# Attachment A.1: Non-Technical Summary

## A.1.1 Nature of Facility

Indaver Ireland is applying for a review of waste licence W0167-02 to increase the capacity of their Meath waste-to-energy plant from 200,000 tonnes per annum to 220,000 tonnes per annum (tpa). In addition it is proposed to accept a number of suitable hazardous waste types for treatment in the Meath WTE facility. Most of these are already present in the MSW waste being currently accepted on site, (e.g. paint tins, rags and wipes contaminated with paints or oils), and are treated without difficulty.

The Environmental Protection Agency (EPA) has confirmed that this application constitutes a review rather than a new application, at a meeting with Indaver on February 7th, 2012.

Similar to other conventional solid fuel power plants, the tonnage throughput of waste-to-energy facilities is defined by the size of the boiler (thermal capacity), the average expected CV of the waste and the number of operating hours per annum. In the Meath WTE facility, the boiler has a design capacity of 70MW. If the waste has a low calorific value, then more waste needs to be processed to achieve the same thermal output. Conversely, if waste has a higher calorific value then less waste is processed to achieve the same thermal output.

As Irish waste currently has a lower calorific value than anticipated, more waste can be processed at the facility than previously expected to meet the thermal capacity of the boiler. As a result, it is now proposed to accept an additional 20,000 tpa at the Meath WTE facility bringing the total capacity to 220,000tpa.

The proposed amendments sought by this application in terms of the additional waste types and additional capacity do not result in any significant changes to the nature of the process or waste handling procedures (with the exception of one waste type if granted). This application also seeks to remove the restriction on the hours of dispatch of residues from the site, and to extend the hours of waste acceptance.. A planning application is also to be submitted to An Bord Pleanala to address some other proposed changes including conversion to permanent status of structures, car parking, an additional foul water treatment system for a new office building however these require only minor construction works.



The facility is located in the townland of Carranstown, approximately 2.7km north east of Duleek in Co. Meath as shown in Figure 1.1. Following a period of c.3years of construction works, the facility accepted its first loads of waste in October 2011. The facility is now fully operational.

## A.1.2 Developer Profile

**Indaver Ireland Limited (Indaver)**

In 1999 Indaver NV acquired 60% of MinChem Environmental Services Limited, a hazardous waste management company operating in Ireland since 1977. In 2003 Indaver NV acquired the remaining 40% of MinChem and in 2004 changed the name of the company to Indaver Ireland Limited. Today, Indaver Ireland Limited, with offices in Carranstown, Dun Laoghaire, Dublin Port and Cork, employs approximately 125 people and is the company that operates the Meath WTE Facility.

Indaver Ireland Limited are a registered Waste Broker (IRE/AG040/12), and also operate an EPA Licenced (W36-02) Waste Transfer Station and Solvent Recovery facility in Dublin Port. In 2010, Indaver Ireland Limited managed approximately 65,000 tonnes of hazardous waste for its customer base, and exported the majority of this amount to other Indaver Group facilities or external treatment centers.

***Indaver Ireland***

Indaver Ireland, a wholly owned subsidiary of Indaver NV, was established in 1999 to develop waste infrastructure in Ireland. Indaver Ireland developed and built the Meath WTE facility and then transferred this to Indaver Ireland Limited to operate. Indaver Ireland is also trying to develop and build an Industrial waste facility, which includes a hazardous waste incinerator, in Ringaskiddy, County Cork. Information on Indaver's projects can be found on the website www.indaver.ie.

**Indaver NV Company Profile**

Indaver NV, is the Flemish parent company of Indaver Ireland and Indaver Ireland Limited.. Indaver is a waste management company that specialises in integrated waste management for industries and households. Indaver recycles, treats and disposes of both domestic and industrial waste. Advice on the prevention of waste is an integral part of the Indaver service.

The Dutch multi utility company, Delta is the majority shareholder of Indaver NV with a 75% shareholding. Flemish Environmental Holding is the holding company of the Government of Flanders and it has a 16% stake in Indaver NV. The remaining shares are held by a number of leading private companies in Flanders. The Indaver group plays a leading role in the implementation of the Flemish Government Waste Policy. The company employs over 800 people and has operations in six European countries. In 2010, Indaver offered a solution for the management of around 4.3 million tonnes of waste in its own processing installations as well as in external centres.



## A.1.3 Classes of Activity

As outlined above it is proposed to accept a number of additional waste streams at the facility and these wastes coupled with recent changes to regulations following the implementation of the Waste Framework Directive require amendment to the classes of activity permitted at the Meath waste management facility. A revised list of activities is listed below.

### A.1.3.a Classes of Activity

The principal class of activity under the Fourth Schedule of the Waste Management Acts 1996 to 2010, as amended by the European Communities (Waste Directive) Regulations, 2011 will be as follows:

*R1: Use principally as a fuel or other means to generate energy: This includes incineration facilities dedicated to the processing of municipal solid waste only where their energy efficiency is equal to or above:*

*-0.60 for installations in operation permitted in accordance with applicable Community acts before 1 January 2009,*

*-0.65 for installations permitted after 31 December 2008.*

The process at the facility is based on conventional grate incineration technology and will be used treat non-hazardous household, commercial and industrial solid waste and sludge and suitable forms of hazardous wastes. This technology is proven and reliable and has been used in many countries worldwide. Information relating to the energy efficiency of the facility is provided in Attachment G2.

*B.7.1.2 Other Relevant Activities*

The following other activities will take place at the site under the Fourth Schedule of the Waste Management Acts 1996 to 2010 as amended by the European Communities (Waste Directive) Regulations, 2011 will be as follows::

*R4 Recycling/reclamation of metals and metal compounds*

Ferrous metals are recovered from the bottom ash and sent off site for recycling. As standards and markets develop, the facility may be retrofitted with systems for the reclamation of non-ferrous metals also.

*R5 Recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials*

As standards and markets develop, the facility may be retrofitted with systems for recycling or reclaiming other inorganic materials from bottom ash.

*R13 Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where the waste is produced)*

Waste intended for energy recovery is stored temporarily in the waste bunker. If pre-treated bottom ash residues are found suitable for use in road contruction or other applications, and there are outlets for this material, it will be stored on site for treatment and distribution.

The following activities will take place at the site under the Third Schedule of the Waste Management Acts 1996 to 2010 as amended by the European Communities (Waste Directive) Regulations, 2011 will be as follows::

*D9 Physico-chemical treatment not specified elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any of the operations D1 to D12(e.g. evaporation, drying, calcinations, etc)*

Should hazardous waste landfill capacity become available in Ireland a solidification plant may be installed to pre-treat flue gas treatment residues and boiler ash prior to disposal at this outlet.

D14 *Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.*

This activity will occur on site if non conforming wastes are discovered in the reception area, some of these items may have to be repackaged prior to being sent off site for disposal.

D15 *Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.*

Residues are stored on site prior to being transported for disposal, as would any non-conforming wastes.



## A.1.4 Quantity and Nature of Waste

**A.1.4.a Quantity and nature of waste**

As outlined above Indaver Ireland intend to apply for an increase in annual tonnage of wastes accepted at the Carranstown Facility. It is proposed to increase the annual tonnage accepted from 200,000 to 220,000 tonnes. It is also proposed to accept a number of suitable hazardous wastes and non hazardous wastes as detailed below.

| EWC Description | EWC | EST QTY P.A. |
|---|---|---|
| Aqueous Wastes: Rinse waters containing sugar coating solution and pharmaceutical residues, ink and water mixtures, aqueous washings from spill cleanups. | 070501*<br>080308<br>070101* | Not exceeding 15,000T per annum of these materials. |
| Contaminated Packaging/Clothing. These waste types from pharmaceutical, computer chip or chemical manufacturers are commonly classified as hazardous waste due to the potential contamination from exposure to the materials that they were designed to protect people from. The level of risk is very low but again because they have been assigned a hazardous EWC code, they must be exported to incinerators abroad. An example being empty paint tins, or rags and wipes contaminated with paint/glues/inks etc | 150110*<br>150202* | |
| Redundant or Off Specification Materials/Products: Mascara, lipstick and other make-up. Eye drops, eye baths that are out of date. Headache Tablets, Starch and Sugars used for coating capsules & filler powders. | 070513*<br>160303* | |

| | | |
|---|---|---|
| | 160305*<br>160507*<br>160508* | |
| Treated or Contaminated Wood. Once wood/timber has been treated, it can no longer be recycled. If treated with certain preservatives, this then makes the waste "hazardous" even though the same timber is used on decking, furniture, schools etc. | 170204*<br>170903*<br>191206*<br>200137*<br>030104* | |
| Medical Wastes Bandages, gauze/wipes, incontinence pads, used cotton wool from Nurses Stations & veterinary/dental practices etc., expired medicines, gloves and gowns, expired medications / chemicals | 180103* | |
| Sludges from waste water treatment plants (municipal & industrial) can currently be treated at the facility provided that they are classified as non hazardous. Some sludges are still spread on land as a fertiliser, but industrial facilities with waste water treatment plants of their own have moved away from this practice in recent years. Due to the possibility (but not the certainty) of certain contaminants being present in some industrial sludges, environmentally conscious companies commonly assign hazardous EWC codes to their sludges as a precaution. Despite the fact that these sludges are no different to other non-hazardous sludges, we cannot accept them at the facility without further permission to do so. | 070511*<br>190811* | |
| Other soils, and sludges similar to waste water treatment sludges from land decontamination projects | 170505*<br>170503*<br>191303* | |
| Shredded and pre-mixed Material such as car shred waste and shredded paint containers | 191003*<br>191211* | |
| Discarded paint and inks: This material is currently mainly disposed of by domestic waste producers at Civic Amenity sites (and exported to similar facilities on the continent) | 200127*<br>200128 | |
| Discarded Oil Filters | 160107* | |
| Waste Oil | 130701* | |
| Return to site of any reject Bottom Ash, FGR & Boiler Ash | 190113*<br>190107*<br>190112 | |

Indaver Ireland are seeking to have the Maximum 50,000 tpa restriction on EWC Code 19 12 12 removed, and to be listed alongside Non- Hazardous residual municipal waste. There are large quantities of this material available in the market with very limited treatment options.

Indaver intend to apply to An Bord Pleanala to amend the existing permission in relation to permitted waste acceptance hours. This is to facilitate waste contractors and spread the deliveries of waste during the day. At present the majority of deliveries are arriving to site in the early morning period particularly from 08.00 to 09.00. It is proposed to extend waste acceptance from their current hours of between 0800 and 1830 Monday to Friday inclusive and between 0800 and 1400 on Saturdays to 0600- 2000 Monday to Friday and 0600 to 1400 on Saturdays. The plant will continue to operate 24 hours a day for approximately 7,752 hours per annum, depending on the energy content of the waste.

Deliveries will only be accepted at the facility from authorised carriers holding relevant waste collection permits. Frequent inspections of waste will be carried out to ensure that all contractors are in compliance with Indaver Ireland's waste acceptance criteria. Any non-conforming waste will be consigned to a designated waste quarantine area for removal from site.

## A.1.5 Raw and Ancillary Materials

### A.1.5.a Raw and ancillary material use

The main use of raw materials onsite is in the flue gas treatment system, which requires hydrated lime (Ca(OH)2), quicklime (CaO), expanded clay (Dioxorb), activated carbon, nitrogen gas (N2) and a nitrogen oxides (NOx) removal reagent ("SNCR" reagent) of ammonia solution. In order to be conservative for this application a 10% increase in raw material is projected. Raw materials are also required for purifying water in the steam cycle. This typically involves the use of trisodium phosphate (Na3PO4), caustic soda (NaOH), nitric acid) and ammonium hydroxide (NH4OH). Oils are used as both a fuel in the auxiliary burners and diesel generator sets and, in smaller quantities, as lubricants for equipment and coolant in transformers.



The site is connected to the 38kV distribution network, to export electricity during normal operations. During normal operations the electrical demand of the site is met with electricity from the generator with the excess electricity exported.

Approximately 8.5m3 per hour of water is extracted from a groundwater well onsite, which is mostly used in the evaporating spray reactor, ash quench, steam cycle and staff/visitor facilities.

With the proposed increased waste acceptance it is projected that the combustion process will produce approximately 69,100 tpa residues in the form of bottom ash, boiler ash and flue gas cleaning ash. Ferrous metals and possibly other materials will be recovered from the bottom ash insofar as practicable and the remaining residues will be sent offsite for recovery and/or disposal.

## A.1.6 Site Infrastructure and Operations

### A.1.6.a Site Infrastructure

The proposed facility as amended will incinerate and recover energy from the residual fraction of non-hazardous household, commercial and industrial waste and sludges and the proposed additional suitable hazardous waste types. As outlined earlier the proposed amendments will require no changes to the process or facility infrastructure (with the exception of the additional structures at the office block and the maintenance facility). The facility consists of an incineration plant with energy recovery (a "waste-to-energy" plant) and ancillary services.

The main buildings or structures on the site will include:
- The main process building
- A turbine building with air cooled condensors
- A Spare Parts Facility to be converted to a Centralised Maintenance Facility
- A temporary office structure to be converted to a permanent modular office block
- A transformer compound and ESB substation
- A security building
- A water storage tank and pumphouse

The main process building is approximately 160m long, 40m wide at the widest point and 40m above ground at the highest point. The stack is c.65m tall. The general layout of the facility and the proposed amendments is shown in Figure A.1.a.


**Figure A.1a: General layout of the facility**



### A.1.6.b Process Description

The plant is based on conventional grate furnace technology with a horizontal steam boiler and an advanced flue gas treatment system designed to meet current emissions regulations. The plant will produce 18MW electricity of which approximately 16MW will be exported to the distribution network. A schematic of the process is provided in Figure A.1.b. Current output from the facility is averaging c.16.56MW due to lower calorific value of waste and the plant being in a start-up phase and not operating at 100% capacity.

***Waste acceptance and handling***

Grate incineration technology is not suited for all types of hazardous waste. Careful consideration has been given to the process of identifying the proposed additional hazardous waste streams. These are waste streams that Indaver currently export, that would be suitable for the Meath Grate WTE.

Deliveries are only accepted at the facility from authorised carriers holding relevant waste collection permits. It is foreseen that only minor adjustments will have to be made to the existing Waste Acceptance Procedure and Waste Handling Procedure (ENV 01.00 and ENV 02.00 respectively) to reflect the acceptance of the proposed additional waste codes. These procedures are included in the accompanying EIS.

All trucks entering the site report to the weighbridge where they present documentation to staff in the gatehouse and are weighed. Details on all waste entering the facility will be recorded in a tracking system.

Trucks then drive to the enclosed waste acceptance hall and discharge loads into the bunker through one of the five discharge chutes. Liquid wastes proposed will be pumped directly into the furnace. If acceptance of wastes EWC 18 01 03* is allowed, a direct feed mechanism will be installed to feed this material directly into the furnace.

Frequent inspections of waste take place in the reception hall to ensure all waste is in compliance with Indaver Ireland's waste acceptance criteria. Any nonconforming waste will be consigned to a waste quarantine area in the service yard where it will be held until alternative disposal arrangements are made.
Operators located in the control room overlooking the bunker screen and mix the waste using overhead grab cranes. The blended waste is fed to the highest point in the furnace via hoppers, and forms a plug that isolates the furnace from the bunker.

The reception hall is enclosed and maintained under negative pressure to ensure there are no odour or litter emissions. The bunker has an approximate capacity of 5,600 tonnes, which facilitates the storage of waste for a continuous feed of fuel to the furnace outside of waste acceptance hours. The average retention time of the waste in the bunker is approximately three days.

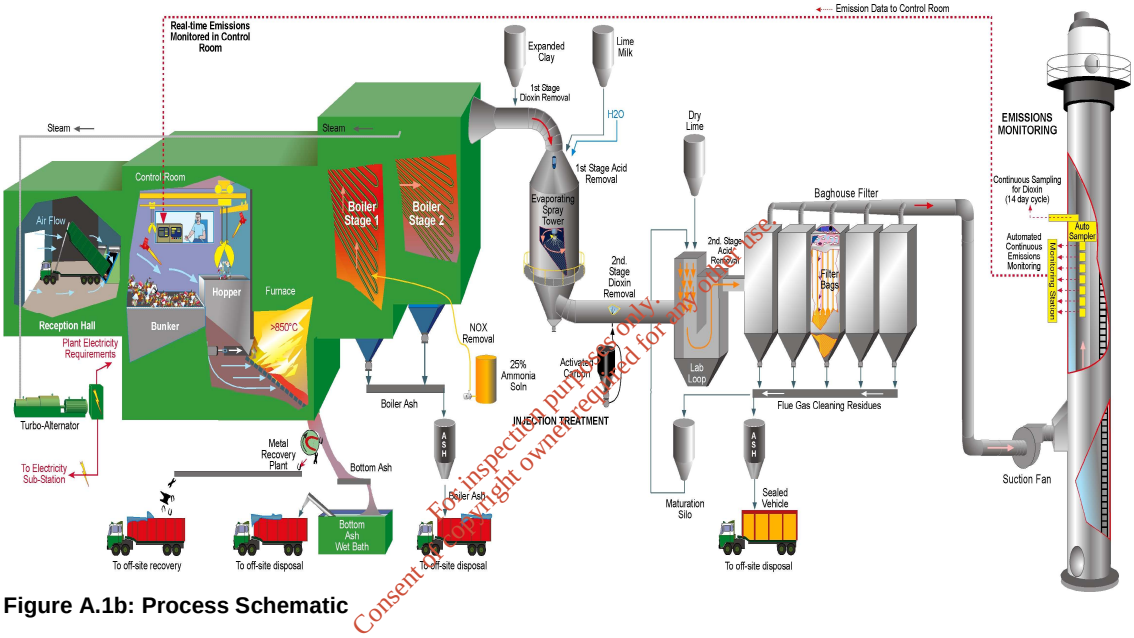




**Figure A.1b: Process Schematic**

***Moving Grate Furnace***

The waste in the hoppers is fed to the furnace at a controlled rate by feeding rams. The furnace consist of a grate mechanism, which promotes the complete and efficient combustion of waste through slow and continuous movement, mechanical breakup and effective air distribution.

The combustion of waste on the grate produce both gases and solid residues. The gases pass into a post-combustion chamber situated over the grate, where further combustion takes place. Bottom ash is discharged at the end of the grate into a water bath or "wet de-slagger". The average residence time of waste in the furnace is approximately one hour.

Oxides of nitrogen (NOx) are treated using Selective Non Catalytic Reduction (SCNR). This involves injecting an SCNR reagent (ammonia) at two levels into the post-combustion chamber.

The control system in the furnace monitors a range of parameters, and makes adjustments to the process to ensure complete combustion and that emissions limits are met.

***Boiler***

The boiler immediately follows the furnace and has been designed to recover energy from hot flue gases to produce steam. In the process, the flue gases are cooled from about 950°C to about 190°C. The total residence time of gases in the boiler is approximately 30 seconds.

In order to comply with the EU Waste Incineration Directive 2000/76/EC, the boiler is designed to ensure that flue gases are maintained at 850°C for at least 2 seconds after the last air/fuel injection. Auxiliary burners are used where necessary to ensure these conditions are met, for example during startup. The burners are not required during normal operation.

The velocity of gases in the boiler is controlled to minimise dioxin formation and promote the deposition of boiler ash into a hopper for removal.

***Electricity generation and Steam Cycle***

Steam from the boiler at 40 bar and 400°C is sent to the steam turbine, which drives a generator set to give an electrical output of approximately 18MW. As approximately 2MW is required for use within the plant, the amount available for export to the national grid will be about 16MW.

To maximise energy recovery, steam leaving the turbine is maintained at extremely low pressure by an air cooled condenser. Using air cooled condensers rather than cooling water reduces water consumption and avoids water discharge. The flow of steam through the cycle is approximately 82 tonnes per hour at 100% load..

A small quantity of water is purged constantly from the steam cycle and replaced with fresh makeup water from a water purification (demineralisation) plant. This "boiler blow down" is recycled within the process plant.



***Flue gas treatment system***

The flue gas treatment system is designed to ensure emissions from the stack are well below limits set by EU Directive 2000/76/EC. The system has been designed to produce no effluent and to minimise the consumption of water, reagents and energy.

The key stages of the treatment system include:

- A first dioxin removal stage, where expanded clay ("Dioxorb") is injected into a duct at the outlet of the boiler. Any dioxins and heavy metals are adsorbed into the clay for removal in the baghouse filter downstream.
- A spray drier absorber, which cools flue gases and injects lime slurry to react with acid gases such as HCl and SO2. This forms reaction salts, which are also removed in the baghouse filter downstream.
- A second stage dioxin removal and acid gas treatment, which takes place in a reaction duct with the injection of activated carbon, recirculated and reactivated reagent from the baghouse filter and fresh lime absorbent (where necessary). This ensures that any remaining pollutants are captured.
- A high performance baghouse filter, to trap dust and heavy metals. The residue is shaken off the filters into dust collection hoppers. As it still contains some un-reacted lime, most of it can be reactivated and recycled into the reaction duct to minimise the amount of residue going for disposal.
- An induced draught fan and a stack equipped with continuous emissions monitoring systems. The fan maintains the flue gas system under constant pressure to ensure that all gases pass through the system. Treated gases will then leave the 65m stack at a temperature of 140°C.

The flue gas treatment system will be controlled using parameters measured at the stack, and if possible at the boiler exit.

***Residues handling***

Solid residues will be collected from three different process areas including:

- Bottom ash and grate siftings from the grate furnace. This will constitute the bulk of residue from the facility at c.27% of waste input by weight or 59,400 tpa.
- Boiler ash from the boiler ash hopper. This will constitute about 0.7% of the waste input by weight or 1,500 tpa.

• Flue gas treatment residues from the spray drier absorber and baghouse filter hoppers. This will constitute about 3.7% of the waste input by weight or 8,200 tpa.
The bottom ash and grate siftings will be passed over a sieve to separate out oversized ash particles. Approximately 5,000 tpa ferrous metals will also be separated out for recycling. The remaining ash will be stored in an ash hall with 2,400 tonnes capacity. The water content of the grate siftings and bottom ash will be approximately 25%, which will minimise dust emissions during storage.
Boiler ash and flue gas cleaning residues will be stored in silos in the main process building before being sent offsite. The boiler ash and flue gas cleaning residue transport, storage and truck discharge mechanisms will be specially designed to minimise dust emission.

**A.1.6.c Compliance with the Waste Incineration Directive**
The facility as constructed has been designed to comply with the Waste Incineration Directive 2000/76/EC by:
• Ensuring the facility design is suited to the types of waste to be accepted,
• Designing the plant for maximum energy efficiency in order to optimise electrical output,
• Minimising the generation of residues by designing the combustion process to be as complete as possible, minimising reagent use in the flue gas treatment system and other measures,
• Recovering metals from the bottom ash, and striving to recover and reuse as much as possible from the bottom ash where practicable. All disposal of residues will be to appropriate licensed facilities.

## A.1.7 Section 40(4) of the Waste Management Act

It is submitted that Indaver Ireland have previously demonstrated (via the previous licence applications and related correspondence) that all the requirements of Section 40 (a-i) of the Waste Management Act are met by the facility and its operator. The proposed amendments do not alter any of the requirements.

## *A.1.8 Nature of Emissions from the Facility*

It is one of Indaver's core values to operate in a way that is safe, socially responsible and sustainable with minimal impact on activities and surroundings. This includes avoiding any release, disposal or emission that might harm the environment. Compliance with national and European regulations will be achieved as a minimum expectation.



**A.1.8.a Air emissions**
The main emission point from the facility is at the stack through which treated flue gases are discharged. These flue gases consist primarily of carbon dioxide (CO2) and water vapour but may also contain a number of substances regulated by EU and Irish legislation.

The process is designed and operated to ensure typical emission concentrations for all pollutants are well below the limits specified in the Waste Incineration Directive (2000/76/EC). This Directive specifies the most stringent emissions limits of any industry. There is one minor emission source from the emergency generator, which is only run in the unlikely event that there is no alternative power source for the plant. It is anticipated that the total annual operation of this generator will not exceed 12 hours per year. There will be no fugitive or uncontrolled emissions to air from the facility.

**A.1.8.b Surface Water Emissions**
The process has been specifically designed to minimise the use of water and to ensure that there is no process effluent discharge. All water from the main process building is recirculated within the plant.
There is one emission source from the drainage system, consisting of non-contaminated surface water runoff collected from roofs and hardstand areas. This will discharge to a drainage ditch at the western corner of the site at a rate controlled by a hydrobrake system, which will mimic a discharge from agricultural land. Two monitoring stations are in place to detect any contamination and divert it to a separate storage tank, or if this is full, shut off all discharge from the system. A Class II full retention separator for petrol like substances is also in place at the discharge point.

The undeveloped area of the site continues to drain naturally to existing drainage ditches. Waters draining from these areas will not come into contact with any potential contamination from the plant.

**A.1.8.c Emissions to Sewer**
There are no emissions to sewer from the facility. All sanitary effluent from staff and visitor facilities is treated onsite in a Puraflo treatment system, which discharges treated effluent to ground as described below.

**A.1.8.d Groundwater Emissions**
There are currently two minor emissions to ground of treated sanitary effluent from staff and visitor areas. It is proposed to install another puraflo system and engineered percolation area (designed and constructed in accordance with EPA guidelines) to serve the new modular office block.

The Puraflo system provides a combination of physical, chemical and biological treatment of the 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 Agrement Board. There will be no fugitive or uncontrolled emissions to ground or groundwater.

**A.1.8.e Noise Emissions**
There are six potential sources of continuous noise, all from process equipment at various points in the plant. The stack, air cooled condensers and turbine coolers are the most significant continuous sources of noise as they are located externally. These will always be operated below the EPA permitted noise limits as stipulated in the licence. Traffic noise assessments have found site traffic to have little impact on overall noise in the locality and is therefore not considered to be a significant emission.

**A.1.8.f Other Nuisances**
To limit nuisances such as vermin, dust emissions and litter, all deliveries, handling and storage activities take place in fully enclosed environments. The main process building is maintained under negative pressure and the facility is kept clean and tidy at all times. Roads, parking areas and service yards are paved and therefore minimise the potential for dust emissions. Measures for limiting the impact of traffic movements on the road network have been complete include road widening and the provision of a ghost island junction to facilitate a turning lane.



The facility is considered to be normal fire risk since the likely fuel source, the waste, has a high moisture content and a slow natural burn rate. The entire plant has been designed for and provided with adequate fire protection and detection systems consistent with the requirements of the Building Regulations, the Code of Practice for Fire Safety in Buildings BS5588 and in consultation with Indaver's insurers. The system include smoke/heat detectors, an alarm system, onsite storage of water for fire fighting purposes and manual call points.

## A.1.9 Impacts of Emissions from the Facility

**A.1.9.a Air Emissions**
Air emissions from the facility via the stack are controlled through both process optimisation and physical / chemical treatment in the flue gas treatment system. These systems have been designed to ensure emissions are significantly lower than the limits set out in the EU Waste Incineration Directive (2000/76/EEC). Data obtained from the facility since commencement in October 2011 confirms this is the case (Section 5.7 of the EIS).

To limit fugitive emissions from the facility, the main process building is maintained under negative pressure. The storage, treatment and handling operations for waste, consumables and residues are carried out in enclosed environments with filters or closed loop loading systems fitted where necessary. The storage area for consumables, boiler ash and flue gas treatment residues are isolated from the main process building to contain any emissions that may arise from this area.

In the 2006 EIS and subsequently in the 2009 EIS Amendment application, the emissions from the plant were assessed based on the maximum allowable limits in the Waste Incineration Directive (which will be replaced by the Industrial Emissions Directive 2010/75/EU) and 110% of the estimated flue gas flow rate at the plant nominal capacity. Recent measurements of the short term average nominal flue gas flowrate have shown that the flue gas flowrate is higher than was anticipated and in order to ensure that assessment from 2009 was still valid, the model was re-run and shows (as explained in Chapter 7 Section 7.4 of the EIS) that the variation in flowrate does not materially alter the original conclusions

and that the assessment is still valid. This, combined with the fact that the actual emissions from the plant are well below the limits modeled, ensures that the assessment of the impact on air quality is robust.

Throughout the various studies, a worst case approach was taken for all input assumptions including emissions, background concentrations and weather conditions. The study demonstrated that all substances emitted from the facility will meet the most stringent ambient air quality standards for the protection of human health and the environment, even where the plant is operating at maximum or abnormal operating conditions.

An odour impact assessment also found that all predicted ground level concentrations will be lower than the recommended EPA limit even during a worstcase meteorological year.

An assessment of the potential worst-case impact of dioxin and furan emissions on an individual living near the site (Maximum At Risk Individual) due to inhalation and ingestion was also conducted. This found that the proposed facility would have no significant impact on dioxin and furan intake even considering worst case scenario exposure levels.

**A.1.9.b Surface Water Emissions**
The surface water discharge consists only of clean surface water runoff and mimics natural discharge rates from agricultural land. There is no discharge of process effluent to surface water.

Any potential contamination identified by the monitoring stations or fire alarm system will automatically divert or will shut off the discharge from the system. All potentially polluting substances will be stored within the main process building and provided with adequate containment. Substances stored in the yard areas will be fully bunded. As a result, the proposed facility will not have any negative impact on surface waters.



**A.1.9.c Groundwater Emissions**
The only emissions to ground from the facility are treated domestic sewage from Puraflo systems and engineered percolation areas. These systems, designed and constructed in accordance with EPA requirements, discharge into the overburden via a percolation area. There will be no other discharge to ground from the facility. Groundwater extraction for domestic and process water requirements will only increase marginally and will therefore not have any negative impacts on the aquifer.

There will be no fugitive emissions from the facility to ground or groundwater. All areas where potentially polluting materials are handled are either indoors or in bunded, contained and hardstand areas. The waste bunker has been fitted with a double containment system to ensure that in the unlikely event that a leak should occur, the liquids are collected and removed. All bunds will be integrity tested in accordance with the facility licence to confirm they are watertight on a regular basis.

**A.1.9.d Noise Emissions**
To limit noise emissions, key items of equipment are located within the main process building and acoustic insulation has been installed where required. Due to these and other measures, noise modelling of the proposed development found that operational noise impacts will not exceed EPA recommended limits offsite. Predicted noise levels due to vehicle movements onsite were found to be within recommended criteria and will not have a negative impact on the local community. The predicted noise increase from additional traffic using public roads was estimated at less than 3dB in all instances and its impact is therefore considered to be negligible with a magnitude of change imperceptible. Anti-vibration mounts are used on all plant with the potential to generate significant levels of vibration, which will ensure vibration from operations is not significant.

**A.1.9.e Impacts on Ecology**
The existing development as constructed between 2009 and 2011 required the removal of arable crop land, improved agricultural grassland and a number of hedgerows in the area. The proposed amendments to the facility entail only minor construction works and is therefore not anticipated that there will be any additional impact on the ecology of the surrounding environment.

## A.1.10 Monitoring and Sampling

**A.1.10.a Air Monitoring and Sampling**
Continuous monitoring on stack emissions assesses the following parameters, in line with the requirements of EU Directive 2000/76/EC,:
- Total dust
- Total Organic Carbon (TOC)
- Hydrogen Chloride (HCl)
- Hydrofluoric Acid (HF)
- Sulfur dioxide (SO2)
- Oxides of nitrogen (NOx)
- Carbon Monoxide (CO)
- Temperature
- Oxygen (O2)

Measurements are relayed to the plant computerised control system and the emission registration software system where operators view the results.

In accordance with Schedule C.1.2 of W0167-02, grab samples are also taken from the stack on a quarterly basis to monitor for heavy metals and their compounds. These are taken and measured by an external accredited laboratory. Furthermore, although not required by EU or Irish legislation, a dioxin sampling system has been installed. This enables the collection of dioxin samples over a fortnightly period for analysis in an independent laboratory.

**A.1.10.b Surface Water Monitoring and Sampling**
Surface waters pass through two monitoring chambers before being discharged, which will measure for the parameters required by the EPA and the drainage division of Meath County Council. Schedule C.2.3 of licence W0167-02 requires surface water monitoring to be conducted continuously at 2 locations. It is not proposed to conduct any additional surface water monitoring as a result of the proposed amendments.



**A.1.10.c Groundwater Monitoring and Sampling**
The emission of treated domestic effluent to ground will be monitored on a quarterly basis from a sampling chamber located at the discharge point.

Schedule C.6.1 of licence W0167-02 requires ambient groundwater monitoring to be conducted monthly for a number of indicator parameters and biannually for a wider suite at three locations. It is not proposed to conduct any additional groundwater monitoring as a result of the proposed amendments.

**A.1.10.d Noise Monitoring and Sampling**
Schedule C.6.2 of licence W0167-02 requires noise monitoring to be conducted annually at 4 locations. It is not proposed to conduct any additional noise monitoring as a result of the proposed amendments.

**A.1.10.e Meteorological Monitoring and Sampling**
A meteorological monitoring station monitors wind speed and direction and atmospheric pressure at the facility on a continuous basis. Precipitation volume and temperature is also monitored on a daily basis. All measurements meet World Meteorological Organisation Standards and Recommendations.

## A.1.11 Waste Arisings

**A.1.11.a Handling of Waste Arising**
Bottom ash generated by the facility has been classified non-hazardous and consists mostly of inert materials such as glass, sand, metal pieces and stones. Approximately 5,000 tpa ferrous metals will be extracted from the bottom ash generated by the process for recycling, which will be sent off-site to an appropriate and licensed recycling facility.

In the absence of an alternative recovery outlet, bottom ash is currently being sent to a nearby non-hazardous landfill. The volume of ash produced by a waste-to-energy plant requires significantly less landfill capacity to dispose when compared to sending MSW directly to landfill. In addition, due to the

inert nature of the ash, it will have a less adverse impact than untreated waste, which is currently being landfilled. However, should the appropriate standards be devised for the reuse of bottom ash components in the construction industry, Indaver will explore options for the further treatment and reuse of bottom ash.

Flue Gas Residues and Boiler ash are currently sent for re-use in the remediation of salt mines in Germany. The increase in residues produced will result in a small increase in traffic movements to dispose/re-use of the residues. The impact of this is discussed in detail in Chapter 13. Based on experience from other grate furnaces in Europe burning additional wastes of the type proposed, the classification of the bottom ash will remain unchanged. The classification of the other residues produced will also remain unchanged.

It is not envisaged to solidify or otherwise pre-treat these residues prior to export as this would only increase their overall mass and volume, thereby increasing the environmental impact of their transport. Indaver Ireland has over 20 years experience of sourcing suitable outlets, both in Ireland and abroad, for the disposal of hazardous waste. Indaver also operates its own hazardous waste landfill in Antwerp, Belgium. Other wastes arising from the facility will include only minor quantities of waste from facility operations and staff and visitor facilities.

## A.1.12 Accident Prevention and Emergency Response

It is the policy of Indaver Ireland to attach the greatest importance to the health and safety of all persons employed on and indirectly affected by site activities. The proposed amendments to the facility require no changes that would affect the continuing non-SEVESO status of the site.



**A.1.12.a Accident Prevention and Emergency Response**

The facility has been designed in accordance with internationally recognised health and safety standards, design codes, legislation, good practice and experience. To improve safety and minimise the risk of emergency situations, the plant design include:

- manual and automatic controls
- a comprehensive interlock system which can automatically shut down the plant in a safe manner in the event of equipment failure or dangerous situations arising
- fire detection and fighting systems
- backup systems for pumps, control systems, power supply and instruments.

The plant is operated in line with Indaver Ireland's Quality, Environmental, Safety and Health (QESH) system which is accredited to the quality standard ISO 9001, the environmental standard ISO 14001 and the safety standard OHSAS 18001.

Hazard and operability studies have been conducted to systematically identify hazards towards the production of a comprehensive set of standard operating procedures for the plant to help minimise the risk of accident/emergency situations arising. Indaver's experience of successfully operating similar plants in Belgium allows potential hazards to be easily identified. Wherever possible, Indaver strive to minimise human interaction in safety critical operations in order to eliminate the potential for "human factors" to initiate or exacerbate major accidents at the site. The facility is and will continue to be well maintained and cleaned at all times. A preventative maintenance system is in place, which incorporates routine checks and maintenance of key equipment to ensure they remain in good working order. A Site Emergency Plan has been prepared and sets out the response measures to be taken by personnel in the event of an emergency. These measures ensure maximum protection for site employees, visitors and people in other premises near the site to limit damage to property and minimise the impact on site operations and on the environment.

Through recruitment, training, performance management, employee development and succession planning, Indaver Ireland aims to ensure that all members of staff are in possession of the knowledge, skills and experience necessary to perform their jobs to a satisfactory standard.

## A.1.13 Closure, Restoration and Aftercare

**A.1.13.a Closure, Restoration and Aftercare Measures**

In 2011 an ELRA and CRAMP was prepared by Byrne O'Clerigh on behalf of Indaver to address the requirement for financial provision for the known and unknown liabilities associated with the facility.

The total lifespan of the plant is currently anticipated to be 30 years but this can be extended with maintenance and replacement of equipment. Should circumstances arise whereby it becomes necessary to shut down the facility, Indaver will provide the EPA with a detailed decommissioning plan for its approval before the commencement of any works.

This will include measures to avoid any pollution risk and return the site of operation to a satisfactory state. The absence of materials stored or landfilled onsite will mean that an aftercare management plan is not required.

## *A.1.14 Definitions and Abbreviations*

| | |
|---|---|
| BAT | Best Available Techniques |
| BREF | European IPPC Bureau Reference Document |
| dB | decibel (noise) |
| EWC | European Waste Catalogue |
| HAZOP | Hazard and Operability |
| HSA | Health and Safety Authority |
| l/s | litres per second |
| MARI | Maximum At Risk Individual |
| MJ | Megajoules |
| MSW | Municipal Solid Waste, including household and commercial waste and street sweepings |
| MW | Megawatt (of energy) |
| NCV | Net Calorific Value |
| PAH | Poly Aromatic Hydrocarbons |
| PEC | Predicted Emissions Concentration (at ground level) |
| PVC | Poly vinyl chloride |
| QESH | Quality, Environmental, Safety and Health |
| SNCR | Selective Non-Catalytic Reduction |
| TOC | Total Organic Carbon |
| tpa | tonnes per annum |
| tph | tonnes per hour |