

Attachment E.1: Emissions to Atmosphere

Section 7 of the EIS describes potential emissions to atmosphere, which are summarised here.

E.1.1 Point Source Emissions

There will be one main emission source and one minor emission source resulting from activities at the proposed site, referred to as:

- A2-1 Waste-to-energy plant stack flue (main emission source)
- A2-2 Waste-to-energy plant emergency generator (minor emission source)

Appendix E1 (Drawing 15013\WL\0010) shows the locations of these emission points. More details about the type and nature of the emissions are provided in Table E.1 (ii) (a) and E.1 (iii) (a) in Appendix E2.

Emissions leaving the stack (A2-1) will pass through an extensive flue gas treatment system described in Attachment D.2.6, which is designed to ensure compliance with the emissions limits set out in the EU Directive on the Incineration of Waste (2000/76/EC). These limit values are given in Table 5.1 of the EIS. Based on experience from operating Indaver's facilities in Belgium (see Appendix E3¹), typical emission concentrations will be well below the limits specified in this Directive.

The emergency diesel generator (A2-2) results in minor emissions because it will only run when there is no alternative power source for the plant e.g. when both the waste-to-energy plant and the connection to the National Grid are not operational. It is anticipated that the total annual operation of this generator will not exceed 12 hours. Indaver Ireland also intends to investigate the option of using biodiesel rather than conventional diesel to fuel the generator.

More details on this minor emissions source are provided in Table E.1 (ii) (b) and E.1 (iii) (b) in Appendix E4.

E.1.2 Fugitive Emissions

All road and yard surfaces will be paved to minimise dust generation and vehicle cleaning requirements. Waste storage, treatment and handling operations will take place within the confines of the waste acceptance hall and bunker. The bunker will be large enough to allow acceptance of waste during periods of shutdown, so waste will never be stored externally. The reception hall and bunker will be maintained under negative pressure to prevent fugitive emissions.

The storage, treatment and handling of all other solids and plant cleaning operations will be carried out in fully enclosed environments. No solids will be stored in the open.

E.1.2.a Residues

Bottom ash and grate siftings will be handled within the main process building, which will be fully enclosed and maintained under negative pressure. The material will be wet when stored and transported due to the quenching bath, so will not be dusty. Trucks will be loaded with bottom ash in an enclosed loading bay and will be securely covered for transport to prevent any windblown ash emissions.

¹ Extract from Indaver NV Sustainability Report 2007, available at <http://www.indaver.com>

Boiler ash and flue gas treatment residues will be transferred in enclosed conveyors to silos located in a dedicated storage area within the main process building. As outlined in Attachment D.2.7, these silos will be fitted with High Efficiency Particle Attenuation (HEPA) filters to prevent fugitive dust emissions. Trucks will be loaded in an enclosed loading bay and securely covered for transport. There will be no fugitive emissions associated with the storage or unloading of these residues during normal operation

E.1.2.b Solid Consumables

There will be no fugitive emissions associated with the loading or storage of consumable materials during normal operation.

All storage of consumables will be in fully enclosed silos in a contained storage area in the main process building, with the exception of the SNCR reagent. The silos will be allowed to breath normally during operation and will be equipped with HEPA filters to prevent any fugitive dust emissions. Air from this section of the building will ventilate naturally.

The consumables to be loaded and stored in this fashion include:

- Activated carbon
- Quick lime (CaO)
- Hydrated lime (Ca(OH)₂)
- Expanded clay (Dioxorb)

Unloading will take place in a bay located outside the main process building. Fugitive emissions from the unloading process will be prevented by using a closed loop system.

E.1.2.c Liquid Consumables

The SNCR reagent is the main liquid reagent for the flue gas treatment system and will be stored in a tank in the main process building. The tank will be equipped with a closed loop system to prevent fugitive emissions during loading and unloading and pressure relief valves to avoid extreme overpressure situations. This will ensure that there are no fugitive emissions from the SNCR reagent tank during normal operations.

Other liquid reagents to be used onsite in very small quantities include:

- Sodium hydroxide (for water treatment)
- Hydrochloric acid (for water treatment)

These will be also stored in the main process building, and will not give rise to any fugitive emissions.

The fuel oil tank will be located outside the main process building, adjacent to the turbine building. All filling of the tank will take place using a closed loop system to prevent fugitive emissions. The tank will breathe normally to atmosphere to cope with elevated temperatures, as is standard practice for diesel storage tanks. Fugitive emissions from this source will be insignificant.

E.1.2.d Other

The proposed sanitary effluent treatment system will be fully enclosed and will not cause any emissions to atmosphere. For more information on this system, please see Attachment D.1.k.

Cleaning operations will take place inside the main process building so will not give rise to any fugitive emissions.

E.1.3 Modifications to Air Emissions

The principle modifications to the air emissions approved in Waste Licence 167-1 are outlined in Table E.1.a below.

Table E.1.a: Modifications to air emissions

Aspect	Difference
E.1.1: Point source emissions	The emission point reference A2-1 (stack) was previously referred to as A1.1. The emission point reference A2-2 (emergency generator) was previously referred to as A2.1.
	Annual emissions from A2-1 have increased in line with the increased throughput. Expected emissions remain well within EU Waste Incineration Directive (2000/76/EC) emissions limit values.
	A2-2 was not previously included in the emissions tables E.1(ii) or E.1(iii). Although expected emissions have not increased from this source, it was included for completion as a minor emission source.
E.1.2: Fugitive emissions	Consumables will be stored in a fully contained room in the main process building to ensure any spills do not affect the whole plant.

Attachment E.2: Emissions to Surface Waters

Section 11 of the EIS and Attachment D.1.k describe the surface water management regime onsite, which is summarised here. More information on surface water management was provided to Meath County Council on their request. This Additional Information was submitted in June 2006 and is available at <http://www.indaver.ie/meath1.htm>. Relevant details from this submission are included in Attachment D.1.k and the text below.

E.2.1 Process Water

There will be no process effluent from the facility. The process has been specifically designed to minimise the use of water and to avoid discharge by using a combined semi-wet and dry flue gas treatment system with process water recirculation.

E.2.2 Stormwater Drainage

There will be one emissions source from the drainage system, referred to as:

- SW1 Stormwater drainage outfall

Appendix E1 shows the locations of this emission point. More details on the emission are provided in Table E2(i) in Appendix E5. Due to the nature of the discharge, Table E2(ii) could not be completed. However, it is expected that the EPA in conjunction with the drainage division of Meath County Council will set limits on the emission of parameters such as TOC, conductivity and pH at SW1.

Please refer to Section D.1.k for a detailed description of the stormwater drainage system. Meteorological data used in the design of the system is provided in Appendix 11.2 of the EIS.

E.2.2.a Nature of Emission

Emissions at SW1 will consist of non-contaminated surface water runoff collected in the surface water drainage system. The discharge rate will be controlled by a hydrobrake system at the Dublin City Council Storm Water Management Policy recommended rate of 16.98 l/s. With this system, the discharge from the site will be similar in nature and quality to runoff from agricultural lands so will not have any impact on existing drainage patterns from the site. Attenuation capacity onsite will ensure the recommended discharge rate is not exceeded even during a 1 in 100 year storm.

Drainage waters from the main process building will not be discharged to the surface water drainage system but will drain to a separate spill tank for recirculation in the process. The undeveloped area of the site will continue to drain naturally to existing drainage ditches. Surface waters draining from these areas will not come into contact with any potential contamination from the plant.

E.2.2.b Potential Contamination

Contamination of the surface water drainage system could occur in the event of a fire or uncontained spillage of polluting substances on the hardstand areas draining into the system.

To minimise the potential for spillages, personnel will follow handling procedures when dealing with chemicals and other potentially polluting substances. Adequate containment will be provided in storage areas to prevent any spills from

contaminating the surface water drainage system. In general, mitigation measures to prevent the contamination of surface water are similar to those for the protection of groundwater, discussed in Attachment F.1.2.

A full description of the measures taken to prevent contamination of surface water emissions is given in Attachment D.1.k. The drainage system will be split into three sections. No drainage from inside the waste-to-energy plant will enter the surface water drainage system apart from firewater². Drainage from the main hardstanding areas will pass through two monitoring chambers and a Class II full retention separator for petrol like substances prior to discharge to a drainage ditch. This will ensure that emissions from the surface water drainage system are not contaminated.

Significant tanks such as the stormwater/firewater attenuation tank and contaminated water diversion tank will be fitted with level alarms to notify operators of blockages and prevent overflow. Regular inspection and maintenance of drainage bunds, traps and other components will ensure the sound operation of the system.

A schematic of this system is provided in Attachment D.1.k.

E.2.3 Modifications to Surface Water Emissions

The principle modifications to surface water emissions approved in Waste Licence 167-1 are outlined Table E.2.a below.

Table E.2.a: Modifications to Surface Water Emissions

Aspect	Difference
E.2.2: Stormwater Drainage	Discharge of surface water runoff to the drainage ditch will be more frequent and greater in volume overall because water will no longer be recirculated within the plant. Increased attenuation capacity has been provided to ensure the discharge rate will not exceed the rate recommended by the Dublin City Council Storm Water Management Policy.
	Two monitoring chambers will be installed to divert flows if required and thereby ensure that any discharge is strictly uncontaminated. The fire alarm will also automatically trigger the diversion of runoff to a contaminated water tank. All surface water runoff will pass through a Class II full interceptor for petrol like substances.

² From areas outside the bunker, as explained in Attachment D.1.k.

Attachment E.3: Emissions to sewer

There will be no emissions to sewer from the facility. All sanitary effluent from staff and visitor facilities will be treated onsite in a Puraflo treatment system as outlined in Attachment D.1.k.

For this reason, Tables E.3(i) and E.3(ii) have not been included.

E.3.1 Modifications to Sewer Emissions

There are no modifications to the sewer emissions approved in Waste Licence 167-1.

*For inspection purposes only.
Consent of copyright owner required for any other use.*

Attachment E.4: Emissions to Groundwater

Sections 9 and 10 of the EIS describe the potential impacts of site activities on groundwater, which are summarised here.

E.4.1 Area Source Emissions

There will be one minor emission from the facility to ground, which will be referred to as:

- GW1 Groundwater percolation area

Appendix E1 shows the location of this emission area, to the northern end of the site.

The emission will consist of treated sanitary effluent from staff and visitor areas. It will be treated in a Puraflo Liquid Effluent Treatment System prior to discharge over a 300m² percolation area into the overburden. This system provides a combination of physical, chemical and biological treatment of wastewater in a biofibrous medium. It is common to development located in areas with no public sewer facilities such as golf clubs and is certified by the Irish Agreement Board. More information is provided on the Puraflo system in Attachment D.1.k and Appendix D4.

A percolation test has been carried out for the reserve percolation area, which found that the water table at the site is low and will therefore not have any negative impacts on percolation. However, the percolation area did not meet EPA Guideline values during the soil percolation "T-value" test. To rectify this, the site will be engineered to ensure a sufficiently high level of percolation in line with EPA Guidelines. This includes removing the existing overburden material and importing suitable material such as fine sand or clayey sand to build a percolation area. A reserve percolation area will also be provided in the event of the main area malfunctioning.

The Puraflo system will treat the effluent to a very high standard prior to dispersion in the percolation area. Expected emissions values extracted from the Puraflo brochure in Appendix D4 are shown in Table E.4.a.

Table E.4.a: Typical Treated Effluent Quality from the Puraflo system

Parameter	Concentration
pH	5 – 8
Biological Oxygen Demand (BOD) (mg/l)	<15
Total Suspended Solids (TSS) (mg/l)	<15
NH ₃ -N (mg/l)	<5
Nitrate-N (mg/l)	20
Total coliforms elimination	>99.9%
Faecal coliforms elimination	>99.9%
Pathogenic Bacteria ³	Absent

More details on the discharge at GW1 are provided in Table E.4 (i) in Appendix E6.

³ Including Salmonella spp, Shigella spp, Sulphide reducing Clostridia, Staphylococcus spp and Psudomonas aeruginosa

E.4.2 Fugitive Emissions

Abatement and treatment techniques to prevent fugitive emissions to ground are outlined in Attachment F.1.2.

E.4.3 Modifications to Groundwater Emissions

There are no modifications to the groundwater emissions approved in Waste Licence 167-1.

*For inspection purposes only.
Consent of copyright owner required for any other use.*

Attachment E.5: Noise emissions

Section 8 of the EIS provides information on the noise emissions from site activities, which are summarised here.

E.5.1 Point Source Emissions

There are six potential sources of continuous noise due to the operation of process equipment, which will be referred to as:

- N1 Stack
- N2 Air Cooled Condensors
- N3 Turbine Cooling
- N4 Fan Turbine Building
- N5 Compressor Louver Grids
- N6 Cooling Oven Grid

Appendix E1 shows these emissions at various locations within the main process building and turbine building. Grid references are provided in Table E.5(i) in Appendix E7. Although Table 8.9 of the EIS lists 16 noise emissions points, these are all based on the 6 points listed above and represent different orientations for modelling purposes.

The stack, air cooled condensers and turbine coolers are the most significant continuous sources of noise as they are located externally. In order to mitigate noise from this equipment, the plant has been located as far as practicable from the nearest sensitive receptor. Emissions points N4, N5 and N6 represent louvers on the sides of buildings where noise from equipment operated within those buildings may escape.

Other potential noise sources including feedwater pumps, induced draught fans, the shredder and primary and secondary air fans, will be located within the main process building and will be provided with individual acoustic insulation to minimise emissions. Further mitigation measures outlined in Section 8 of the EIS include selecting equipment with low noise emission levels, installing duct mounted attenuators on the atmosphere side of all air moving plant and installing splitter attenuators or acoustic louvers to internal plant and process areas.

Details of the expected emissions are provided in Table E.5 (i). These are based on sound power levels measured for similar items of plant at the Indaver facility in Beveren, Flanders, Belgium.

E.5.2 Fugitive Emissions

The only other potential source of noise on and off the site is traffic. The majority of traffic movements onsite, including all heavy vehicle movements, will take place during the waste acceptance hours of 08:00 to 18:30 Monday to Friday and 08:00 to 14:00 on Saturdays. Traffic noise was predicted to have little impact on the overall noise from the site, so was not included in Table E.5(i). More details on traffic noise emissions are provided in Attachment I.6 and Section 8.5.4 of the EIS.

E.5.3 Vibration

Potential vibration sources from operations include the turbine, generator and ID fan, all located inside the main process building. The turbine will be mounted on a separate soleplate or dedicated skid and isolated from the rest of the building to avoid vibrational impacts on other equipment. None of the plant items could cause ground vibrations of magnitude that would cause damage to surrounding buildings or persons while in operation.

E.5.4 Modifications to Noise Emissions

The principle modifications to the noise emissions approved in Waste Licence 167-1 are outlined in Table E.5.a below.

Table E.5.a: Modifications to Noise Emissions

Aspect	Difference
E.5.1	A noise emission from the Cooling Oven Grid has been included, which represents the louver nearest to a small air condenser used to cool the grate. The number of emissions points at the turbine building has been reduced to one for simplicity in this section (see Table 8.9 of the EIS for the number of points modelled). The location of all process equipment causing noise emissions has also changed with the revised layout. Expected emissions from process equipment have been updated, with some emissions expected to decrease (stack, turbine cooling, cooling oven) and others expected to remain constant or increase by no more than 1dBA at reference distance.
E.5.2	Noise emissions from traffic onsite and from the R152 were considered in more detail, as shown in Section 8 of the EIS.

Attachment E.6: Other Environmental Nuisances

E.6.1 Vermin Control

Vermin including birds, flies and rodents are attracted to untreated waste and associated odours. To prevent access of vermin to untreated waste, all waste delivery trucks will be enclosed and waste handling and storage will take place in the enclosed waste reception hall. The hall will be maintained under negative pressure to prevent odour emissions.

Ensuring the rapid turnover of waste in the reception hall and bunker will also minimise odour emissions and the potential for vermin. Most of the waste delivered to the facility will be loaded directly into the waste bunker and will be processed within four days on average. There will be no storage of waste in the reception hall.

All parts of the facility will be kept clean and tidy through good housekeeping measures, which will reduce bird and fly nuisance. In addition, a comprehensive rodent control plan will be put in place and implemented by a specialist rodent control company. It is envisaged the company will visit the site on a regular basis and records of these site visits will be maintained by Indaver Ireland.

E.6.2 Dust Control

Potential sources of dust from the facility will include stored waste, solid consumables, and residues. As outlined in Attachment E.1, all solid materials will be transported and handled in fully enclosed environments to prevent dust emissions. Maintaining the bunker area under negative pressure will also help to prevent dust emissions from stored waste.

Dust emissions from traffic will be minimal as the roads, parking areas and service yards will be paved. Good housekeeping practices such as litter patrols (see below) and keeping the site clean will help to maintain the roads free of dust.

E.6.3 Litter

All waste will be handled in enclosed areas and stored in the main process building under negative pressure to limit windborne litter. The waste bunker will be large enough to allow acceptance of waste during periods of shutdown to ensure waste is never stored outside of this area. The area will be kept clean and odour free through good housekeeping practices including regular washing and sweeping of the operating areas and monitoring of waste deliveries. The facility will also operate "litter patrols" around the site and on local approach roads to ensure that litter will not become an impact.

E.6.4 Traffic

A comprehensive traffic assessment is included in Section 13 of the EIS. Further to this a cumulative traffic assessment was conducted as part of the Additional Information submitted to the planning authorities. This is included in Appendix E8. Onsite traffic control is described in Section D.1.j.

Measures for limiting the impact of traffic movements on the regional roads include road widening and the provision of a ghost island junction to facilitate a turning lane. In line with the conditions of planning permission PL17.219721, a number of traffic related plans will be submitted to the planning authorities prior to commencement of the development of the facility, including:

- design details for the proposed junction of the access road with the Regional Road R152
- a traffic management plan which will prohibit traffic associated with the facility from travelling along Regional Road R150, between its junction with Regional Road R153 to the west and the N2 to the east.
- a detailed lighting design and layout for the lighting of the facility including all internal roads, storage and hardstanding areas, circulation areas between buildings and pedestrian paths.

This information will also be forwarded to the EPA as it is made available.

E.6.5 Fire Control

Fire risk and emergency response measures are outlined in Section 5.17.3 of the EIS and in Attachment D.1.o.

E.6.6 Modifications to Other Nuisances

The principle modifications to the other nuisances approved in Waste Licence 167-1 are outlined in Table E.6.a below.

Table E.6.a: Modifications to other nuisances

Aspect	Difference
E.6.2: Dust control	The overall quantity of reagent and residues to be stored is greater. Reagents and residues will be contained in a dedicated area within the main process building to prevent fugitive dust emissions.
E.6.4: Traffic	Due to an increase in background traffic levels on the R152 from 890 to 1,108 two way peak hour traffic flows, the predicted relative impact of the facility on traffic flow on the R152 is now lower. The scale of road works required to limit the impact of traffic movements has not changed.