Waste Licence Review Application W0167-02

Response to Article 12 Compliance

December 2009

Table of Contents

List of Appendices

List of Figures

List of Tables

Article 12 Compliance

Introduction

Since the Revised Waste Licence Application (referred to here as "RWLA") was submitted on the 3/3/09, a number of detailed design developments have emerged that prompted the application for an amendment to existing planning permission. Planning permission SA/901467 was granted for these amendments by Meath County Council on 10/11/2009. Please refer to Appendix 12.a for a copy of this permission.

A revised EIS, referred to throughout this document as the "2009 EIS", was submitted as part of this amendment. The EIS submitted to the EPA with the RWLA will be referred to here as the "2006 EIS". Many of the baseline and other studies provided in the 2006 EIS remain valid and are referred to here where necessary.

The amendments mostly relate to changes to the main process building, reducing its overall size and changing the shape, as well as changes to other site infrastructure (gatehouse, warehouse, turbine building, ESB compound, storage tanks) and services (drainage scheme, sewage treatment, internal road network). A summary of amendments is provided in Section 1.1 of the 2009 EIS and illustrated in Appendix 13.d of Article 13 Compliance. A summary of how the amendments impact on the information provided in the RWLA already submitted is provided in Table 13.b of the response to Article 13 Compliance.

Insofar as possible, clarifications provided here relate to the current design as described in the 2009 EIS but some reference is also made to the 2006 EIS for comparison.

1. Class of Activity

1.a Residue Pre-treatment

Question

1.a. Attachment B.2.2 states that the residue solidification unit has been removed from the proposed facility yet Attachment B.7 identifies Class 7 of the Third Schedule (physico-chemical treatment) as a relevant class of activity. Please clarify the need for this class, and provide details of the infrastructure/processes and emissions for the solidification of residues prior to disposal off-site, if applicable.

Response

It is a requirement that Indaver Ireland retains the option to install residues pre-treatment equipment at the Meath facility in the future. This is due to the uncertainties around the development of hazardous landfill capacity in Ireland.

At present there is no such capacity in Ireland. If this situation persists when the plant begins operations, residues will have to be exported for disposal. In this case, pre-treatment would take place at the destination landfill site, as explained in Attachment H.4 of the RWLA. However, plans are currently underway to develop a hazardous landfill cell in Ireland. Depending on economies of scale, this facility may or may not include pre-treatment equipment at the site. Where there is no pre-treatment available at the hazardous landfill outlet, the residues will require pre-treatment at the Meath facility prior to transport offsite.

For this reason, Indaver Ireland is applying for the inclusion of Class 7 of the Third Schedule (physico-chemical treatment) as a relevant class of activity. The activity was not described in detail in the RWLA, due to the uncertainties around the extent and nature of pre-treatment that will be required onsite. Specifically, the extent and nature of pre-treatment will depend on the residue properties and the landfill waste acceptance criteria that must be adhered to.

Any pre-treatment system would have to be designed to handle both flue gas treatment residue, which is classified as a hazardous waste, and boiler ash which may also be classified as hazardous. While the extent and nature of pre-treatment required is currently unknown, pre-treatment typically involves mixing residues with cement based or other binders, acid and water leading to solidification. The total tonnage requiring pre-treatment may be up to 13,000tpa depending on the classification of boiler ash.

Attachment D.1.t: Incineration Infrastructure

Residue pre-treatment can involve simple processes like inline cement mixing (e.g. in a screw conveyor) or more complex solidification processes with standalone dosing units and a mixing plant. It is envisaged that pre-treatment will occur either in the main process building or as a stand alone unit in the service yard or other suitable location. All processes and materials would be fully contained and transported in fully enclosed conveyors.

Attachment D.1.k: Sewerage and Surface Water Drainage

There will be no process water emissions from the pre-treatment process.

Attachment D.1.l: Other Services

D.1.l.b Water Supply & Demineralisation

Pre-treatment with cement based additives typically requires the addition of 0.15m^3 to 0.35m^3 water per tonne residue to be pre-treated. With a capacity of 13,000tpa the unit would be expected to consume 4,550m^3/y or approximately 7% of the total water consumption of the plant. As the pre-treatment process can accept contaminated water, this may provide an opportunity for the reuse of any contaminated water collected onsite.

Attachment D.2.7: Residues Handling

The aim of pre-treatment is to physically and hydraulically encapsulate the residues. Typical hydraulic binders include cement, slags and mineral binders. It is anticipated that cement would be used as a hydraulic binder though this may depend on the availability of other materials.

As noted, the extent and nature of the pre-treatment equipment will depend on the residue properties and the acceptance criteria at the landfill destination. Typically, the process involves mixing cement, water and the residues together on a continuous basis or in a batch process. The typical cement/residues ratio is 0.1 to 0.4. Other materials like fly ash from other combustion processes can also be added as a substitute for cement in waste-to-waste applications.

It is likely that acid (Hydrochloric acid or HCl) will also be required to modify the pH and reduce the leaching potential of Pb.

Following mixing, the residues would be transferred to flexible bulk containers (FIBCs) for transport. It is estimated that about 19,000tpa solidified material may be generated from 13,000tpa residue.

A flowsheet of a typical standalone solidification process is provided in Figure 12.a below.

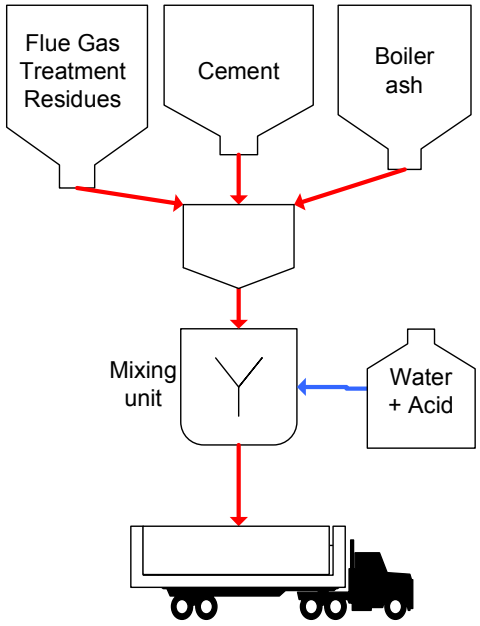


Figure 12.a: Flowsheet of residue solidification unit

As noted, a separate solidification unit may not be necessary and cement addition may be facilitated inline in the main process building.

D.2.7.b Process Control

All boiler ash and flue gas treatment residue handling equipment will be designed to minimise dust emissions. This includes, for example, slow moving screw conveyors, chain conveyors, bucket elevators and planetary screw discharges. Equipment for conveying and storing the boiler ash and flue gas treatment residue will be fully enclosed, insulated and fitted with electrical trace heating where necessary to avoid deposits and encrustation. Silos will also be equipped with High Efficiency Particulate Abatement (HEPA) filters to prevent fugitive emissions. Once pre-treated, the residues will have a high moisture content and resemble pre-set concrete. They will therefore not result in any dust emissions during transport or handling.

D.2.7.c Abnormal Conditions

In the event of plant failure, there will be sufficient storage space within the residue silos for 4 (boiler ash) to 7 (flue gas treatment residue) operating days residue production. Where the equipment or plant cannot be brought online within this period, the residues will be exported (untreated) to an authorised hazardous waste landfill for pre-treatment and disposal.

Attachment E.1.2 Fugitive Emissions [Air]

All pre-treatment equipment will be fully enclosed and fitted with dust mitigation equipment as noted above. It is therefore anticipated that there would be no fugitive emissions to air from this facility.

Attachment E.5.2 Fugitive Emissions [Noise]

There would be no fugitive noise emissions associated with an inline pre-treatment process. A standalone pre-treatment unit would require the installation of small motors (5-10kW) to power the dosing and mixing units. These would be fitted with acoustic insulation and would not contribute to fugitive noise emissions.

Attachments E.2, E.4, E.6: Other Emissions

There will be no emissions to surface water or groundwater. As noted above, dust emissions will be minimised using specific mitigation measures.

Attachments F.1, F.2, F.3, F.5, F.6: Emissions Abatement and Monitoring

Emissions abatement is described above. Since the impacts of residue pre-treatment would be minimal, there would be no changes to existing monitoring arrangements for air, surface water, groundwater or noise.

Attachment G.1: Raw Material Use

It is envisaged that the pre-treatment process would use cement, acid and water. The additions and changes to Table G.1.a have been outlined below in Table 12.a. A complete revised Table G.1.a is provided in Appendix 13.p of the Response to the Article 13 Compliance.

Table 12.a: Update to Table G.1.a submitted in RWLA.

Ref. Nº or Code	Material/ Substance	CAS Number	Danger Category	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	R - Phrase	S - Phrase
M9	Hydrochloric Acid (30%)	7647-01-0	Corrosive	4	1,100	Pre-treatment of flue gas treatment residue	34, 37	(1/2) 26, 45
M18	Cement	65997-15-1	Irritant	30	1,650	Pre-treatment of flue gas treatment residue	36 / 37 / 38	24/25/26, 36/37/39

Attachment G.2: Energy Efficiency

The planned standalone solidification plant in Doel, Belgium, will consume approximately 11kWh/t. Based on this, it is estimated that the residues pre-treatment facility in Meath, processing 13,000tpa, would consume a maximum of 149MWh/y or 0.8% of the estimated houseload. It is noted that an inline process would consume less energy than a standalone unit and therefore this represents the maximum likely consumption for residue pre-treatment. Including this additional consumption in the R1 calculation has a negligible impact on the result, which was revised in Appendix 13.q.

Attachment H.4.1.c Reuse / Disposal of Residues

As outlined in Attachment H.4.1.c of the RWLA, the development of pre-treatment equipment at the Meath facility would only occur if it were possible to send the solidified residues to a hazardous landfill in Ireland, and if that facility did not provide pre-treatment capabilities. For this reason, Indaver Ireland seeks to retain the option to carry out pre-treatment onsite in the future.

Attachments I.1 – I.7: Impacts

There will be no additional impacts associated with the solidification facility to air, surface water, ground or groundwater, noise or ecology due to the abatement measures outlined above.

Attachment L.1.3.a: Generic BAT for all waste incineration

Changes to BAT associated with the development of a solidification plant include:

- **54:** The process described aligns with the FGT residue treatment technique of cement solidification outlined in Section 4.6.11.1 of the BREF Note. Cement is likely

to be used as a hydraulic binder and other additives may be used to balance the pH of the residues.

1.b Recycling and Reclamation of Inorganic Materials

Question

Please provide details of the infrastructure/processes for the recycling or reclamation of other inorganic materials at the facility (Class 4 of Fourth Schedule).

Response

Indaver Ireland would like to retain the option to develop a bottom ash recovery facility in the future.

As noted in Attachment H.4.1.c of the RWLA, there is currently no bottom ash recovery operation in Ireland, nor are there bottom ash reuse criteria or a market for such products. For this reason, it is not immediately envisaged to recover materials other than ferrous metals from bottom ash.

However, it is the intention of Indaver Ireland to proactively identify potential outlets for recovered aggregate and other ash derived materials. In case it becomes feasible to recover ash at the Meath facility, Indaver Ireland has applied for activity Class 4 of the Fourth Schedule: *Recycling or Reclamation of other Inorganic Materials*.

Attachment D.1.t: Incineration Infrastructure

As noted in the 2009 EIS, changes to the layout of the main process building have included the removal of an ash bunker and inclusion of an ash handling building. This is discussed in more detail in Section 1.1 of the 2009 EIS. This building will be separate but adjacent to the main process building along the north western side. It will be approximately 44m x 22.5m in floor plan.

It is envisaged that any bottom ash recovery activity would take place within the confines of this building. Alternatively, if more space is required, a separate and dedicated building may be developed where planning permission can be obtained for this.

Attachment D.1.k: Sewerage and Surface Water Drainage

It is envisaged that bottom ash recovery would not produce any effluent.

Attachment D.1.l: Other Services

D.1.l.b Water Supply & Demineralisation

It is envisaged that the bottom ash recovery plant would not consume any additional water. The moisture content of the quenched ash is sufficient to minimise any dust emissions that may otherwise occur during separation and treatment.

Attachment D.2.7: Residues Handling

D.2.7.a Process Description

The bottom ash recovery unit in Meath would have a capacity of 50,000tpa. The main process elements would include sieving, removal of ferrous and non-ferrous metals, mechanical separation and maturation. It is not possible at this stage to specify the order or extent of these processes since this will depend on the quality of material required for the available outlets identified for recovered materials.

A preliminary assessment indicates that the bottom ash recovery unit could facilitate the recovery of 1,000tpa non-ferrous metals in addition to the 5,000tpa ferrous metals already being recovered. It would also facilitate the recovery of different granulate fractions that can be used in construction applications such as road building or block making.

D.2.7.b Process Control

The bottom ash recovery process described above is predominantly mechanical, with some chemical transformation during maturation. In general, process control would be similar for other mechanical handling operations. The chemical process and separation quality would be controlled by testing granulate products to ensure that they meet specified quality standards (which have not yet been established) for the relevant applications. Any non-conforming materials would be returned for further maturation or consigned to landfill.

D.2.7.c Abnormal Conditions

In the event of plant failure, there will be sufficient storage space within the ash handling building for 850 tonnes or the equivalent of 5 operating days ash production. Where the plant cannot be brought online within this period, all bottom ash will be sent (untreated) to an authorised landfill for recovery (i.e. as a capping material) or disposal.

Attachment E.1.2 Fugitive Emissions [Air]

The ash handling building will normally be enclosed, except during the entrance and exit of the loading shovel and trucks for removing bottom ash or scrap metal. Air from this building will ventilate naturally. Bottom ash is wet when stored and transported due to the quenching bath, so the material is not dusty. The building will be fitted with a loading bay enclosed by automatic doors, which will remain shut while trucks load ash or metals for removal. This will prevent any windblown material from being released from the building during loading operations. Loading will be performed by a diesel driven loading shovel. The only emission from this operation will be from the engine of the loading shovel.

Attachment E.5.2 Fugitive Emissions [Noise]

The ash recovery plant will require the installation of motors to drive the mechanical separation processes and conveyors. These will be a minor source of noise but, since they will be housed within an enclosed building, will not contribute to fugitive noise emissions.

Attachments E.2, E.4, E.6: Other Emissions

There will be no emissions to surface water or groundwater. As noted above, dust emissions will be minimised by processing the quenched bottom ash in a wet treatment process.

Attachments F.1, F.2, F.3, F.5, F.6: Emissions Abatement and Monitoring

Emissions abatement is described above. Since the impacts of the recovery plant will be minimal, there will be no changes to existing monitoring arrangements for air, surface water, groundwater or noise.

Attachment G.1: Raw Material Use

No raw materials other than bottom ash are required in the ash recovery process.

Attachment G.2: Energy Efficiency

Indaver's bottom ash recovery plant in Flanders, Belgium consumes approximately 5.7kWh/t. Based on this, it is estimated that the ash recovery facility in Meath, processing 50,000tpa, would consume at most 290MWh/y or 1.5% of the estimated houseload. It is likely that the recovery process in Meath would consume less energy than the facility in Belgium per tonne and therefore this represents the maximum likely consumption for bottom ash recovery. Including this additional consumption in the R1 calculation has a negligible impact on the result, which was revised in Appendix 13.q.

Attachment H.4.1.c Reuse / Disposal of Residues

The aim of the ash recovery facility would be to prepare bottom ash for reuse as a construction material rather than to dispose of it to landfill. Information about bottom ash reuse as outlined in the RWLA applies.

Attachments I.1 – I.7: Impacts

There will be no additional impacts associated with the ash recovery facility to air, surface water, ground or groundwater, noise or ecology due to the abatement measures outlined above.

Attachment L.1.3.a: Generic BAT for all waste incineration

Changes to BAT associated with the development of an ash recovery plant include:

- **12, 52**: An ash recovery facility would facilitate the recovery of non-ferrous metals as well as the ferrous metals already being recovered.
- **53**: The recovery facility would most likely involve dry bottom ash treatment as described in 4.6.7.

2. Waste Types and Quantities

2.a Defined list of waste types and quantities

Question

You are requested to re-submit a more defined list of waste types and quantities for incineration, and to elaborate on the type and source of waste in relation to each EWC code.

Response

Table H.1 (c) of the RWLA has been revised in Table 12.b below. This shows specific EWC codes for acceptance compared with the generic EWC groups sought in Table H.1(c) of the RWLA.

Due to continual changes in the quantity and types of waste generated by customers, it is not possible to predict today what waste will require treatment in 2011. For that reason, Indaver Ireland requests the ability to include a wide range of EWC codes in its licence. Any additional EWC codes would be agreed with the Agency.

The EWC codes listed in Table 12.b are based on over 30 years experience working with commercial and industrial companies in Ireland. Many of the listed waste streams are currently handled at a lower level in the waste hierarchy or exported for thermal treatment. Indaver Ireland's policy is to ensure that any waste streams handled by the company are correctly and accurately classified, in line with the EWC catalogue and Commission Decision 2000/532/EC as amended.

The reason for including non-hazardous aqueous waste streams, apart from reducing the cost of exporting these streams for the customer, would be to mitigate the effect of high CV waste streams like RDF that are likely to increase in volume in the future. In effect, aqueous waste could be used in the Meath facility in a waste-to-waste application to cool the grate. This would reduce the amount of water extraction potentially required from the groundwater well for grate cooling.

Table 12.b: Revised Table H.1 (c) Showing Expected Waste Types and Quantities

WASTE TYPE	EWC Codes	TONNES PER ANNUM (proposed)	Source
Non-Hazardous Residual Municipal Waste	20 03 01: Mixed Municipal Waste	0 – 200,000[a]	Waste collectors sourcing household, commercial and similar industrial waste, local authorities, industrial customers, schools, hospitals, etc.
	20 03 02: Waste from Markets		
	20 03 03: Street Cleaning Residues		
	20 03 07: Bulky waste		
	20 03 99: Municipal wastes not otherwise specified		
Commercial and Industrial Non-Hazardous Waste[a]	02 01 02, 02 01 03, 02 01 04, 02 01 06, 02 01 07, 02 01 09, 02 01 99, 02 02 02, 02 02 03, 02 02 99, 02 03 02, 02 03 03, 02 03 04, 02 03 99, 02 04 03, 02 04 99, 02 05 01, 02 05 99, 02 06 01, 02 06 02, 02 06 99, 02 07 01, 02 07 02, 02 07 03, 02 07 04, 02 07 99	0 – 50,000	Rendering plants, Slaughterhouses, Veterinarians, Farms, Horse Stables, Food factories, Warehouse distributors, Manufacturers, Restaurants. NB: the acceptance of ABP waste will provide much needed capacity in the case of scares as per the pork crisis at the end of 2008
	03 01 01, 03 01 05, 03 01 99, 03 02 99, 03 03 01, 03 03 07, 03 03 08, 03 03 99		Furniture production, carpentry, forestry,
	04 01 01, 04 01 02, 04 01 05, 04 01 09, 04 01 99, 04 02 09, 04 02 10, 04 02 15, 04 02 17, 04 02 21, 04 02 22, 04 02 99		Leather, fur and textile industries
	05 01 99, 05 06 99, 05 07 02[b], 05 07 99		Petroleum refining, natural gas purification and pyrolysis of coal
	06 01 99, 06 02 99, 06 03 99, 06 04 99, 06 06 03[b], 06 06 99, 06 07 99, 06 08 99, 06 09 04, 06 09 99, 06 10 99, 06 11 01, 06 11 99, 06 13 03, 06 13 99		Wastes from inorganic chemical processes[c]
	07 01 99, 07 02 13, 07 02 15, 07 02 17[d], 07 02 99, 07 03 99, 07 04 99, 07 05 14, 07 05 99, 07 06 99, 07 07 99		Chemical process companies who produce non hazardous waste e.g. pharmaceutical, cosmetics, chemicals.
	08 01 12, 08 01 18, 08 01 99, 08 02 01, 08 02 99, 08 03 13, 08 03 18, 08 03 99, 08 04 10, 08 04 99		Paint/Varnish/Coating/Glue manufacturues, painting companies, householders, printers waste, general maintenance contractors.
	09 01 07, 09 01 08, 09 01 10, 09 01 99		Photographers, Pharamacists, Schools and colleges
	10 01 02[g], 10 01 03[g], 10 01 17[g], 10 01 25, 10 01 99, 10 03 99, 10 04 99, 10 05 99, 10 06 99, 10 07 99, 10 08 99, 10 09 99, 10 10 99, 10 11 99, 10 12 99, 10 13 99		Wastes from thermal processes
	11 01 14 11 01 99, 11 02 03, 11 02 06, 11 02 99, 11 05 99		Metal plating, Engineering firms
	12 01 01[e], 12 01 03[e], 12 01 05, 12 01 13, 12 01 99		Crane companies, Jewellers, Car manufacturers, Engineering irms

	15 01 01, 15 01 02, 15 01 03, 15 01 04[e], 15 01 05, 15 01 06, 15 01 07[e], 15 01 09, 15 02 03		Any manufacturing company who produced a product that has packaging, Schools, Hospitals, Chemical industry, Councils, householders[f].
	16 01 03, 16 01 06, 16 01 15, 16 01 17[e], 16 01 18[e], 16 01 19, 16 01 20[e], 16 01 22, 16 01 99, 16 02 16, 16 03 04, 16 03 06, 16 05 09, 16 07 99, 16 11 02[d], 16 11 04[d], 16 11 06[d]		Garages, Maintenance of vehicles, farming, warehouse distributors, any company who produces a product/batch e g. pharmaceutical, chemical, food manufacturing(off spec), schools, universities, hospitals.
	17 02 01[f], 17 02 02[e], 17 02 03[f], 17 03 02, 17 05 04[e], 17 05 08, 17 06 04		Construction and demolition industry
	18 01 01, 18 01 02, 18 01 04, 18 01 07, 18 01 09, 18 02 01, 18 02 03, 18 02 06, 18 02 08		Health care/hospitals, universities, veterinarians
	19 02 03, 19 02 10, 19 02 99, 19 05 01, 19 05 02, 19 05 03, 19 05 99, 19 06 04, 19 06 06, 19 06 99, 19 08 01, 19 08 02[e], 19 08 09, 19 08 99, 19 09 01, 19 09 04, 19 09 05, 19 09 99, 19 10 01[e], 19 10 02[e], 19 10 04, 19 10 06, 19 11 99, 19 12 01[f], 19 12 02[e], 19 12 03[e], 19 12 04[f], 19 12 05[e], 19 12 07[f], 19 12 08[f], 19 12 10, 19 12 12, 19 13 02		Waste facilities, transfer stations, Water treatment facilities(e.g. Councils, pharma industry), MBT plants, landfill waste
	20 01 01[f], 20 01 08[f], 20 01 10, 20 01 11[f], 20 01 25[f], 20 01 30, 20 01 32, 20 01 38[f], 20 01 39[f], 20 01 40[f], 20 01 41, 20 01 99, 20 02 01[f], 20 02 03, 20 03 06		Waste facilities, transfer stations, waste collectors, local authorities, septic tank companies
Aqueous wastes[h]	08 01 20, 08 02 03, 08 03 08, 08 04 16, 11 01 12, 16 10 02, 16 10 04, 19 04 04, 19 06 03[i], 19 06 05[j], 19 07 03, 19 13 08	0 – 10,000	Pharmaceutical industry, Paint / Varnish / Coating / Glue manufacturers, painting companies, engineering firms, printers waste, general maintenance contractors, metal plating
Sewage and Industrial Sludges	02 01 01, 02 02 01, 02 02 04, 02 03 01, 02 03 05, 02 04 03, 02 05 02, 02 06 03, 02 07 05, 03 03 02, 03 03 05, 03 03 10, 03 03 11, 04 01 07, 04 02 20, 05 01 10, 05 01 13, 06 05 03, 07 01 12, 07 02 12, 07 03 12, 07 04 12, 07 05 12, 07 06 12, 07 07 12, 08 01 14, 08 01 16, 08 02 02, 08 03 07, 08 03 15, 08 04 12, 08 04 14, 10 01 21, 10 02 15, 10 11 18, 10 12 13, 11 01 10, 12 01 15, 19 02 06, 19 08 05, 19 08 12, 19 08 14, 19 09 02, 19 09 03, 19 09 06, 19 11 06, 19 13 04, 19 13 06, 20 03 04	0 – 20,000	Industrial & municipal wastewater treatment plants, washing and cleaning at commercial and industrial sites including those sources listed above.

Construction and Demolition Waste	Not accepted		
Hazardous ***(Specify detail in Table H 1.2)**	Not accepted		
Inert Waste imported for restoration purposes			

[a] Where this material cannot be otherwise recycled or composted i.e. residual waste
[b] Sulphur-containing waste can help balance the effects of chlorine from other wastes in the furnace
[c] The availability and quantities of these waste streams is likely to be very limited but such wastes may require cleaning in a waste-to-energy plant e.g. 06 13 03 (carbon black).
[d] Acceptable in small quantities only for e.g. cleaning
[e] May be accepted for cleaning purposes or where contaminated for landfill purposes. NB Fe metals will be recovered from bottom ash and non-Fe metals may be recovered through a recovery plant.
[f] Non-contaminated and separately collected recyclable waste would only be processed in the waste-to-energy plant if recycling outlets are not available e.g. during a collapse in the recycling market.
[g] Fly ash may be accepted for waste-to-waste applications in a residue pre-treatment facility
[h] See introduction to table – aqueous wastes would be used instead of groundwater to cool the grate where high CV wastes are also processed. The method of introducing aqueous wastes to the furnace is described in the response to Article 13 Compliance Appendix 13.e.
[i] Where these are unsuitable for landspread or other recycling applications

2.b Meeting the Pre-Treatment Obligations

Question

Please explain how waste arriving at the facility will meet the municipal solid waste pre-treatment obligations, as per the Agency's technical guidance document referred to above.

Response

Please refer to Appendix 12.b for advice we received from Arthur Cox on the pre-treatment guidance. Responses to Questions 2.a and 2.c describe the nature of waste proposed for acceptance at the Meath facility.

2.c Identify the sources and quantities of sludges

Question

Identify the sources and quantities of sludges that are proposed to be incinerated at the facility, including details of anticipated % dry solids content and calorific values. Describe the technology proposed for feeding sludges to the furnace, and proposals for odour management during sludge delivery and storage. Provide details of the capacity of the sludge storage vessel.

Response

Indaver Ireland's existing customer base currently generates sludges that are exported for disposal in incineration facilities. It is envisaged that these and other similar sludges would be accepted at the Meath facility, which would help to reduce Ireland's reliance on exports for these waste streams. It is also understood that outlets for municipal sludges are increasingly restricted and that alternative outlets, like energy recovery, may be required in the future.

According to the North East Regional Waste Management Plan, approximately 20,000 tpa industrial and municipal water and wastewater sludge was generated in the region in 2003.

Based on these potential sources, it is expected that sludges accepted at the facility will have a dry solids content of 10 – 35% and calorific value of 0 to 15MJ/kg.

In the RWLA, it was suggested that the waste bunker would be split to accommodate a separate bunker for sludges. It is now envisaged that sludges would be directly loaded into the existing bunker with other wastes. This would provide for improved mixing and a more homogeneous feedstock to the furnace. Furthermore, sludges will not require a special feeding mechanism into the furnace as they will be lifted into the feeding hopper with the other waste. The total capacity of the waste bunker is 16,000m^3 though a maximum of 10% of the waste flow or 20,000 tpa into the furnace may be composed of sludges.

There will be no additional odour management requirements for the proposed sludge handling method. All deliveries will be carried out in fully enclosed trucks. Trucks delivering sludge will discharge in the reception hall, which is enclosed and maintained under negative pressure. This will ensure that there are no fugitive odour emissions during sludge delivery, discharge or treatment.

3. Facility Infrastructure

3.a. Describe grate type & cooling

Question

Please describe the proposed grate type & grate cooling mechanism, having regard to section 2.3.1.2 of the BREF document on Waste Incineration (August 2006).

Response

The BREF document on Waste Incineration lists four main types of incinerator grates including:

- Rocking
- Reciprocating
- Travelling
- Roller

The selected grate type for the Meath facility (Volund BS w Mark 6) is a reciprocating, “push forward” grate, which effectively resembles a staircase. The individual steps, the grate bars, are alternately placed horizontally and vertically and are mounted on shafts. The grate shafts turn alternately to move the bars from vertical to horizontal forming an effective staircase. This achieves a rolling movement, which has the effect of breaking up and agitating the waste while at the same time moving it forward with high levels of aeration. The grate mechanism is illustrated in Figure 12.b below.

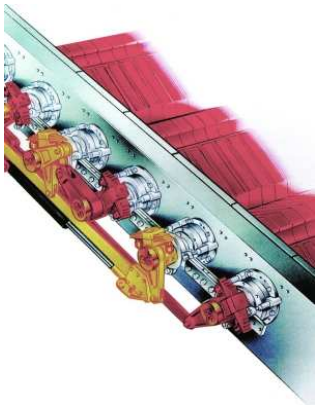


Figure 12.b: Grate Mechanism

As outlined in Section D.2.3.a of the RWLA, the grate will be mostly air cooled but there will also be water cooling in the middle section of the grate. The grate will be designed to facilitate more extensive water cooling in the future should higher calorific wastes be expected.

3.b Site Infrastructure Modifications

Question

With reference to Section A.1.6.b Site Infrastructure Modifications of the application, please explain why the sorting plant and residue solidification unit have been removed from the plant design, and why a bottom ash handling building has been added. Please clarify what type of sorting plant was initially proposed and how the absence of the sorting plant at the facility will conform to the municipal solid waste pre-treatment obligations.

Response

i. Removal of Sorting Plant and Solidification Unit

The sorting plant or Materials Recycling Facility (MRF) was proposed in 2001 to handle 20,000 tpa separately collected dry recyclables.

As per Table D.1.b of the RWLA, this facility is no longer included in the development because separate collection at kerbside has been rolled out since 2001. In line with this expansion of services, a number of MRF facilities have been developed in the region, including a 110,000tpa facility (W0140-03) in Navan, a 22,000 tpa facility (W0206-01) in Dunboyne, a 20,000tpa facility (WL 34-2) in Dundalk, Co. Louth and a 10,000tpa (WL 20-1) facility at the Scotch Corner landfill, Co. Monaghan. This gives a total MRF capacity in the region of over 160,000tpa.

ii. Residue Solidification Unit

Residue pre-treatment is described in more detail in Response to Question 1.a above. A full description of a pre-treatment unit was left out of the RWLA because it is unlikely to be developed in the short term.

However, Indaver Ireland would like to retain the option of developing the activity onsite in the future. This is because it is not yet clear if or when a hazardous waste landfill cell will be developed in Ireland, and whether any pre-treatment of residues would take place at the landfill or at the point of generation (i.e. at waste-to-energy facilities).

iii. Bottom Ash Handling Building

As noted in Section 1.b, changes to the layout of the main process building have included the removal of an ash bunker and inclusion of an ash handling building.

This design modification was made to facilitate better ash handling and storage, and to provide greater flexibility for any future recovery of components from ash e.g. oversize fractions, metals. It also reduces the amount of excavation work involved in the construction (where the building is at ground level rather than underground) and therefore reduces overall impacts.

iv. Compliance with Pre-Treatment Guidance

Please refer to the Response to Question 2.b.

3.c Flue Gas Treatment System Controls

Question

Identify the key process control parameters and monitoring equipment for each step of the revised flue gas treatment design.

Response

Key process control parameters and monitoring equipment are summarised for the flue gas treatment system in Table 12.c. below.

Table 12.c: Flue Gas Treatment System Control and Monitoring

Location	Item / Parameter	Monitoring Equipment
First stage dioxin and heavy metals removal duct	Expanded clay dosing	Dosage rate meter and dosing bin weight
	Expanded clay silo level	Low level alarm
	Flue gas temperature	Thermocouple
	Flue gas pressure	Pressure transmitters
	HCl and SO_2 concentration	Inline flue gas analyser
Spray Drier Absorber	Lime dosage rate	Flow meter
	Lime slurry buffer tank	Low level alarm
	Rotary atomiser	Weekly cleaning
	Outlet temperature	Thermocouple
LAB Loop	Activated carbon dosing	Dosage rate meter and dosing bin weight
	Hydrated lime dosing	Dosage rate meter
	Supply silo levels: activated carbon and hydrated lime	Low level alarms on both silos
	Pressure differential across LAB Loop	Two pressure sensors on either side of loop
Baghouse filter	Pressure differential across filters	Differential pressure indicator
	Temperature of discharge hopper	Thermocouple
	Discharge hopper	High level alarm

Reagent recirculation	Recirculated flue gas cleaning residues supply hopper	Low and high level alarm
Maturation silo	Maturation time in silo	Flow meters at inlet and outlet
ID Fan	Flue gas pressure	Pressure sensors at inlet

3.d Experience with Similar Flue Gas Treatment Systems

Question

Provide evidence, based on international experience at a similar facility, that the revised flue gas treatment technology proposal (combined semi-wet and dry process with recirculation) has been proven to meet the requirements of the WID.

Response

Similar flue gas treatment systems have been installed by LAB (suppliers for the Meath facility) at the locations summarised in Table 12.d.

Table 12.d: International Experience of similar FGT systems

Location	System	Operation
Sheffield, UK	Dry process with hydrated lime injection[1], residue recirculation, maturation silo and activated carbon into reaction duct	Capacity: 155,000 Nm^3/h Startup: 2006
Magdeburg, Germany	Semi-wet reactor with activated carbon injection to spray reactor inlet, lime slurry injection, hydrated lime injection, residue recirculation	Capacity: 2 x 143,000 Nm^3/h lines Startup: 2006
Leuna, Germany	Semi-wet reactor with active carbon injection to spray reactor inlet, lime slurry injection, hydrated lime injection in LAB Loop, residue recirculation	Capacity: 167,000 Nm^3/h Startup: 2006

[1] Note that the ducting at the Sheffield plant facilitates the same residence time and mixing as the "LAB loop" in the Meath facility; a LAB loop is effectively a special design of a reaction duct that allows the necessary residence time and good mixing in a minimal amount of space.

LAB provides guarantees for all of its flue gas treatment systems relating to the emissions levels that will be achieved. These are typically set at or below the WID limits and therefore provide assurance that the technology will meet the requirements of the WID.

Guaranteed values provided by LAB to the Meath facility are outlined in Table 12.e below.

Table 12.e: Guaranteed emission values for Meath facility

Component	Time base for average values	Percentage of reported values (%)	Unit	To be guaranteed	WID emission limit values
Dust	24 h	100	mg/Nm³	5	10
	½ h	100	mg/Nm³	30	30
	½ h	97	mg/Nm³		10
HCl	24 h	100	mg/Nm³	8	10
	½ h	100	mg/Nm³	60	60
	½ h	97	mg/Nm³		10
SO2	24 h	100	mg/Nm³	40	50
	½ h	100	mg/Nm³	200	200
	½ h	97	mg/Nm³		50
HF	24 h	100	mg/Nm³	0.8	1
	½ h	100	mg/Nm³	4	4
	½ h	97	mg/Nm³		2
PCDD/PCDF	6 - 8 h	100	ng TEQ / Nm³	0.05	0.1
Cd + Tl	½ -8 h	100	mg/Nm³	0.04 *	0.05
Hg	½ - 8 h	100	mg/Nm³	0.04 **	0.05
Sum of Sb,As, Pb,Cr, Co,Cu,Mn,Ni, V	½ h	100	mg/Nm³	0.4	0.5

* based on an average maximum value at the entrance of the flue gas cleaning of 1,0 mg/Nm³.
** based on an average maximum value at the entrance of the flue gas cleaning of 0,5 mg/Nm³.

Emissions from the Leuna facility in Germany referred to in Table 12.d can be viewed online at http://www.mvv-umwelt.de/cms/umwelt/de/mvv_umwelt/startebene_mvv_umwelt/umweltschutz/emissionswerte/wochen-emissionswerte/Wochenberichte.jsp (refer to "Wochenwerte TREA Leuna 1 und 2" and any of the week entries in the drop down menu). A scan of these recorded emissions also demonstrates that the LAB system meet the requirements of WID.

Emissions data from the Sheffield waste-to-energy plant referred to in Table 12.d, also using LAB technology, is provided in Appendix 12.c.

3.e Waste Quarantine

Question

Describe the waste storage & infrastructural arrangements to be put in place in the newly proposed waste quarantine area in the service yard that will ensure that appropriate

conditions are maintained to avoid odour generation, the attraction of vermin and any other nuisance. Describe the proposed drainage arrangements to be put in place to facilitate periodic floor washing at the waste quarantine area.

Response

As noted in Attachment D.1.h-I of the RWLA, all waste quarantined in the quarantine area will be fully contained in transport vehicles ready for movement offsite. The trucks or containers held in this area will only be stored for a short period of time during which the waste contractor must arrange alternative treatment. It is not envisaged therefore that any waste temporarily stored in this area will attract vermin or any other nuisance.

The quarantine area will be situated in the bunded delivery area for the diesel storage tank as shown in Drawing 18081\WL\005 in Appendix 13.b. From operational experience in Flanders, it is anticipated that the use of the quarantine area will be limited. Therefore, the location of the quarantine area will not impede deliveries of diesel or other materials. Drainage for this bunded area will be collected and contained in a sump and pumped out as required for treatment. The wastewater will be tested for contamination and where possible reused in the process.

3.f Contaminated Water Treatment

Question

Section D.1.k.b of the application states that "Water collected in the contaminated water diversion tank will be reused in the process where possible, treated on-site or transported off-site for treatment or disposal". Please clarify what type of contaminated water treatment is proposed to be undertaken at the facility and provide details of relevant infrastructure and emission characteristics.

Response

It is not envisaged to develop any contaminated water treatment infrastructure at the site. Any contaminated water treatment onsite relates to reuse within the process. Section D.1.k.b of the RWLA should have read:

> *"Water collected in the contaminated water diversion tank will be reused in the process where possible or transported offsite for treatment or disposal"*

It is envisaged that any contaminated water will be directed to the wet deslagger via the recovered water pit (see Appendix 13.a in the Response to Article 13 Compliance).

4. Water Supply & Drainage

4.a Connection to Public Watermain

Question

Section D.2.8 of the application states that domestic and process water will be supplied from a groundwater well on site. Please confirm whether there is to be a connection to the public watermain for domestic water supply, as discussed at the site inspection of 12/06/09.

Response

The only water source for operations onsite will be the groundwater well. However, water will be sourced from the public mains for drinking water in the kitchens and staff facilities.

Meath County Council provided written agreement to provide a mains connection to the site in September 2008, as shown in Appendix 12.d. The connection was provided in October 2008. A maximum of 1000l/hr is available to the site via this connection.

The recently revised planning permission SA/901467 (Appendix 12.a) refers to the connection to the mains in Condition 6 with the following:

> *"The potable water supply from the public water supply mains shall be used for potable water uses only."*

4.b Site Drainage Layout

Question

Please submit the proposed site drainage layout (Appendix D.5: Drawing No. 15013\WL\006) at a more appropriate scale and using different and clear colours to depict the foul and surface water drainage networks.

Response

Please find revised drawing 18081\WL\006 in Appendix 13.b.

4.c Attenuation Capacity

Question

Section D.1.v of the application states that the "attenuation capacity for surface water run-off has been increased from 1,500m^3 to 4,700m^3 given that water is no longer re-circulated on site". Please determine by calculations the revised attenuation capacity of the site, as discussed at the site inspection of 12/06/09.

Response

The attenuation volume was calculated in the 2006 EIS to ensure the discharge rate did not exceed 16.98l/s for an effective hardstand area of 5.46 Ha, even in a worst case scenario comprising a 1 in 20 year storm occurring at the same time as a two hour fire event. The total combined capacity of the three planned attenuation tanks was 4,700m^3. The calculations supporting these figures were provided in Appendix 11.2 of the 2006 EIS.

These figures have been revised in Section 11 the 2009 EIS.

The effective hardstanding area contributing to surface water runoff has been significantly reduced from 5.46 Ha to 2.2Ha. The discharge rate has also revised by agreement with Meath County Council to 36.2l/s as explained in Section 4.e below. In light of these changes, the overall attenuation capacity has been reduced from 4,700m^3 to 1,900m^3.

The attenuation type has also been revised. The stormwater/firewater attenuation capacity described in the RWLA Attachment D.1.k.b was to be provided by two tanks made up of interlocking modules in the form of a HDPE lined and sealed "hydrocell". The revised attenuation capacity in the 2009 EIS consists of an attenuation pond.

Calculations supporting these figures are provided in Appendix 11.2 of the 2009 EIS. These measures will limit the amount of surface water that can be discharged to the river and will prevent any significant surges or fluctuations of flow rate in the ditch compared to existing conditions.

The changes to attenuation are summarised in Table 12.f below.

Table 12.f: Summary Changes to Attenuation Capacity

Attenuation requirement	Attenuation type	RWLA / 2006 EIS	2009 EIS
Stormwater/firewater	Two hydrocell tanks	4,100m^3	
Stormwater/firewater	Attenuation pond		1,600m^3
Diverted water	Tank	600m^3	300m^3
Total		4,700m^3	1,900m^3

4.d Oil Separator Class

Question

Justify the proposal to install a Class II oil separator on the surface water drainage network, having regard to the requirement for a Class I separator in Condition 3.14.2 of the existing waste licence W0167-01.

Response

A Class I oil separator will be installed in line with Condition 3.14.2 of the existing waste licence W0167-01. Any references to a Class II oil separator were in error and should have read "Class I". The 2009 EIS correctly refers to a Class I separator in Section 11.3.3.

4.e Surface Water Discharge Rates

Question

Justify the use of a surface water discharge rate of 16.98l/s (based on Dublin City Council's Storm Water Management Policy) in the site drainage design. Provide details of any requirements of Meath County Council with regard to the site drainage design.

Response

Calculations supporting the RWLA discharge rate of 16.98l/s are available in Appendix 11.2 of the 2006 EIS.

However, as noted above, the quantity of surface water discharged from the development has been revised in the 2009 EIS.

The updated discharge rate is designed to not exceed the discharge from the greenfield site during a 1 in 30 year storm. This is estimated to be 59.8l/s, based on the QBAR method specified in the Greater Dublin Strategic Drainage Study. Applying the Factor Standard Error of 1.65, gives a permissible discharge of 36.2l/s. Supporting calculations are provided in Appendix 11.2 of the 2009 EIS.

As noted in Section 11.3.3 of the 2009 EIS, the surface water discharge rate and overall site drainage design has been agreed and is in accordance with the requirements of Meath County Council.

5. Air Dispersion Modelling

5.a Revise Dispersion Model

Question

Please revise the air dispersion model & report as appropriate, having regard to the following:

(i) In Chapter 7 (Air Quality Study) of the 2009 EIS, Table 7.2 shows the mass emission rates (g/s) of pollutants used in the model The maximum volumetric flow

rate emitted from the stack is identified as 204,000m^3/hour in Table E.1 Point Source Emissions in Appendix E.2 of the licence application. The maximum emission rates in Table 7.2 do not correspond to the stated maximum volumetric flow rate. Please confirm what the maximum mass emission rates and flow rates will be and confirm that the model represents the worst case scenario. Please also assess the modelled dispersion arising from maximum emission concentrations and average flow rates emitted from the stack.

(ii) The revised flue gas treatment design – the model report refers to the previous design (authorised in licence W0167-01) which included wet scrubbing for second stage acid gas and dioxin removal and flue gas reheat prior to discharge to mitigate against visible plume formation.

(iii) The availability of up-to-date source emission data for Irish Cement Platin works, having regard to the revised IPPC licence (Reg. No. P0030-03), which was issued on 10th June 2008.

Response

The air dispersion model has been revised to reflect changes to the process building shape (with impacts on building downwash) and in line with Articles 12 & 13 requests. Please find the revised model in Section 7 of the 2009 EIS. This chapter also provides clarification on points (i), (ii) and (iii) which are summarised below:

(i) The average operating conditions (which is equivalent to 100% thermal load and will be the maximum annual average for plant) will be 134,000 Nm^3/h @273K, Dry & 11% O_2. Maximum operating conditions (which is equivalent to 110% of Flue Gas Flowrate) will be 147,000 Nm^3/h @273K, Dry & 11% O2. It is noted that the maximum volumetric flowrate previously submitted in Table E.1 of the RWLA referred to the potential maximum flowrate over a 24-hour period calculated at 120% nominal load at the furnace. This no longer applies, according to more up to date performance data provided by the supplier. The potential maximum flowrate over a 24-hour period now will not exceed 147,000 Nm^3/h. The input data is summarised in Table 12.g. The Table *E.1(iii)(a): Main emissions to atmosphere – Chemical Characteristics of the Emission* has been revised in Appendix 12.e. Compared with the discharge rates predicted in the RWLA, this shows a 40% decrease in maximum emissions and 10% decrease in average emissions.

Table 12.g: Process Emission Design Details

Stack Reference	Stack Height (m)	Exit Diameter (m)	Cross-Sectional Area (m^2)	Temp (K)	Volume Flow (Nm^3/hr)(1)	Exit Velocity (m/sec actual)(2)
Main Emission Point	65	2.0	3.14	413	147,000 – Maximum	16.40
Main Emission Point	65	2.0	3.14	413	134,000 – Average	14.95

(1) Normalised to 273K, 11% Oxygen, dry gas.
(2) 413K, 6.6% Oxygen, 21.4% H_2O

(ii) The revised flue gas treatment design has been taken into account in deriving the volume flows, emission temperature and emission concentrations which are detailed in Chapter 7 of the 2009 EIS.

(iii) The up-to-date source emission data for Irish Cement Platin works, as outlined in the revised IPPC licence (Reg. No. P0030-03), has been included in the cumulative impact assessment as outlined in Chapter 7 of the 2009 EIS.

5.b Rationale for HF, TOC and Heavy Metals Concentrations

Question

Justify the rationale for the modelled concentrations of (i) HF under maximum operation and (ii) TOC & Heavy Metals under abnormal operation, having regard to the WID emission limit values.

Response

(i) Council Directive 2000/76/EC has outlined a 30 minute maximum emission rate of 4 mg/m^3 and a daily maximum emission rate of 1 mg/m^3 for HF. In relation to ambient air quality standards and guidelines, HF needs to be assessed over averaging periods ranging from hourly (TA Luft), daily (Dutch) and annual (WHO) as shown in Table 12.h.

Table 12.h: Air Standards for HF

Pollutant	Regulation	Limit Type	Value
HF	TA Luft	Hourly limit for protection of human health – expressed as a 98th%ile	3 µg/m^3
HF	WHO	Gaseous fluoride (as HF) as an annual average.	0.3 µg/m^3
HF	Dutch	Mean fluoride (as HF) concentration during the growing season (April to September)	0.4 µg/m^3
HF	Dutch	Ambient gaseous fluoride (as HF) as a 24-hour average concentration.	2.8 µg/m^3

Thus, for the hourly standard, the relevant emission level for HF is the 30-minute maximum value of 4mg/m^3. However, for the daily and annual ambient standards, the relevant emission level is the daily average as shown in Table 12.i.

Table 12.i: Emission Scenario for HF

Pollutant	Scenario	Concentration	Emission Rate (g/s)
HF	Maximum Operation	4 mg/m^3	0.163
	Maximum 24-Hour Operation	1 mg/m^3	0.041
	Abnormal Operation(1)	4 mg/m^3	0.163

(1) Abnormal operation scenario based on an emission level of 4 mg/m^3 for six hours every Monday for a full year.

(ii) Council Directive 2000/76/EC has outlined a 30 minute maximum emission rate of 20 mg/m^3 and a daily maximum emission rate of 10 mg/m^3 for TOC. In relation to abnormal operation, elevated levels of TOC may occur due to abnormal operating conditions in the furnace. This abnormal condition will be detected immediately from an elevation in the TOC emission value which will be continuously observed on the computerised control system in the control room. An automatic alarm will be activated well in advance of exceedance of the emission limit value to allow adequate time for intervention. Therefore for the purpose of the air modelling study the following abnormal operation conditions were used: 8hrs of operation at an emission value of 30 mg/Nm^3.

Council Directive 2000/76/EC has outlined a daily maximum emission rate of 0.05 mg/m^3 for the sum of heavy metals. Heavy metals are absorbed by activated carbon / clay and thus elevated levels are detected in the same way as dioxins. The waste-to-

energy plant is designed with a two stage dioxin removal system, namely injection of expanded clay prior to the evaporating spray reactor and activated carbon prior to baghouse filter.

During the malfunctioning of one stage, the alternative stage can provide a back up system. For example, if the first stage malfunctions, operation of the second stage alone will result in a typical dioxin emission value of well below 0.1ngTEQ/Nm^3. In the same way, should the second stage fail, the first stage will result in a typical dioxin emission value of below 0.1ngTEQ/Nm^3 also. In order to assume a worst case scenario, it is assumed that a value of 0.5ngTEQ/Nm^3 could be experienced due to a failure involving both systems, which is 5 times the EU limit.

There is little likelihood of either dioxin removal system malfunctioning for any significant length of time as this would occur due to a failing of the clay or activated carbon injection. This injection system and the weight of the clay / carbon in the dosing bin and in the storage silos are monitored continuously. Each dosing bin (volumetric dosing device) continuously transfers carbon or clay from the silo and injects it into the flue gases. The bin must be filled 10 times per day and this is monitored. If the number of fills is less than a preset daily value this activates an automatic alarm. No change in the weight of carbon in the silo after one or two days would also clearly indicate a malfunctioning of the system. Therefore the worst case scenario would be where the first stage malfunctions but is detected within two days from monitoring the dosing bin.

For the purpose of the air modelling study the following abnormal operation conditions were used: Heavy metals: 30 mg/Nm^3 for two days.

5.c Abnormal Operation Scenarios

Question

In the context of the abnormal operation scenarios modelled, please explain the rationale for applying different durations of abnormal operation for each parameter.

Response

The abnormal operations duration in relation to each parameter was based on Indaver's experience of the frequency of occurrence and the speed at which they can be corrected and above all to be conservative in the modelling approach. Modelling at the maximum limits set out in the waste incineration directive, at 110% of the flue gas flowrate and for 365 days of the year for normal operations and then adding in pessimistic assumptions about failure rates of the abatement equipment gives a robust assessment of the potential impacts.

In all cases, a malfunction is detected immediately by the control system which signals an alarm in advance of any exceedance of limit values. This advance notification is also factored into any calculation of response time to abnormal situations.

Table 12.j summarises the scenarios, the durations and the abnormal emissions assigned to those scenarios.

Table 12.j: Summary of Abnormal Scenarios

Pollutant	Scenario	Estimated Duration	Abnormal Emission
NO_x	Malfunction of $DeNO_x$ system.	2 hrs	400 mg/Nm^3
SO_2	Malfunction of evaporating spray reactor or LAB loop.	6 hrs	200 mg/Nm^3

Dust	Malfunction of one or more bags of baghouse filter.	8 hrs	30 mg/Nm^3
HCl & HF	Malfunction of the evaporating spray reactor or LAB loop. As for SO_2.	HCl: 4 hrs HF: 6 hrs	HCl: 60 mg/Nm^3 HF: 4 mg/Nm^3
TOC	Abnormal operating conditions in the furnace.	8 hrs	30 mg/Nm^3
Dioxins	A failure of the injection systems for activated carbon and/or clay, coupled with a failure in the monitoring system for the volumetric dosing device.	Two days	0.5 ngTEQ/Nm^3
	A worst case scenario, where no malfunction is detected and exceedances are only picked up in dioxin sampling results.	Five weeks	0.5 ngTEQ/Nm^3
Hg	As for dioxins	Two days	1 mg/Nm^3
Heavy metals	Ss for dioxins	Two days	Cd: 1 mg/Nm^3 Tl: 1mg/Nm^3 All: 30mg/Nm^3

5.d Electronic Files

Question

Please submit an electronic copy of all files used in the air dispersion model (input, output, meteorological, terrain, buildings data, etc.)

Response

The input, output, terrain and meteorological files associated with the model at enclosed in the attached CD.

5.e AERMOD Details

Question

Please clarify which interface to AERMOD and which version of AERMOD was used in the assessment. Confirm whether the model's routine for calculating annual average concentrations has been validated.

Response

The modeling was undertaken using the latest version of AERMOD (07026) and the latest version of AERMET (06341). The software interface used was the Trinity Consultants Breeze Software (Versions AERMOD 7 (7.0.58) and AERMET PRO (6.2.0)).

In relation to the validation of the annual average mean concentration, the following exercise was undertaken:

(2) The maximum 1-hr modeled receptor for the year 2005 (307000, 270980) was selected as the single receptor for this analysis.

(3) The model was re-run for this single receptor on a monthly basis (Jan through to December) with the Table Output File set to 1000.

(4) In each monthly output file all individual hourly values were reported in the Table option.

(5) The 12 sets of hourly values were extracted into excel to give a total of 8779 individual hourly values for this receptor.

(6) The mean value of these 8779 individual hourly values was compared to the model output value. The results are shown in Table 12.k below:

Table 12.k: Validation of modeled annual mean calculation.

Month	Concentration ($\mu g/m^3$)	Location
January	0.2022	307000, 270980
February	0.1011	307000, 270980
March	0.1210	307000, 270980
April	0.1225	307000, 270980
May	0.1891	307000, 270980
June	0.3286	307000, 270980
July	0.2543	307000, 270980
August	0.1348	307000, 270980
September	0.3398	307000, 270980
October	0.2002	307000, 270980
November	0.1445	307000, 270980
December	0.1007	307000, 270980
Average of 8779 Hourly Results	0.1865	307000, 270980
Modelled Annual Average Result	0.1865	307000, 270980

The results indicate that the agreement is accurate to 4 decimal places and thus validates that the annual average calculation is correct in AERMOD.

5.f Worst Case Meteorological Conditions

Question

Identify the meteorological conditions at which elevated ground level concentrations of pollutants occur. Provide results for the 10 highest ground level pollutant concentrations (including meteorological data) for each modelled year for (i) vapour phase emissions and (ii) particulate phase emissions.

Response

Table 12.l shows the ambient air concentrations for the 10 highest ground level concentrations and the meteorological conditions under which these occurred for a normalized gaseous emission rate of 1 g/s .

Table 12.l: Ambient air concentrations (gaseous) (µg/m^3) for the 10 highest ground level concentrations using AERMOD and Dublin Airport 2005 met data.

Date / Time (HHDDMM)	Concentration (µg/m^3)	Location	Wind Speed (m/s) / Direction (°)	Temp (K)	Surface Heat Flux (W/m^2)	M-O Length (m)	Cloud Cover (%)	Mixing Height (m)
041410	7.45	308000, 267000	1.0 / 334	275.4	-1.0	2.2	1	51
241803	6.78	318240, 308000	1.5 / 338	281.4	-2.8	6.0	8	67
242111	5.88	304100, 272000	4.6 / 288	277.0	-25.9	40.2	1	526
241510	5.68	304100, 272000	3.1 / 116	285.9	-9.5	6.9	0	372
242810	5.33	304150, 272100	2.1 / 119	282.0	-4.1	4.9	5	121
230204	5.18	304100, 272050	2.1 / 118	279.9	-6.4	7.0	3	77
241510	4.67	304150, 272100	3.1 / 116	285.9	-9.5	6.9	0	372
220209	4.64	304150, 272100	3.1 / 119	286.4	-9.5	6.9	1	639
230708	4.43	304100, 272000	2.6 / 116	284.9	-12.3	10.6	1	490
050304	4.33	304100, 272050	2.6 / 118	277.5	-10.1	8.5	1	133

Table 12.l indicates that for gaseous releases, the meteorological conditions leading to the highest ground level concentration are under low to moderate wind speeds, negative surface heat flux, positive M-O length and low to moderate mixing heights. These results indicate that stable conditions lead to the highest ground level concentrations.

Table 12.m shows the ambient air concentrations for the 10 highest ground level concentrations and the meteorological conditions under which these occurred for a normalized particulate emission rate of 1 g/s.

Table 12.m: Ambient air concentrations (particulate) (µg/m^3) for the 10 highest ground level concentrations using AERMOD and Dublin Airport 2004 met data.

Date / Time (HHDDMM)	Concentration (µg/m^3)	Location	Wind Speed (m/s) / Direction (°)	Temp (K)	Surface Heat Flux (W/m^2)	M-O Length (m)	Cloud Cover (%)	Mixing Height (m)
211102	7.99	304750, 272950	2.1 / 141	279.2	-4.2	4.8	4	111
092411	6.65	304750, 273350	2.1 / 147	282.0	-3.6	5.7	8	126
092411	6.13	304750, 273300	2.1 / 147	282.0	-3.6	5.7	8	126
200409	5.86	304750, 273350	2.1 / 147	291.4	-4.0	5.0	5	1102
201502	5.60	304750, 273300	2.6 / 145	278.8	-5.6	6.9	8	286
182311	5.47	304750, 273300	2.1 / 147	283.8	-3.4	6.0	9	224
040204	5.13	304750, 273350	2.1 / 146	278.8	-6.2	7.3	5	143
201502	5.03	304750, 273350	2.6 / 145	278.8	-5.6	6.9	8	286
040211	4.78	304000, 271750	1.0 / 106	280.9	-0.8	2.8	9	52
162311	4.67	304000, 271750	1.0 / 108	284.2	-0.7	3.3	9	214

Table 12.m indicates that for particulate releases, the meteorological conditions leading to the highest ground level concentration are under low to moderate wind speeds, negative surface heat flux, positive M-O length and low to moderate mixing heights. These results again indicate that stable conditions lead to the highest ground level concentrations.

5.g Background $PM_{2.5}$ and NO_x Concentrations

Question

Justify that the background $PM_{2.5}$ and NO_x concentrations used in the assessment are appropriate, given the relatively short sampling periods and the potential for seasonal effects on air quality.

Response

The 24-hour $PM_{2.5}$ concentrations measured over the three-week baseline monitoring period (09/11/05 - 20/11/05 and 05/12/05 - 16/12/05) was significantly below the proposed annual average limit value of 25 µg/m^3 (for the protection of human health) which is applicable from 2015 onwards. The average over this period is 15 µg/m^3.

PM_{10} data is also available from a PM_{10} TEOM monitor operated by the EPA at Kiltrough(1) which is situated several kilometres east of the site. The PM_{10} concentration during the same monitoring period as the on-site $PM_{2.5}$ survey averaged 19.2 µg/m^3 whilst the annual average concentration for PM_{10} in 2005 was 16.8 µg/m^3. This indicates that during the measurement period PM concentrations were raised relative to the annual limit value (of the order of 15%) indicating that a long-term average may be of the order of 13 µg/m^3.

Similarly, PM_{10} data is also available from a PM_{10} monitor operated by the EPA in the Phoenix Park(1). The PM_{10} concentration during the same monitoring period as the on-site $PM_{2.5}$ survey averaged 13.8 μg/m^3 whilst the annual average concentration for PM_{10} in 2005 was 12.1 μg/m^3. Again, this indicates that during the measurement period PM concentrations were raised relative to the annual limit value (of the order of 15%) indicating supporting the view that a long-term average may be of the order of 13 μg/m^3.

Therefore, for the purposes of the updated modeling, a background $PM_{2.5}$ level of 13 μg/m^3 was assumed which rises to 14 μg/m^3 when traffic emissions and the cumulative assessment is taken into account.

NO_x

Average concentration of nitrogen dioxide were significantly below the EU annual limit value for the protection of human health of 40 μg/m^3, which is enforceable in 2010 over the three month survey period. The highest NO_2 level, which was measured at the M1/R152 roundabout is still less than 63% of this annual limit value whilst background levels near the facility ranged from 7-10 μg/m^3 rising to around 20 μg/m^3 near roadside locations.

NO_2 data is also available from a NO_2 monitor in Ballyfermot, Dublin 12. The NO_2 concentration during the same monitoring period as the on-site NO_2 survey averaged 16.6 μg/m^3 whilst the annual average concentration for NO_2 in 2005 was 21.8 μg/m^3. This indicates that during the measurement period NO_2 concentrations were reduced relative to the annual limit value (of the order of 30%) indicating that a long-term background average of the order of 9 - 13 μg/m^3 rising to around 26 μg/m^3 near roadside locations.

Similarly, NO_2 data is also available from a NO_2 monitor in Winetavern St, Dublin 2. The NO_2 concentration during the same monitoring period as the on-site NO_2 survey averaged 28.0 μg/m^3 whilst the annual average concentration for NO_2 in 2005 was 32.6 μg/m^3. This indicates that during the measurement period NO_2 concentrations were reduced relative to the annual limit value (of the order of 16%) indicating that a long-term background average of the order of 8 - 12 μg/m^3 rising to around 23 μg/m^3 near roadside locations.

Therefore, for the purposes of the updated modeling, a background NO_2 level of 18 μg/m^3 was assumed which rises to 20 μg/m^3 when traffic emissions and the cumulative assessment is taken into account for the opening year of 2012.

5.h Ambient Monitoring Locations

Question

For all background ambient monitoring locations, explain the criteria used for site selection and justify their appropriateness having regard to Schedule 8 Location of Sampling Points for the Measurement of Pollutants of the Air Quality Standards Regulations 2002, S.I. No. 271 of 2002.

Response

S.I. No. 271 of 2002 transposes Council Directives 1999/30/EC and 2000/69/EC into Irish Law. The predominant focus of the Directives is to ensure that ambient air quality is assessed (by the relevant national authority) in a uniform manner across the EU. Thus the Directives have outlined very specific monitoring methodologies at both the macro and micro levels to ensure that this is achieved. The Directives however do not focus particularly on specific industrial projects and any requirements that might be necessary in order to determine the air quality impact of these facilities prior to their construction.

Specifically, S.I. 271 of 2002 has guidance in relation to macro-siting of monitoring points including that sampling should focus on:

> "(i) *the areas within zones and agglomerations where the highest concentrations occur to which the population is likely to be directly or indirectly exposed for a period which is significant in relation to the averaging period of the limit value or values*";

and:

> (ii) "*levels in other areas within the zones and agglomerations which are representative of the exposure of the general population*".

The Directives also note that:

> "*Sampling points should in general be sited to avoid measuring very small microenvironments in their immediate vicinity. As a guideline, a sampling point should be sited to be representative of air quality in a surrounding area of no less than 200 m^2 at traffic-orientated sites and of several square kilometres at urban-background sites*."

In relation to the baseline study undertaken for the 2006 EIS, a range of monitoring locations were selected. Several locations such as M1, M3, M4, M5 and M6 would be similar to (ii) above in that they would be viewed as background locations and give a good indication of the general exposure of the population. In contrast, locations M2, M7, M8, M9 and M10 focused on roadside and kerbside locations which would be similar to (i) above in that they would be viewed as being representative of locations for which the population would be exposed for periods which are significant in relation to short term averages (such as the 1-hour limit values for NO_2 and SO_2).

Although the Directives above highlight the need to avoid microenvironments, when sampling for a specific project it may not be prudent to adopt such an approach. The approach for the current assessment was to capture not only background levels but also any potential hot-spots in the region such as the junction of the M1 / R152 and along Duleek main street (at kerbside) to ensure background levels over-estimated the actual levels to which the local population was exposed.

In terms of the microscale, the Directives have given specific instructions including:

> "(a) *the flow around the inlet sampling probe should be unrestricted without any obstructions affecting the airflow in the vicinity of the sampler (normally some metres away from buildings, balconies, trees, and other obstacles and at least 0.5 m from the nearest building in the case of sampling points representing air quality at the building line)*;
>
> (b) *in general, the inlet sampling point should be between 1.5 m (the breathing zone) and 4 m above the ground…..;"*

In terms of the above guidelines, the current baseline sampling generally complied with these guidelines as much as was practical. In relation to the diffusion surveys, samples were generally placed on lampposts at a height of approximately 2m. In relation to the fixed monitoring location (M1) the sampling height was of the order of 1-1.5m and was several metres from the nearest building.

Guidelines at the micro-scale are also give specific to traffic-orientated samplers:

> "(a*) for all pollutants, such sampling points shall be at least 25 m from the edge of major junctions and at least 4 m from the centre of the nearest traffic lane;*
>
> *(b) for nitrogen dioxide and carbon monoxide, inlets shall be no more than 5 m from the kerbside; and*

(c) for particulate matter, lead and benzene, inlets shall be sited so as to be representative of air quality near to the building line."

In terms of the above guidelines, the current baseline sampling again generally complied with these guidelines although sampling point M10 was closer than 25m to the major junction (M1/R152 roundabout) and thus will overestimate the air quality relative to the requirements of the Directives.

In terms of Point Sources, the Directives has given specific instructions including:

"*For the assessment of pollution in the vicinity of point sources, the number of sampling points for fixed measurement shall be calculated taking into account emission densities, the likely distribution patterns of ambient air pollution and the potential exposure of the population*".

In this regard, the monitoring complied with the thinking of the Directive in that a high density of measurements were located near the boundary of the site which is near the location of the predicted annual average maximum. A secondary consideration was the population distribution with sampling points M1 (nearest receptor), M5, M6, M7, M8 and M9 focussed on nearby residential receptors.

The EU has also given guidance in regards to air quality assessment around point sources(1). The guidance outlines the following recommendations:

- The focus should be on the nearest residential receptors rather than the site boundary.
- The primary assessment method should be based on air dispersion modelling using five years of meteorological conditions.
- Complementary to modelling, the assessment could be completed by a limited number of measurement stations (one or maximum two) focusing on residential areas.
- The purpose of the monitoring is to ensure that the model works properly.

References

(1) Guidance Note On Air Quality Assessment Around Point Sources (EU CAFE Working Group on Implementation, 2003)

5.i Model Receptor Grids

Question

Review and revise as necessary, the model receptor grids to show finer detail within 1km radius of the site (e.g. 20m x 20m) in order to demonstrate the effect of emissions from the proposed incinerator, as compared to the effect of emissions from neighbouring sources.

Response

The model has been updated to incorporate a grid resolution of 20m sized 2km x 2km with the site at the centre. This is nested within a middle grid of 50m resolution for the inner 5km x 5 km and an outer grid of 1km x 1km of grid size 19km x 19km. The total number of receptors (including boundary receptors) is 20501.

5.j PCDD/PCDF Emission Concentrations

Question

Table 7.29 PCDD/PCDF Relative Emission Factors for Municipal Waste Incinerator (MB-Ref WS) provides a Total PCDD/PCDF emission concentration of 0.1ng/m^3 from stack. As this concentration is the WID emission limit for Dioxins and Furans, please clarify whether it is a

worst-case scenario. In addition, please justify the appropriateness of using PCDD/PCDF emission factors for a mass burn refractometry system with wet scrubbing (taken from the Database of Sources of Environmental Releases of Dioxin-like Compounds in the United States, USEPA, 1998), given the changes to the proposed flue gas treatment design.

Response

The updated modeling has used 0.1ng/m^3 for Dioxin as it is the WID limit. It is expected that average emissions of dioxins will be well below this level averaged over a 24-hour period. In regards to changes to the APCS, the Database of Sources of Environmental Releases of Dioxin-like Compounds in the United States, USEPA, 1998 has been used to update the dioxin congener profile. The default profile now used as shown in Figures 7.15 and 7.16 and Table 7.29 of the 2009 EIS, is representative of a Mass Burn-Waterwall (MB-WW) kiln with an APSC consisting of DS (Dry Scrubber)/ CI (Carbon Injection) / FF (fabric filter) which is the APSC which is most similar to that now proposed for the Carranstown facility.

5.k Particulate Deposition Flux

Question

Table 7.34 PCDD/PCDF Annual Particulate Deposition Fluxes under Maximum Operating Conditions;- please clarify why the sum of the dry and wet particulate deposition fluxes does not correspond to the figure provided for the combined particulate deposition flux.

Response

The dry and wet deposition maxima occur in differing locations and thus the total deposition maximum is less than the sum of the dry and wet deposition.

5.l Polycyclic Aromatic Hydrocarbons

Question

Section 7.9 Polycyclic Aromatic Hydrocarbons (PAHs):- please clarify whether the assessment only considers benzo[a]pyrene or were all PAHs considered by weighting each one in terms of benzo[a]pyrene?

Response

Various approaches have been adopted to quantify exposure to the complex mixtures of PAHs including total PAH levels or the level of a marker substance such as benzo[*a*]pyrene[1,2]. Recent studies have found that the relation of B[*a*]P to the levels of 18 other individual PAHs was relatively stable[2]. Together these 19 PAH compounds constitute 90-95% of the PAHs measured in the air in this study[2]. The UK DETR Expert Panel on PAHs[1] has reviewed extensively the data available in terms of animal toxicology in deriving an ambient air quality standard for PAHs. The approach used by the Panel was to compare the sum of potential carcinogenic contribution of 7 individual PAHs (possible & probable carcinogens, see above) in ambient air with that of B[*a*]P. Contributions to total carcinogenicity from other PAH compounds are expected to be small relative to those considered above. Results from the comparison indicated that the estimated contribution of B[*a*]P to the total carcinogenicity of the seven chosen PAH compounds was similar in the three locations studied (ranging from 37.5%-49.3%)[1]. The overall conclusion from this approach was that using B[*a*]P as a marker of PAH exposure in the environment was suitable so long as major changes in the ambient mixture of PAH compounds do not occur in the future and that an air quality standard for PAH mixtures could be expressed in terms of the ambient concentration of B[*a*]P.

The EU has confirmed the validity of this approach in Council Directive 2004/107/EC which designates B[*a*]P as a marker for PAHs in general. The Directive has set a target value for the protection of human health for B[*a*]P of 1 ng/m^3 to be achieved prior to 2013.

References

(1) UK DETR (2000) Polycyclic Aromatic Hydrocarbons

(2) Farant & Gariepy (1998) Relationship between benzo[a]pyrene and individual polycyclic aromatic hydrocarbons in a Soderberg primary aluminium smelter American Industrial Hygiene Association Journal 59 (758-765)

5.m Comparable PAH Results

Question

Section 7.9.1 PAHs:- Are there any independent results available of monitoring of PAHs in emissions from a similar facility?

Response

PAH monitoring data for the Beveren facility in Flanders in available for 2008. The facility is a grate furnace burning Municipal Solid Waste and the APCS is semi-wet combined with a wet flue gas cleaning stage. The independently monitored data was undertaken by TAUW in March - April 2008 with analysis by GC-MS. The results show that levels of B[a]P were less than 0.001 µg/m^3 over the monitoring period (analysis sheet is shown in Appendix 12.f (in Dutch)). For the purposes of the air dispersion modelling a maximum 24-hour emission rate of 0.003 µg/m^3 was assumed.

5.n B[a]P Deposition

Question

Table 7.43 B[a]P Deposition Fluxes - please clarify why the sum of dry and wet particulates does not correspond to the figure provided for total particulates.

Response

The dry and wet deposition maxima occur in differing locations and thus the total deposition maximum is less than the sum of the dry and wet deposition.

6. Construction and Commissioning

Question

Provide an update on the schedule of plant construction and commissioning works.

Response

Please find in Figure 12.c an updated schedule.

Figure 12.c: Construction and Commissioning Schedule

Milestone	2009				2010				2011			
Construction start												
Detailed Design Complete												
Construction Phase												
Completion foundations and bunker												
Delivery of key equipment												
Completion and closing of building												
Construction Complete												
Pre Cold Commissioning Start												
Cold Commissioning Start												
Hot Commissioning Start												
Cold Commissioning Finish												
Operational Plant												

7. Classes under IPPC Directive

Question

Identify the relevant class or classes of activity in accordance with Council Directive 96/61/EC concerning integrated pollution prevention and control.

Response

Annex I of the IPPC Directive (96/61/EC) includes Activity Classes that are covered by the Directive. Activities that are relevant to the proposed facility include:

- Activity 1.1: *Energy industries – Combustion installations with a rated thermal input exceeding 50MW*
- Activity 5.2: *Waste Management - Installations for the incineration of municipal waste as defined in Council Directive 89/369/EEC of 8 June 1989 on the prevention of air pollution from new municipal waste incineration plants (4) and Council Directive 89/429/EEC of 21 June 1989 on the reduction of air pollution from existing municipal waste-incineration plants (5) with a capacity exceeding 3 tonnes per hour*[1]

The BREF Document relating to Activity 1.1 (for Large Combustion Plants) clarifies in the Scope (page i) that:

> *"Incineration of waste is not covered, but co-combustion of waste and recovered fuel in large combustion plants is addressed."*

Activity 5.2 is covered separately in the BREF Document on Waste Incineration. For this reason, only the latter BREF Document was referred to in Attachment L of the Licence RWLA.

[1] It is noted that the recently codeified IPPC Directive 2008/1/EC revising Directive 96/61/EC includes a slight modification to Activity 5.2 as follows:

- Activity 5.2: *Waste Management – Installations for the incineration of municipal waste (household and similar commercial, industrial and institutional waste) with a capacity exceeding 3 tonnes per hour.*

Appendix 12.a: Revised Planning SA/901467

Meath County Council
Planning Department
Abbey Mall
Abbey Road
Navan
Co. Meath
Phone: 046 909 7000 Fax: 046 909 7001

Planning & Development Act 2000 - 2008
NOTIFICATION OF DECISION

TO: Indaver N.V.
4 Haddington Terrace
Dun Laoghaire
Co. Dublin

PLANNING REGISTER NUMBER: SA/901467
APPLICATION RECEIPT DATE: 16/09/2009
FURTHER INFORMATION DATE:

In pursuance of the powers conferred upon them by the above-mentioned Act, Meath County Council has by Order dated 10-11-2009 decided to **GRANT** PERMISSION to the above named for development of land, in accordance with the documents submitted namely:- amendments and alterations to previously permitted development for a 70MW waste to entergy facility as applied for under(Planning permission register reference number SA60050 and An Bord Pleanala register reference number PL17.219721) as follows. Reduction in length of the main building by approx 45m;increase in width of the main process building by approx 8m (at widest point);increase in height of the main process building by approx 1m;increase in height of the flue cleaning building by approx 1m;increase in height of the bunker roof by approx 4.3m & decrease in width by approx 5m addition of an external fire escape from the administration block;inclusion of an additional floor within the administration block to accommodate an education centre;decrease in tipping hall roof height by approx 5m and decrease in width by approx 4m;relocation of the sprinkler tank and pumphouse (including height reduction of pumphouse by approx 2.5m & height increase of tank of approx 3.5m);relocation and modification to air cooled condenser (including a decrease in height of approx 8.5m);relocation and modification of ESB compound and switchroom (including a increase in height from 3m to 3.6m);modifications of the stormwater attenuation tank from an underground tank to a lagoon type tank;omission of proposed education, warehouse and workshop building, relocation and amendments to the proposed gatehouse and internal access road. Planning permission is also sought for an Ash Storage Hall approx 22m x 44m x 12.4m high and associated ash loading bay approx 23.8m x 4.4m x 12.4m high and the addition of a second puraflo effluent treatment plant to service the gatehouse. Planning permission is also sought for 2 no. new signs to main building on the south elevation and other minor modifications which are detailed in the plans and particulars submitted all on 10.36 hectare site. This application relates to an activity, which is the subjection to a waste licence under Part V of the Waste Management Act 1996. An Environmental Impact Statement will be submitted to the Planning Authority with this application. at Carranstown, Duleek, Co. Meath, subject to the 13 conditions set out in the Schedule attached.

Signed on behalf of MEATH COUNTY COUNCIL

DATE: 10-11-2009

M. Loughran
Administrative Officer

Provided there is no appeal against this DECISION a grant of planning permission will issue at the end of four weeks.

THIS NOTICE IS NOT A GRANT OF PERMISSION AND WORK SHOULD NOT COMMENCE UNTIL GRANT OF PLANNING PERMISSION HAS ISSUED

NOTE:

1. Any appeal against a decision of a Planning Authority under Section 34 of the Planning and Development Act, of 2000-2008 may be made to An Bord Pleanala. Any person may appeal WITHIN FOUR WEEKS beginning on the date of the decision.

2. Appeals should be addressed to An Bord Pleanala, 64 Marlborough Street, Dublin 1. An appeal by the applicant should be accompanied by this form. **In the case of a third party appeal, the acknowledgement from the Planning Authority of receipt of the submission or observation made by the person to the Planning Authority at application stage should be submitted and the name of the person, particulars of the proposed development and the date of the decision of the Planning Authority should be stated.**

Guide to Fees payable to the Board

a. Appeal against a decision of a planning authority on a planning application relating to commercial development[1] made by the person by whom the planning application was made, where the application relates to unauthorised development is € 4,500 or € 9,000 if EIS involved[2].

b. Appeal against a decision of a planning authority on a planning application relating to commercial development[1], made by the person by whom the planning application was made, other than an appeal mentioned at (a) is € 1,500 or € 3,000 if EIS involved[2].

c. Appeal against a decision of a planning authority on a planning application made by the person by whom the planning application was made, where the application relates to unauthorised development, other than an appeal mentioned at (a) or (b) is € 660.

d. Appeal other than an appeal mentioned at (a), (b), (c) or (f)[3] is € 220

e. Application for leave to appeal is € 110.

f. Appeal following a grant of leave to appeal € 110.

An appeal will be invalid unless accompanied by the appropriate fee and evidence of payment of submission fee to the Planning Authority.

3. Submissions or observations to An Bord Pleanala by or on behalf of a person (other than the applicant) as regards an appeal made by another person must be submitted within four weeks of receipt of the appeal by An Bord Pleanala and must be accompanied by a fee of € 50.

Footnote

[1] Commercial development includes 2 or more dwellings. See Board's order determining fees and its appeal guide.

[2] The higher fee applies where an environmental impact statement (EIS) was submitted to the planning authority under section 172(1) of the 2000-2008 Planning Act or article 103(1) of the 2001-2008 Planning Regulations except where the appeal relates solely to a section 48 / 49 development / supplementary development contribution scheme and/or a special financial contribution.

[3] Applies to:- (i) All third party appeals except where the appeal follows a grant of leave to appeal; (ii) First party normal planning appeals (section 37) not involving commercial or unauthorised development, or an EIS; (iii) All other appeals (non-section 37).

For more information on Appeals you can contact An Bord Pleanala at:

Tel: 01 - 8588100 or LoCall: 1890 275 175
Fax: 01 – 8722684
E-mail: bord@pleanala.ie
Web: www.pleanala.ie

Schedule of Conditions

1. The development shall be carried out in accordance with the plans and particulars lodged with the Planning Authority on the 16th September 2009, and in accordance with the provisions of the Environmental Impact Statement, except as may otherwise be required in order to comply with the following conditions.
Reason: In the interests of clarity.

2. The conditions of SA60050 (PL17.219721) relating to the overall development shall be fully complied with except where conditions hereunder specify otherwise.
Reason: In the interest of proper planning control.

3. The site construction working hours shall be confined to between 0700 and 1900 hours Monday to Saturday, inclusive (excluding bank holidays and Sundays) unless otherwise agreed in writing with the Planning Authority.
Reason: In the interests of residential amenity.

4. The developer shall fully comply with the requirements of Bord Gais relating to the execution of any works in the vicinity of the Bord Gais distribution mains, which traverse the site.
Reason: In the interest of development control.

5. Details of the materials to be used in the external finishes of the building, including samples shall be submitted to and agreed in writing with the Planning Authority prior to their construction.
Reason: In the interests of the visual amenities of the area.

6. A) The potable water supply from the public water supply mains shall be used for potable water uses only.

   B) As per Meath County Council Water Bye-Laws 2007 Part 3 Water Conservation, a Water Management and Conservation Plan shall be submitted to Meath County Council Water Services Infrastructure Section for approval within 2 months of the final grant. Such plan shall set out details of how best practice in water conservation shall be applied in respect of the proposed development to include water mains and internal plumbing and how water usage, leaks or excessive consumption may be identified and remedied. The applicant shall demonstrate how the measures outlined in the said Water Management and Conservation Plan will reduce the potable water demand of the proposed development.

   C) The development shall be designed to operate satisfactorily at minimum water mains pressure in the public water mains at peak hour demand.

   D) If not already in place, a water meter shall be installed at the connection to the public water main. The water meter shall be capable of remote reading. The type of and location for the water meter to be agreed with Meath County Council Water Liaison Officer prior to commencement of development.
   Reason: In the interests of public health and orderly development.

7. A) As 'long term storage' is not being provided on the proposed development the application of growth curve factors for the 1 in 30 and 1 in 100 year events shall not be used.

B) There shall be no pumped discharges to local drainage ditches/watercourses. Standoff manholes shall be provided before discharging to local drainage ditches/watercourses.

C) As per the Section 3.15 of the Greater Dublin Regional Code of Practice for Drainage Works Version 6.0, soak ways, filter drains and similar infiltration systems must comply with the relevant documents, including BRE Digest 365, CIRIA C522.

Class 1 Light Liquid Separators shall be in accordance with the latest version of European Standards prEN 858: Parts 1 & 2 and shall be installed at suitable locations, as agreed with the Area Engineer, on the private drainage system before discharging to the drainage ditch/ watercourse.

D) Within 2 months of the final grant, the applicant shall undertake and submit to the Planning Authority a Hydrological Study of the drainage ditch/watercourse into which it is proposed to discharge surface water from the proposed development. The Hydrological Study to be carried out by a qualified, experienced and competent Hydrologist. The study shall be carried out from the proposed point of discharge from the development site to a point to be agreed with the Area Engineer and shall examine the capacity of the drainage ditch/watercourse, in particular capacity at any existing culverts/pipes, and shall include details on cross sections, invert levels, flow data and water quality data.

E) Proposed regrading and cleaning out of existing drainage ditches shall be carried out under the supervision of a qualified Ecologist and in consultation with the Eastern Regional Fisheries Board.

F) Application for connection to the local drainage ditch/watercourse and for the carrying out of proposed regrading and cleaning out works shall be made to the Area Engineer.

G) Within 2 months of the final grant, the applicant shall submit full details of the proposed surface water attenuation pond together with a full risk assessment identifying all hazards and the proposed mitigation measures to eliminate/reduce the hazards identified together with a programme for the operation and maintenance of the proposed surface water attenuation pond. All work from the design stage through to construction and maintenance should be carried out in accordance with current Safety & Health Regulations.

H) The application shall comply with the Greater Dublin Strategic Drainage Study (GDSDS) Regional Drainage Policies Volume 2, for New Developments.

I) The rate of surface water runoff from the proposed development shall not exceed the pre-development 'greenfield' runoff rate.

J) Within 2 months of the final grant the applicant shall liaise with Meath County Council Water Services Infrastructure and agree exceedence routes and measures that will be provided for dealing with storm events greater than the 1 in 100 year storm event.

K) The Fire Fighting provisions for the proposed development to be agreed with Meath County Council Chief Fire Officer prior to commencement of development.
Reason: In the interests of public health and orderly development.

8. During the construction phase of the proposed development, noise levels at the site when measured at noise sensitive locations shall not exceed 65 dBA between the hours of 07:00 and 19:00 hours, Monday to Saturday inclusive, excluding bank holidays and public holidays and Sundays and 45 dBA at any other time. The $L_{Aeq,1hour}$ shall apply to all measurements.
Reason: To protect the amenities of property in the vicinity of the site.

9. Dust deposition monitoring at the site shall be carried out by a suitably qualified independent body on a quarterly basis. Dust deposition, when measured at the site boundaries and averaged over 30 days shall not exceed 350mg/m^2/day using the 'Bergerhoff Method'.
Reason: To protect the amenities of property in the vicinity of the site.

10. The single phase puraflo system serving the security gate house this shall be designed and constructed in accordance with the EPA code of practice wastewater treatment and disposal systems serving single houses (P.E. < or equal to10).
Reason: In the interests of public health.

11. No traffic, during either the construction phase or once the plant is operational, shall pass through the Bru na Boinne World Heritage Site
Reason: In order to protect the amenities of the World Heritage Site.

12. The proposed ash storage building should be completely enclosed and maintained under negative ventilation, trucks emerging from the building should be completely sealed and exit the site through the wheel wash in order to prevent any fugitive dust emissions.
Reason: In the interests of public health.

13. The developer shall provide aviation warning lights on the emission stack. The details of which shall be agreed in writing with the Irish Aviation Authority and the Planning Authority. The co-ordinates of the as constructed position of the stack and the as constructed elevation shall be submitted to the Irish Aviation Authority.
Reason: In the interests of public safety, development control and the protection of light aircraft using the surrounding area.

Appendix 12.b: Legal Opinion on EPA Pre-Treatment Requirements

Legal Opinion on EPA Pre-Treatment Guidance Note

Based on advice from Mr B. Slattery, Senior Associate, Arthur Cox

1. The EPA Pre-Treatment Guidance Note

The Pre-Treatment Guidance Note (referred to here as "the Guidance") is principally directed to providing a framework within which compliance with features of the Landfill Directive (1999/31/EC) can be achieved by landfill operators. This is unsurprising, given the Landfill Directive contains express and unambiguous obligations for Member States:

> (a) Under article 5, to set up a national strategy to ensure that biodegradable municipal waste going to landfills is reduced to a specified percentage of a given baseline year (the "diversion targets"); and,
>
> (b) Under article 6, to take measures in order that "only waste that has been subject to treatment is landfilled" (the "pre-treatment obligation").

Under EU law, there is no equivalent diversion target or pre-treatment obligation for any other waste activity. For this reason, again, it is unsurprising that the Guidance has little to say about "energy recovery", "incineration", "thermal treatment" or "waste to energy" (for convenience "WTE").

The Guidance does make two relevant observations:

(i) The primary intent behind pre-treatment obligations is described to include ensuring "extraction from the waste disposal stream of recyclable/recoverable resources, including energy" (page 11).

(ii) The processes that satisfy the pre-treatment obligation are described to include "energy recovery" and "thermal treatment (including pyrolysis)" (page 13).

This is entirely consistent with the National Strategy on Biodegradable Waste (Department of Environment, Heritage & Local Government, April 2006). That strategy relies upon thermal treatment in facilities such as the Meath WTE project to achieve compliance with the diversion targets (part 9).

Put simply, WTE is part of the solution to the problem posed by the diversion targets and the pretreatment obligation. This much is established under domestic and EU law and policy and, indeed, within the Guidance itself.

Against this background, the Guidance appears to do something irreconcilable with all of the foregoing by recommending:

> (A) "minimum pre-treatment obligations for waste intended to be accepted at WtE incineration facilities", namely "source separation (2 bin or equivalent) is a minimum pretreatment/diversion requirement. For urban areas (>1,500 population) diversion or separate collection of biowaste (i.e. third bin) is expected"; and,
>
> (B) "mechanical treatment of the incinerator residues".

We are advised that the first recommendation cannot be applied to the Meath WTE project without breaching domestic and EU law.

Before analysing this in more detail, it is noted that the Guidance makes no attempt to lay a foundation for the second recommendation. Although mechanical treatment is commonplace in WTE facilities across Europe, the recommendation is entirely out of place in Guidance based on diversion targets and the pre-treatment obligation. This contrasts starkly with the diligent and careful analysis of the legal and policy basis for regulation of landfill operators.

We would appreciate further guidance regarding the genesis of and thinking behind this recommendation.

Returning to the first recommendation, we are advised that:

1. **It has no basis in domestic or EU law.**

   The Guidance claims that "principles established in BAT as well as in EU legislation and policy obligations" require a WTE operator to "demonstrate to the EPA that what is accepted for combustion has been appropriately pre-treated" and describes the minimum appropriate pre-treatment with reference to source separated collection systems.

   No attempt is made to particularise this claim. Again, this contrasts starkly with the diligent and careful analysis of the legal and policy basis for regulation of landfill operators. This is wrong because the basis for action should be clearly stated and, more importantly, because there is no such basis.

   The only instrument that establishes a pre-treatment obligation and diversion targets is the Landfill Directive and, by definition, that instrument does not apply to the Meath WTE project (article 3(1)).

   The reference to best available techniques ("BAT") is confused. The relevant "techniques" include "both the technology used and the way in which the installation is designed, built, managed, maintained, operated and decommissioned" (section 5(2) of the Waste Management Acts, 1996 to 2008 (the "Waste Acts")). As such, BAT is relevant to the technology and installation proposed for the chosen input material.

   The reference document on BAT ("BREF") for waste incineration (European IPPC Bureau, August 2006) recognises this:

   > "it is BAT to pretreat incoming wastes to the degree required to meet the design specification of the receiving installation, noting that to treat waste beyond this requires balanced consideration of (possibly limited) benefits, operational factors and cross-media effects" (emphasis added)(page vi).

   BAT is relevant to whether the waste accepted for combustion has been pre-treated to the degree required to meet the design specification of the receiving installation. It is not relevant to source separated collection systems and the number of bins used to collect waste from urban and other areas.

   It is noted that the EPA does not rely on domestic law or policy for this recommendation. This is rational given that there is no such basis to do so.

2. **It is premature.**

   If domestic or EU law obliged all those involved in the production, generation and collection of waste to separate their waste in the manner described by the Guidance, those involved in treatment, recovery and disposal could be expected to respect that obligation. There is no such obligation. It is premature and inappropriate to insist that a WTE operator must respect an obligation that does not yet exist.

   The current Waste Framework Directive (consolidated in 2006/12/EC) does not address the issue of separate collection. The revised Directive (2008/98/EC) does. Under article 22, Member States must take measures to encourage, *inter alia*, "the separate collection of bio-waste with a view to the composting and digestion of bio-waste". This provision does not provide the EPA with an obligation to impose (or, for that matter, a basis for imposing) a pre-treatment obligation or diversion target for WTE. There are six reasons for this.

First, Member States have until 12 December 2010 to transpose the revised Directive. Pending transposition, unilateral action by the EPA is premature.

Second, article 22 imposes a reciprocal obligation on the European Commission to carry out an assessment on the management of bio-waste. That assessment must examine "the opportunity of setting minimum requirements for bio-waste management". Again, pending that assessment, unilateral action by the EPA is premature.

Third, article 22 is expressed to be subject to the waste hierarchy (in article 4). For reasons explained below, the Guidance offends that hierarchy and cannot be considered compliant with article 22.

Fourth, article 22 requires a balance between "separate collection" and "a high level of environmental protection". Any measures taken by a Member State cannot ignore that the necessary high level of protection can be achieved by WTE.

Fifth, article 22 does not simply extend the pre-treatment obligation and diversion targets in the Landfill Directive to other waste activities. As noted, it requires a co-ordinated and balanced assessment of bio-waste management, the outcome of which cannot be pre-empted, pre-judged or otherwise short-circuited by the EPA in the form of mere guidance.

Sixth, by granting the Meath WTE project a revised licence, the EPA does not prejudice the delivery of measures ultimately arising from the necessary assessment under article 22. Those measures would trigger the power for the EPA to further review the licence (section 46 of the Waste Acts).

3. **It does not differentiate between landfill and WTE.**

This is important for two reasons. First, there exists a hierarchy to be applied in waste management legislation and policy that distinguishes the two. Second, there is a critical factual difference that is directly relevant to source separated collection systems.

Waste Hierarchy

The hierarchy has most recently been articulated in the revised Waste Framework Directive. Although the deadline for transposition has not yet passed, each Member State is prohibited from taking measures that would prejudice the results to be achieved by the Directive (in the context of waste, Case C-129/96 *Inter-Environnement Wallonie ASBL v. Région Wallonne* and, in other contexts, Case C-144/04 *Werner Mangold v. Rüdiger Helm*).

Article 4 of the revised Directive established a hierarchy to be applied "as a priority order" in waste management legislation and policy. The hierarchy distinguishes between:

> "(d) other recovery, e.g., energy recovery; and,
>
> (e) disposal."

For current purposes, the Meath WTE project falls within paragraph (d), as it will meet the energy efficiency criterion described at R1 of Annex II to the revised Directive. Landfill falls within paragraph (e).

Notwithstanding this different priority order, the Guidance subjects both landfill and WTE to the same minimum pre-treatment obligation. This necessarily offends the hierarchy and, if given effect in the Meath WTE revised licence, would represent a breach of EU law.

Collection Systems

The Guidance fails to recognise one critical factual difference between landfill and WTE that is directly relevant to source separated collection systems. Every landfill operator is simultaneously responsible for the collection of waste from producers. Specifically, almost every landfill operator, whether private or public, operates a parallel waste collection service and/or has control over the management of that collection service (sections 34 and 35 of the Waste Acts).

Indaver does not.

This presents Indaver with insurmountable practical difficulties that simply do not arise for landfill operators, as Indaver does not have any meaningful control over collection systems. More fundamentally, the EPA must acknowledge relevant differences and cannot impose a disproportionate burden on waste operators who do not also collect waste or control waste collection services.

4. **It represents an unlawful and unjustified barrier to entry to, and will prevent, restrict or distort competition in, the market for waste infrastructure.**

   EU law requires effective competition and prohibits unjustified regulatory interference that would distort competition (Articles 3(1)(g), 30, 81 and 82 of the EC Treaty). There exist equivalent provisions to protect competition within Ireland (sections 4 and 5 of the Competition Acts 2002 and 2006).

   The Irish High Court has applied this logic to the waste collection market and prohibited a public authority from exercising regulatory powers to distort competition in that market (*Nurendale Limited t/a Panda Waste Services v. Dublin City Council & ors.* and *Greenstar Limited v. Dublin City Council & ors.*, unreported, High Court, McKechnie J., 21 December 2009).

   The, perhaps inadvertent, advantage for landfill operators gives rise to the same competition issues.

   Specifically, the minimum pre-treatment obligation imposed on WTE requires a measure of control over collection services. It is entirely possible that the necessary measure of control cannot be achieved without establishing collection services. This perverse outcome would represent an unlawful and unjustified barrier to entry to the market for waste infrastructure. Put simply, it would be unlawful to insist that Indaver enters the waste collection market as pre-condition to accessing the market for waste infrastructure.

   The point is underscored by the fact that Indaver's competitors in the waste infrastructure market are responsible for the collection of waste from producers. These are the same persons with whom Indaver would have to make arrangements to satisfy the minimum pre-treatment obligation in the Guidance.

   Also, the Guidance necessarily provides an advantage to Indaver's competitors in the waste market, whether public or private. They can limit source-separated collection systems to the extent necessary to deliver waste to their own landfill infrastructure, to the exclusion of WTE facilities.

   All of these difficulties flow from the premature attempt to impose obligations that have no basis in domestic or EU law or policy.

5. **It is impractical, unclear and incapable of meaningful enforcement.**

   Any attempt to give effect to the Guidance, by way of condition in the Meath WTE revised licence, would suffer practical difficulties.

   As noted, Indaver does not have meaningful control in or over the waste collection market (and it would be unlawful to insist we enter that market as pre-condition to

accessing the market for waste infrastructure). Indeed, the BREF note on waste incineration recognises that “waste incinerators may have only limited control over the precise content of the wastes they receive” (page 7).

Assuming waste from third party collectors is accepted at the Meath WTE facility (which is the only fair and reasonable assumption), those persons would have influence (if not control) over how and whether the Meath WTE facility complies with the minimum pre-treatment obligation in the Guidance. This would be unacceptable and inconsistent with proper administration and enforcement of any licensing code. The fact that many of those same persons are in competition with Indaver underscores the point and illustrates the perverse consequences of the Guidance.

6. **It is unnecessary**.

   There exist alternative and more appropriate mechanisms for regulating the waste collection market. These include:

   (a) primary regulation of waste producers, by requiring presentation of separate waste streams for collection; and/or,

   (b) primary regulation of waste collectors, by requiring separate collection, whether under law or through their collection permits.

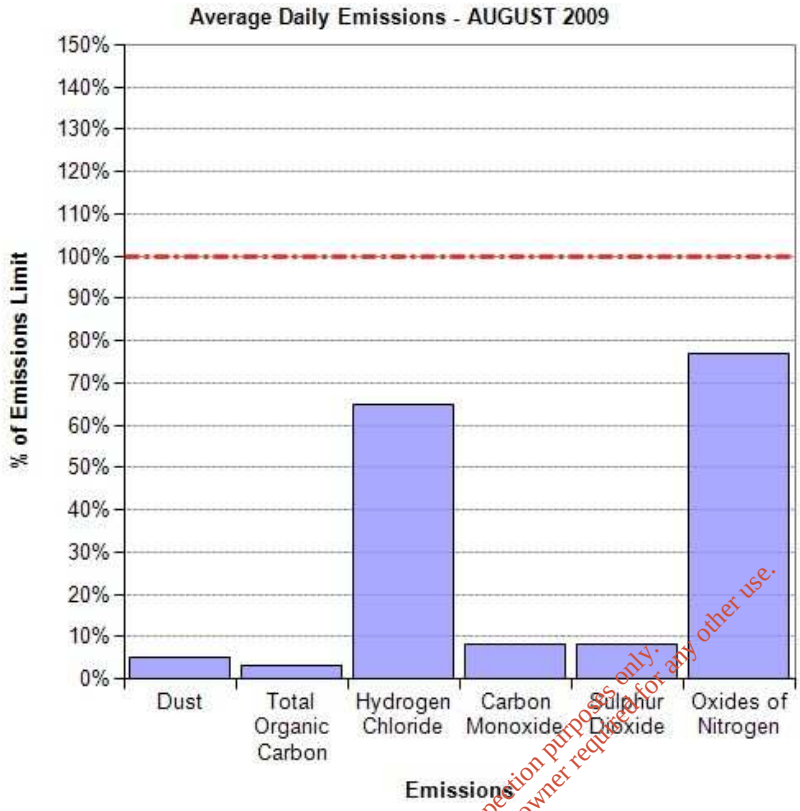
   Both would provide meaningful control of persons directly responsible for production and collection. WTE is too far removed from the activity that requires regulation for the Guidance to be effective.

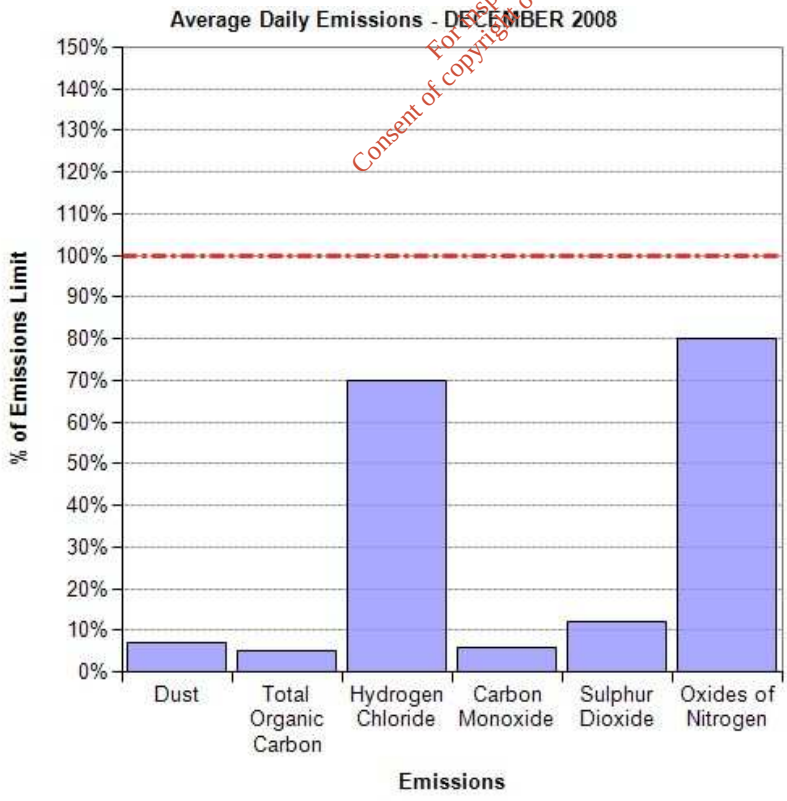
Conclusion

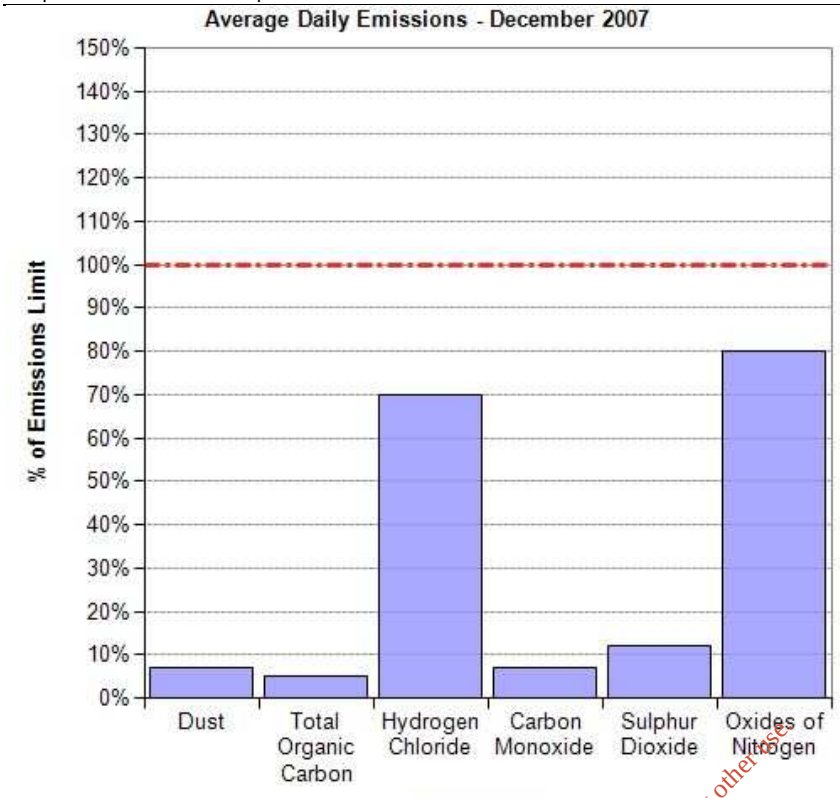
Finally, it is noted that the Guidance represents current thinking of the EPA and no more. It is not listed as a relevant statutory consideration in the decision-making process on a new or revised licence.

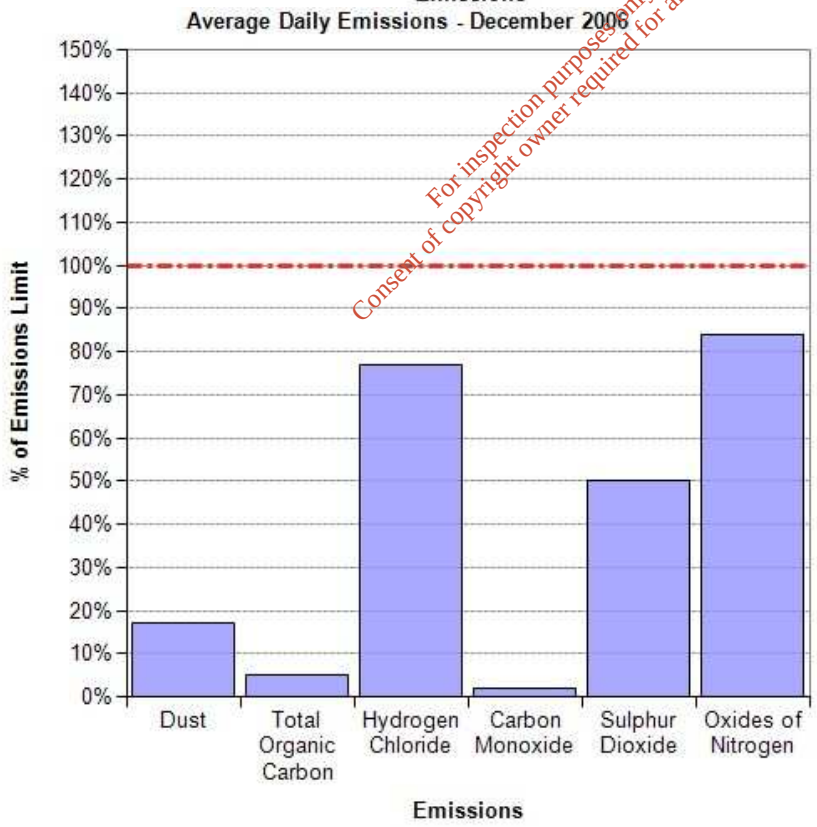
For all of these reasons, we are advised that there is no lawful basis for the EPA to impose the minimum pre-treatment obligation of the kind proposed in the Guidance.

Appendix 12.c: Emissions from LAB System in Sheffield Waste-to-Energy plant









Appendix 12.d: Meath County Council Agreement to provide a mains connection

Comhairle Chontae na Mí
Oifigí Cathartha Damhlaig,
Damhlaig, Contae na Mí.
Fón: 041 - 9880700
Cuirtear Fáilte Roimh Chomhfhreagras i nGaeilge

Meath County Council
Duleek Civic Offices,
Main Street, Duleek, Co. Meath.
Fax: 041 - 9880139

19th September 2008

John Sisk Site Office
Carlanstown
Duleek
Co. Meath
f.a.o.: Brian O`Neill

Re: Water Connection Application – WC2008-25

Dear Brian,

I refer to the above and wish to advise that Meath County Council have no objection to the proposed connection subject to the following:

1. Payment of attached invoice 38014295 for €948.12.

Trusting this is to your satisfaction.

Yours sincerely

Paul Monahan
Area Administrator

Appendix 12.e: Revised Table E.1(iii)(a)

Emission Point Reference Number: ***A2-1***

Parameter[2]	Prior to treatment				Brief description of treatment	As discharged [3]					
	mg/Nm^3		kg/h[4]			mg/Nm^3		kg/h [4]		kg/year[5]	
	Avg	Max	Avg	Max		Avg[6]	Max[7]	Avg	Max	Avg	Max
Dust	2,000	3,000	268	294	Baghouse filter	5	10	0.67	1.47	5,869	12,877
SO_2	658	1,664	88	97	Spray dryer absorber / lime slurry	40	50	5.36	7.35	46,956	64,386
NO_x (as NO_2)	350	600	21	24	SNCR	160	200	21.4	29.4	187,826	257,544
Hg	0.2	0.5	0.03	0.03	Clay injection / baghouse filter / activated carbon	0.04	0.05	0.005	0.007	47	64
HCl	1,472	2,984	197	216	Spray dryer absorber / lime slurry	8	10	1.07	1.47	9,391	12,877
HF	10	30	1.34	1.47	Spray dryer absorber / lime slurry	0.8	1	0.11	0.15	939	1,288

[2] All values are at standard conditions of: T=273 Kelvin, P=101.3 kPa, 11% O_2 dry gas. All heavy metals measurements include compounds e.g. Cd represents Cadmium and its compounds

[3] All values are relevant for the sample period specified under Directive 2000/76/EC. For Cd, Tl, Hg and Heavy Metals categories the sample period is between 30 minutes and 8 hours. For dust, TOC, HCl, HF, CO, SO_2 and NO_x the sample period represented in Table E.1 is 24 hours.

[4] The average discharge is based on the average annual average flowrate of 134,000 Nm^3/h. The maximum discharge is based on the maximum annual flowrate of 147,000 Nm^3/h which was modelled as the worst case scenario.

[5] Annual emissions are based on 8760 hours operation whereas actual annual operating hours are more likely to be 7800 h/y.

[6] Average values are based on guaranteed emissions limits from the supplier. Actual emissions are expected to be lower, in line with experience from operating facilities in Belgium.

[7] Maximum values are based on maximum concentrations permitted under Directive 2000/76/EC over the specified sample period.

Parameter[8]	Prior to treatment				Brief description of treatment	As discharged [9]					
	mg/Nm^3		kg/h[10]			mg/Nm^3		kg/h.[9]		kg/year[11]	
	Avg	Max	Avg	Max		Avg[12]	Max[13]	Avg	Max	Avg	Max
PCDD/F[14]	5 ng/Nm^3	5 ng/Nm^3	0.67 mg/h	1.0 mg/h	Clay injection / baghouse filter / activated carbon	0.058 ng/Nm^3	0.1 ng/Nm^3	0.0078 mg/h	0.015 mg/h	68 mg/y	129 mg/y
Heavy metals[15]	100	150	13.4	14.7	Clay injection / baghouse filter / activated carbon	0.4	0.5	0.05	0.07	470	644
Cd & Tl	0.4	1	0.05	0.06	Clay injection / baghouse filter / activated carbon	0.04	0.05	0.005	0.007	47	64
TOC	8	10	1.07	1.18	Combustion optimisation	8	10	1.07	1.47	9,391	12,877
CO	40	50	5.4	5.9	Combustion optimisation	40	50	5.4	7.4	46,954	64,386

[8] All values are at standard conditions of: T=273 Kelvin, P=101.3 kPa, 11% O_2 dry gas. All heavy metals measurements include compounds e.g. Cd represents Cadmium and its compounds

[9] All values are relevant for the sample period specified under Directive 2000/76/EC. For Cd, Tl, Hg and Heavy Metals categories the sample period is between 30 minutes and 8 hours. For dust, TOC, HCl, HF, CO, SO_2 and NO_x the sample period represented in Table E.1 is 24 hours.

[10] The average discharge is based on the average annual average flowrate of 134,000 Nm3/h. The maximum discharge is based on the maximum flowrate of 147,000 Nm3/h as modelled.

[11] Annual emissions are based on 8760 hours operation whereas actual annual operating hours are more likely to be 7800 h/y.

[12] Average values are based on guaranteed emissions limits from the supplier. Actual emissions are expected to be lower, in line with experience from operating facilities in Belgium

[13] Maximum values are based on maximum concentrations permitted under Directive 2000/76/EC over the specified sample period.

[14] All PCDD/F values are expressed as ng_{TEQ}/Nm^3 or ng_{TEQ}/h according to the units required

[15] Heavy metals includes Antimony (Sb), Arsenic (As), Chromium (Cr), Cobalt (Co), Copper (Cu), Lead (Pb), Manganese (Mn), Nickel (Ni), and Vanadium (V) and their compounds

Appendix 12.f: Beveren Analysis Report - PAHs (In Dutch)

BEPALING GEHALTEN PCDD EN PCDF (Gekoelde lans methode)

Laatste validatie rekenprogramma: 23/08/2005

Project	:	Indaver
Projectnummer	:	9537499
Projectcode	:	B08/250
Datum	:	26/03/08 - 09/04/08
Locatie	:	RO 12

BEMONSTERINGSGEGEVENS		:	METING 1
monstercode		:	229
aanvang	dd/mm/jj	:	26/03/08
einde	dd/mm/jj	:	09/04/08
netto meettijd	d u m	:	14d 1u 16m
stilstand bemonsteringsapparatuur	d u m	:	0d 0u 11m
gasmonstervolume	Nm³	:	131,13
ZUURSTOFCORRECTIE t.o.v. 11 VOL%			
gemeten zuurstofgehalte	vol%	:	9,5
omrekeningsfactor		:	0,87

RESULTATEN	Analyseresultaten	Emissieconcentraties [µg/Nm³]	
			11 vol% O2
PAK	µg/filter	[µg/Nm³], droog	[µg/Nm³], droog
Naftaleen	730	5,57	4,82
Acenaftyleen	13	0,099	0,086
Acenafteen	0,9	0,007	0,006
Fluoreen	1,5	0,011	0,01
Fenanthreen	1,4	0,011	0,009
Anthraceen	<0,4	<0,001	<0,001
Fluorantheen	<0,4	<0,001	<0,001
Pyreen	<0,4	<0,001	<0,001
Benzo(a)anthraceen	<0,4	<0,001	<0,001
Chryseen	<0,4	<0,001	<0,001
Benzo(b)fluorantheen	<0,4	<0,001	<0,001
Benzo(k)fluorantheen	<0,4	<0,001	<0,001
Benzo(a)pyreen	<0,4	<0,001	<0,001
Dibenzo(ah)anthraceen	<0,4	<0,001	<0,001
Benzo(ghi)peryleen	<0,4	<0,001	<0,001
Indeno-(1,2,3-c,d)pyreen	<0,4	<0,001	<0,001
Som PAK (EPA)	750	5,72	4,95
Som PAK (VROM)	730	5,57	4,82
PCB's			
PCB 28	<1	<0,001	<0,001
PCB 52	<1	<0,001	<0,001
PCB 101	<1	<0,001	<0,001
PCB 118	2	0,015	0,013
PCB 138	<1	<0,001	<0,001
PCB 153	<1	<0,001	<0,001
PCB 180	<1	<0,001	<0,001
Chloorbenzenen			
Hexachloorbenzeen	5,08	0,039	0,034

RESULTATEN	Analyseresultaten	Emissieconcentraties [ng/Nm³]	
			11 vol% O2
	ng/filter	[ng/Nm³], droog	[ng/Nm³], droog
Coplanaire PCB's			
PCB 77	0,9	0,007	0,006
PCB 81	0,4	0,003	0,003
PCB 105	2	0,015	0,013
PCB 114	2,4	0,018	0,016
PCB 118	2	0,015	0,013
PCB 123	1,1	0,008	0,007
PCB 126	4,5	0,034	0,03
PCB 156	2,3	0,018	0,015
PCB 157	1,7	0,013	0,011
PCB 167	1,2	0,009	0,008
PCB 169	2	0,015	0,013
PCB 189	1,5	0,011	0,01
TEQ PCB volgens WHO	0,474	0,004	0,003
TEQ PCB volgens WHO Upper Bound	0,474	0,004	0,003