Conservation (Section 2.8);
- that that "in preparing the Scoping Report for Sustainability Appraisal and Strategic Environmental Assessment (SA/SEA) of the LDP the Council has identified the following objectives for delivering sustainable development: [number 3 of which is] ***Protect and enhance biodiversity, flora and fauna - including sites and species of international, national and local importance.*** (Section 4.10).

4.2 JUSTIFICATION OF OBJECTION

4.2.1 The westernmost reaches of the Severn Estuary Special Protection Area adjoin the Cardiff docks area in which Trident Park is situated. It contains mudflats and Atlantic salt meadows that are feeding grounds for populations of wild birds that are of European importance, and one of the most diverse fish populations in Britain, with over 110 species recorded.[1]

4.2.2` Toxic particulate matter (in particular of the ultra-fine variety) emitted into the air from an incinerator can be carried many miles. With the prevailing westerly winds

such particulate matter would be deposited on the waters, mudflats, sand banks and salt meadows of the Estuary and would potentially damage the ecosystem.

4.2.3 Additionally, emissions of gaseous pollutants from the incinerator would contribute directly and indirectly to concentrations of harmful gases such as nitrogen oxides, sulphur oxides, hydrocarbons and carbon dioxide downwind of the incinerator.

Nitrogen oxides and sulphur oxides react in the atmosphere to form acids, which fall to the ground and water surfaces when it rains. Nitrogen oxides and hydrocarbons can also react under strong sunlight to form the secondary pollutants found in photochemical smog, a chief component of which is ozone (O_3). This is a strong oxidiser capable of damaging most biological systems, including plants.

It has been estimated that Nitrogen dioxide emissions from each tonne of waste would equate to the vehicular emissions from driving about 8,000 km.[2]

4.2.4 Contamination of the Severn Estuary by air and water pollution should be considered cumulatively with the outputs of other industrial processes in the area, both existing and proposed.

4.2.5 To determine the level of risk to the Severn Estuary Conservation Area, a detailed independent analysis of environmental impact should be carried out in accordance with Regulation 48 (1) of the Habitat Regulations 1994.

4.3 ***We object to the application on the grounds that the pollution produced by the proposed incinerator would potentially damage the Severn Estuary Special Protection Area (which is also a Ramsar site and possible Special Area of Conservation)***.

Notes:

1. Information Sheet on Ramsar Wetlands – Severn Estuary Special Conservation Area.

2. This is based on Euro III standard petrol cars with an emission limit of 0.15 g/km. 1 tonne of waste emits c 6,000 m3 of flue gas @ the WID standard of 200 mg/m3 ie c 1.2kg. Therefore each tonne is equal to 8,000 km.

Objection 5: Non-compliance with the proximity principle

We object to the proposed development on the grounds of non-compliance with TAN 21 concerning minimisation of transport movements and the Proximity Principle. The proposal for a large incinerator serving the needs of five local authorities would generate longer transportation movements than would be the case with two or more smaller facilities, and the incinerator would create large

quantities of toxic waste for which there are no disposal sites in the region.

5.1 POLICY CONTEXT

5.1.2 TAN 21 Waste (2001), Sections 3.1 & 3.18 includes the following guidance:
•"The Proximity Principle states that waste should be treated and or disposed of as near to the source of origin as possible because transporting waste itself has an environmental impact. This principle recognises the need for us all to take responsibility for our own waste arisings and not be content with distributing it to other locations for disposal, even if there has always been a tradition of doing so."
•The key *physical* environment issues that local planning authorities must take into account in the development of their BPEO and their SWMO [include] ***the minimisation of transport impacts".***

5.1.3 Cardiff LDP Preferred Strategy Report (2007), Section 3.20, confirms that "a key element is the 'Proximity Principle' - that waste should be dealt with as close to source as possible".

5.2 JUSTIFICATION OF OBJECTION

5.2.1 The Promixity Pinciple enjoins "dealing with waste as close to its source as possible" . "As close as possible" is an elastic concept. Actual distances in miles or kilometres are rarely specified and transport emissions depend on the method of transportation (road, rail or water).

In the case of the proposed Viridor incinerator, all transportation would be by road. Parts of Monmouthshire are 50km and of the Vale of Glamorgan 45km away by road from the proposed plant. While these may not be considered large distances for regular transportations of waste, they are longer than they need be, because ***there is no* a priori *reason why five local authorities should be served by a single facility; two or more smaller facilities would bring the treatment of waste nearer its point of origin.***

5.2.2 The motivation for a single central facility comes from the desire to gain 'economy of scale' through the building of a single large plant rather than two or more smaller ones. It is to be noted that the argument of 'economy of scale' is especially applicable to incinerators, because they are expensive to build as pollution control equipment costs are similar irrespective of the size of plant. The same 'imperative' for a single large plant would not apply in the case of other kinds of plant, such as AD, MBT, autoclave, pyrolysis or gasification.

It is thus the type of plant being proposed, an incinerator, that particularly favours a single, central facility as opposed to two or more smaller ones, and is thus responsible for increased vehicle travel distances and emissions.

5.2.3 The Proximity Principle would be further compromised if, during the life-time of the project, recycling targets for both MSW and Commercial & Industrial Waste

are exceeded by the five LAs. Instead of downsizing – as would be possible with technologies more flexible than incineration – waste to feed the incinerator would have to be brought in from outside the area of the five LAs.

An example can be quoted from the London area: an application to expand an incinerator in Edmonton was rejected because it was ruled that a larger incinerator would give the local authority "little incentive to do more recycling over and above the statutory minimum; and meeting or bettering recycling targets would lead to a shortfall…[***resulting in] waste being imported from other areas, in contradiction of the proximity principle"*** [Statement by Energy Minister Brian Wilson, 23 May 2002].

5.2.4 TAN 21 (Section 2.9) states that "Regional self-sufficiency may be relaxed in special circumstances, where there is a proven sound environmental or management reason to do so. Such special circumstances "would include the viability of developing facilities to handle irregular or small scale arisings of certain special wastes", in which case the materials may have to be transported to an alternative region for treatment or disposal.

Regular journeys to dispose of the toxic fly ash (10,500 tonnes per annum according to Viridor's reckoning) to a hazardous land-fill site outside the region could not be characterised as 'irregular' or 'small-scale'. But if, additionally, significant quantities of bottom ash are also classified as hazardous waste (see section 3.2.5.3 above), then the total amounts of long distance transportation involved would be substantial and certainly in contradiction to the Proximity Principle..

5.2.5 There is, in fact, no hazardous land-fill site within SE Wales, nor in the whole of Wales. The transportation distances involved (which would all be by road) are large – the likely site to be used is Wingmore Farm Hazardous Waste Site, near Cheltenham.

5.3 ***We object to the application on the grounds of non-compliance with TAN 21 concerning minimisation of transport movements and the Proximity Principle – the proposal for a single large incinerator serving the needs of five local authorities would generate longer transportation movements than would be the case with two or more smaller facilities, and the incinerator would create large quantities of toxic waste for which there are no disposal facilities in the region.***

Objection 6: Inadequate public consultation.

We object to Viridor's application on the grounds that its pre-application public consultation was not well publicised or well attended, contrary to requirements for effective involvement of the public at an early stage – especially with a proposal likely to raise strong public concerns.

6.1 POLICY CONTEXT

6.1.1 TAN 21 Waste (2001) includes the following guidance:
1) " Developers preparing applications for waste management developments should undertake consultation with the local planning authority ***and with local communities at an early stage, preferably well before an application is submitted***. .....
Consultation must also be undertaken with statutory consultees such as the Countryside Council for Wales and Environment Agency (Section 12) where relevant, and where known, ***with local community groups."*** (Section 6.8.)
2) "***Consultation on planning issues of public concern including proposed waste management facilities is essential at an early stage, to raise awareness, public confidence and responsibility in the planning process. Such consultation helps waste planning officers to make good quality decisions that reflect public opinion and absorb public expertise and knowledge***." It goes on to say that ***"Public input should then be utilised in a number of ways:***
- ***to make planning decisions based on the concerns, preferences or approval of the public;***
- ***to debate alternative planning options in a non-planning environment;***
- ***to negotiate a passage through contentious issues, possibly arriving at a consensus or agreed course of action*** (Section F 12)

6.1.2 The South East Wales Regional Waste Plan 1st Review (Recommended Draft *Foreword & Non-Technical Summary March 2008* includes among its "Actions for the Waste Management Industry" the stipulation that ***"A high standard of public consultation will be essential"*** and that "The Community Engagement Guidance on Waste Infrastructure will be a valuable tool" for waste management companies during the process of planning and developing new waste management / resource recovery facilities. (Section 45.)

6.1.3 Such stipulations for early and high standard consultation reflect the requirements set out by the Aarhus Convention, which is represented by enforceable binding law in most member states of the European Union (EU), including the UK. The 'Access to Information' section of the Convention explains the importance of ensuring that ordinary people have access to environmental information, while the Public Participation Articles 6, 7 and 8 highlight the importance of involving the public in government decision-making on green policies, legislation and other environmental matters and emphasize that ***the earlier members of the public and community groups get involved in the decision-making process, the greater impact their participation will have on the final outcome of a decision.***

6.2 JUSTIFICATION OF OBJECTION

6.2.1 Applications to build incinerators generally arouse intense public concern. There may be hundreds, even thousands, of objectors. Hence the need to engage with local communities at an early stage, and for " a high standard" of public consultation. Viridor's engagement with the general public, including those living in communities located in closest proximity to the proposed incinerator, is described in Appendix 3 of their application "Statement of Community Engagement".

6.2.2 Their application was sent to the Planning Authority on 26th November 2007.

Consultation with the general public was of two kinds: (1) indirect where contact was through media such as newspaper releases, leaflets and website and (2) face to face.

Response from the indirect route was disappointing (details are from Appendix 3 of their Application):
- from the initial press release in the Western Mail of 11th June 2007, "no letters were published in the Letters Page" and "no feedback was received";
- from the website and telephone line that went live on Tuesday 26th August 2008 only "two responses have been received";
- from the leaflet distribution of 4000 leaflets in the residential communities of Cardiff Bay and (not all of) Splott "the leaflet prompted three telephone calls".

6.2.3 This being the case and in view of the potential high level of public interest, Viridor should have made sure they secured an adequate response from their face-to-face engagement with local communities. However, the response from face-to-face meetings must also be judged as poor. Some of the reasons for this appear to be the fault of Viridor. The two main public engagements were:

1) "Stakeholder workshops" were held at County Hall Cardiff on 8th September 2008 and on the evening of 10th September at the Star Centre Splott with the Local Community Consultation Group. Attendance was poor –only 11 at the County Hall event and 9 at the Splott event. Since these 'workshops' constituted a crucial opportunity for face-to-face engagement with local populations, the small number of attendees indicates lack of success.

2)The other main opportunity to engage face-to-face with the general public and communities likely to be affected by the proposal came with two public exhibitions. The first public exhibition took place in Splott at the Star Centre, Splott Road on 10th September between 14.30 and 19.00 hrs, and the second at the Novotel, Tyndall Street on the following evening 11th September. Viridor state that "the level of attendance was surprisingly low: the Splott exhibition attracted three people; the Novotel event attracted 14 attendees including "a small number from Splott".

6.2.4 While it is recognised that gaining public participation at meetings is not easy, part of the reason for the low attendance at this series of meetings must be attributed to inadequate and tardy publicity:

We have not seen the text of the leaflet circulated, but the lack of response to it may indicate that its content might have enumerated the supposed virtues of 'an energy from waste plant', but not mentioned the word incinerator, nor listed any of the possible concerns that members of the public could have concerning the proposal. Whether or not this was the case, the leafleting did not cover a sufficient area of the city of Cardiff – it didn't even extend to the whole of Splott, the community lying most directly in the path of emissions from the plant given prevailing winds.
- A newspaper advertisement advertising the exhibitions on the 10th and 11th September was placed in the Cardiff Post Free Newspaper on 4th September. Since people might not have got their copies of the newspaper on the 4th, such notification might not have been early enough and so should have been in the previous week's edition also. Moreover, it must be doubted whether "a weekly free-sheet tabloid delivered to homes in and around the Welsh capital" was sufficient medium to

disseminate news of the exhibitions - the exhibitions could also have been published in the Western Mail, South Wales Echo or Wales on Sunday.

- A "media liaison" briefing was in fact held with the Western Mail / Echo and "a small article appeared in the Echo that afternoon" and "the following day a larger feature was carried in the Echo". But this was too late in the proceedings. The briefing was on 10th September – the very day of the first exhibition. Neglect to involve the Western Mail / Echo earlier to publicise the exhibitions and the previous 'stakeholder workshops' is a clear reason for their failure to gain adequate public attendance.

6.2.5 In summary, the public relations efforts carried out by Viridor, with its concentration of effort in September, might be considered early enough for a planning application that was to be submitted at the end of November. However, the standard of publicity judging from the level of response did not meet the condition that "a high standard of public consultation will be essential." (Section 6.1.2 above). Nor was its quality sufficient to "negotiate a passage through contentious issues, possibly arriving at a consensus or agreed course of action". (Section 6.1.1 above). The fact that the few people who did attend the face-to-face events raised questions about 'emissions from the facility', ' air quality issues' and 'the number of vehicles associated with a development of this nature" indicates that there are potentially public concerns with respect to the proposed development which have not been addressed in Viridor's public consultation.

6.2.6 ***We object to Viridor's application on the grounds that its pre-application public consultations were not sufficiently publicised or well attended, in contradiction to requirements for effective involvement of the public at an early stage – especially with a proposal that is likely to raise strong public concerns.***

Cardiff FOE
South East Wales FOE Waste Group

February 2nd 2009