Attachment A.1: Non-Technical Summary

A.1.1 Nature of Facility

Indaver Ireland is applying for a review of waste licence WL 167-1 to increase the capacity of the proposed waste-to-energy plant from 150,000 tonnes per annum to 200,000 tonnes per annum (tpa). The Environmental Protection Agency (EPA) has confirmed that this application constitutes a review rather than a new application, as shown in Appendix A1.

The increase in capacity is sought so that the facility can meet the requirements of the North East Region Waste Management Plan 2005-2010. This plan reviewed the quantities of waste arising since the previous plan was issued and increased the capacity of the thermal treatment plant to be developed for the region to between 150,000 and 200,000 tpa.

Other changes to the proposed development include the removal of the recycling centre and materials recovery facility in line with the original planning permission PL 17.126307 issued in 2003. The layout of the facility was also changed and new design features were included in line with best practice.

The revised facility will consist of a 70 Megawatt (MW) waste-to-energy facility for the acceptance of 200,000 tpa household, commercial and industrial non-hazardous waste.

The site for the proposed development is on lands in the townland of Carranstown, approximately 2.7km north east of Duleek in Co. Meath as shown in Figure A.1.a. The c.25 acre green-field site was chosen from a comprehensive site selection exercise due to its central location with respect to waste production, proximity to existing industrial activity, access to major access routes and access to systems for exporting electricity.

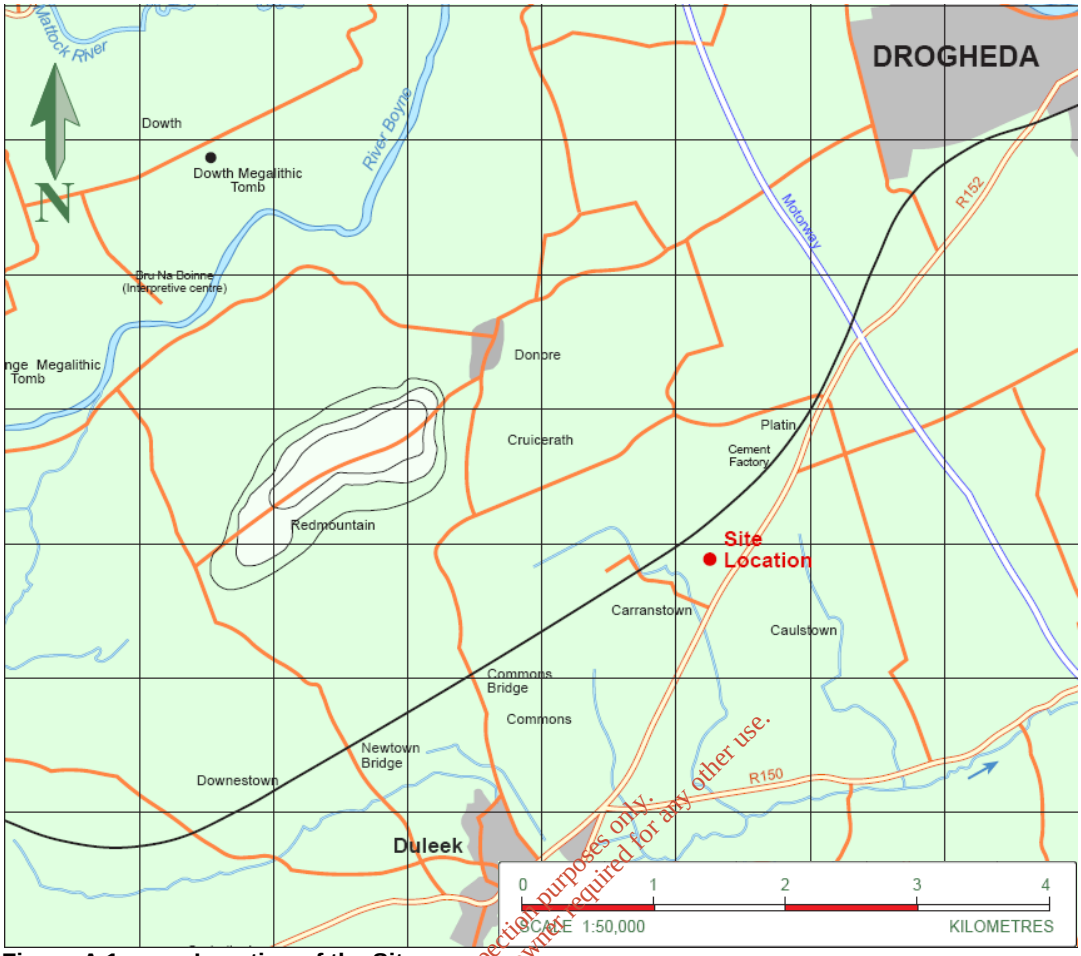


Figure A.1.a: Location of the Site

All modifications to the facility licensed in Waste Licence 167-1 are highlighted throughout this application. Since the turnkey contractor has been selected and the process design has been finalised since the completion of the Environmental Impact Statement[1], some uncertainties regarding for example the flue gas treatment system configuration have been addressed here. Furthermore, supplier information on the process and ancillary services has been added. This has provided more accurate figures on the operation of the plant, which may vary from the figures provided in the Environmental Impact Statement.

A.1.2 Developer Profile

Indaver Ireland is a wholly owned subsidiary of Indaver NV, and was established in 1999 to develop waste infrastructure in Ireland. The branch is currently developing two waste management projects including a municipal waste management facility in Meath (the subject of this application) and an industrial waste facility in Ringaskiddy, County Cork. Information on the Ringaskiddy project can be found on the website www.indaver.ie.

Indaver NV is a Flemish company specialising in integrated waste management. This includes providing advice on the prevention of waste as well as recycling, treating and disposing of household, commercial and industrial waste. Indaver employs over 800 people and has operations in seven European countries. In 2007, the company handled over 1.87 million tonnes of hazardous and non-hazardous waste in facilities like that shown in Figure A.1.b. Indaver NV's majority

[1] Submitted with this licence application, completed for planning application in 2005

shareholder is Delta NV, which is a holding company of the Government of the Netherlands. The remaining shares are held by a number of leading private companies in Flanders.

Figure A.1.b: Indaver NV facility in Flanders, Belgium

Indaver NV has been, and continues to be, an important contributor to the development of an integrated waste management system in Flanders. Twenty years ago, the vast majority of waste in Flanders was still being sent to landfill and there was a very low rate of recycling. Hazardous waste was being exported to other countries for disposal. The Flemish Government, in partnership with local industry, formed Indaver NV in 1985 to provide an integrated waste management strategy for Flanders and address the waste crisis. Today, Flanders has a recycling rate of over 70%, the highest of any region in the world, and is self sufficient in the disposal of residual and hazardous waste.

All of the company's facilities are licensed by the regulatory authorities in the region in which they operate. Indaver strives to have all its facilities accredited to the ISO 9001:2000 Quality Assurance System, the ISO 14001 Environmental Management System and the OHSAS 18001 Health and Safety Standard. The company was the first waste management company in Flanders (and among the first in Europe), to attain accreditation to the ISO 14001. These certifications are independently audited on a regular basis to ensure company compliance. An integral part of the above certifications is clear and regular communications with members of the public, customers, suppliers and regulatory authorities. Indaver is committed to permanent and open dialogue regarding environmental matters.

Figure A.1.c: Indaver Ireland Limited solvent blending facility in Dublin Port

Indaver's Irish activities also include Indaver Ireland Limited, which has over 30 years experience in waste management in Ireland. Indaver Ireland Limited has offices in Dun Laoghaire, Dublin Port and Cork, and employs approximately 110 people. Its activities include hazardous waste collection and management, solvent blending (as shown in Figure A.1.c), on-site services, total waste management and recycling centre operation. The company is accredited to ISO 9001:2000, ISO 14001, and OHSAS 18001, the internationally recognised quality, environmental and health and safety standards.

A.1.3 Classes of Activity

A number of activities will be carried out at the Meath waste management facility, which have different classifications under the Waste Management Act 1996. These classifications are listed below.

A.1.3.a Classes of Activity

The principal activity according to the Third Schedule of the Waste Management Act, 1996, as amended, will be:

8: Incineration on Land or at Sea

Other activities that will take place at the site under the Third Schedule of the Waste Management Act, 1996, include:

7. Physico-chemical treatment not referred to elsewhere in this Schedule (including evaporation, drying and calcination) which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1. to 10. of this Schedule (including evaporation, drying and calcination)

If hazardous waste landfill capacity become available in Ireland, a solidification plant may be installed to pre-treat flue gas treatment residues prior to disposal. Boiler ash would also be treated in this manner if classified as hazardous.

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

This will take place if non-conforming waste materials are found in the reception area that require repackaging before being sent off site for disposal.

13. 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.

Ash will be temporarily stored on site before being sent off-site for disposal, if it is not intended for re-use. Non-conforming waste will also be temporarily stored in the waste quarantine area before being removed from site.

Other activities that will take place at the site under the Fourth Schedule of the Waste Management Act, 1996, include:

3. Recycling or reclamation of metals and metal compounds.

Ferrous metals will be 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 from bottom ash.

4. Recycling or reclamation of other inorganic materials.

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

8. Oil re-refining or other re-uses of oil

The auxiliary burners may be operated on a reusable oil product.

9. Use of any waste principally as a fuel or other means to generate energy

Waste will be used as a fuel in the plant to generate electricity. The plant will produce approximately 17.2MW of electricity, of which 14.7MW will be exported to the national grid.

13. Storage of waste intended for submission to any activity referred to in a preceeding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.

Waste will be stored in the waste bunker before being used as a fuel. If intended for re-use, bottom ash will also be stored onsite temporarily.

A.1.3.b Classes of Activity Modifications

The principle modifications to the classes of activity approved in WL 167-1 include the:

- Removal of all references to a recycling park and a materials recovery facility as these are no longer part of the development
- Revision of the Third Schedule activity 13, removing all references to gypsum as it is no longer produced in the facility
- Removal of the Fourth Schedule activity 2: Recycling or reclamation of organic substances which are not used as solvents
- Revision of the Third schedule activity 4, removing references to a materials recovery facility and giving consideration to the recovery of materials from bottom ash for reuse
- Removal of the Fourth Schedule activity 6: Recovery of components used for pollution abatement
- Addition of the Fourth Schedule activity 8: Oil re-refining or other re-uses of oil

A.1.4 Quantity and Nature of Waste

A.1.4.a Quantity and nature of waste

This application is being made for the treatment of up to 200,000 tpa in total of residual[2] household, commercial and non-hazarous industrial waste, sewage sludges and industrial sludges as shown in Table A.1.a. It is not possible at this stage to provide a detailed breakdown of the anticipated quantities of each waste type. The treatment of sewage sludge is provided for in case alternative outlets to landspreading are required.

Table A.1.a: Waste Types Accepted at the Facility

WASTE TYPE	TONNES PER ANNUM (proposed)
Household	0 – 200,000
Commercial	0 – 200,000
Sewage Sludge	0 – 20,000
Construction and Demolition	Not accepted
Industrial Non-Hazardous Sludges	0 – 20,000
Industrial Non-Hazardous Solids	0 – 200,000
Hazardous waste	Not accepted

Waste will be accepted between 0800 and 1830 Monday to Friday inclusive and between 0800 and 1400 on Saturdays. The plant will operate 24 hours a day for approximately 7,500 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.1.4.b Modifications to Waste Acceptance

The principle modifications to the quantity and nature of waste approved in WL 167-1 include the:

- Removal of references to a materials recovery facility
- Increase in the maximum annual capacity of the waste-to-energy plant from 150,000 tonnes to 200,000 tonnes

A.1.5 Raw and Ancillary Materials

A.1.5.a Raw and ancillary material use

The main use of raw materials onsite will be in the flue gas treatment system, which will require hydrated lime ($Ca(OH)_2$), quicklime (CaO), expanded clay (Dioxorb), activated carbon, nitrogen gas (N_2) and a nitrogen oxides (NO_x) removal reagent ("SNCR" reagent) of either urea or ammonia solution. Raw materials will

[2] Whereby the waste has been pre-treated through source segregation and sorting as per the North East Region Waste Management Plan

also be required for purifying water in the steam cycle. This typically involves the use of trisodium phosphate (Na_3PO_4), caustic soda (NaOH), hydrochloric acid (HCl) and ammonium solution (NH_4OH). Oils will be used as both a fuel in the auxiliary burners and diesel generator set and, in smaller quantities, as lubricants for equipment and coolant in transformers.

The site will be connected to the 38kV distribution network, which will be used to export electricity during normal operations. Electricity will be imported from this network during startup and shut down. During normal operations the electrical demand of the site will be met with electricity from the generator. Approximately 8.7m^3 per hour of water will be extracted from a groundwater well onsite, which will be mostly used in the evaporating spray reactor, ash quench, steam cycle and staff/visitor facilities.

The combustion process will produce approximately 61,000 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.1.5.b Materials Use Modifications

The principle modifications to the raw and ancillary materials approved in WL 167-1 include the:

- decrease in usage of ammonia, lime and limestone due to modifications to the flue gas treatment system
- increase in residues production in line with an increased throughput

A.1.6 Site Infrastructure and Operations

A.1.6.a Site Infrastructure

The proposed facility is designed to incinerate and recover energy from the residual fraction of non-hazardous household, commercial and industrial waste and sludges. It 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 warehouse/workshop/education centre
- A transformer compound and ESB substation
- A security building
- A water storage tank and pumphouse

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

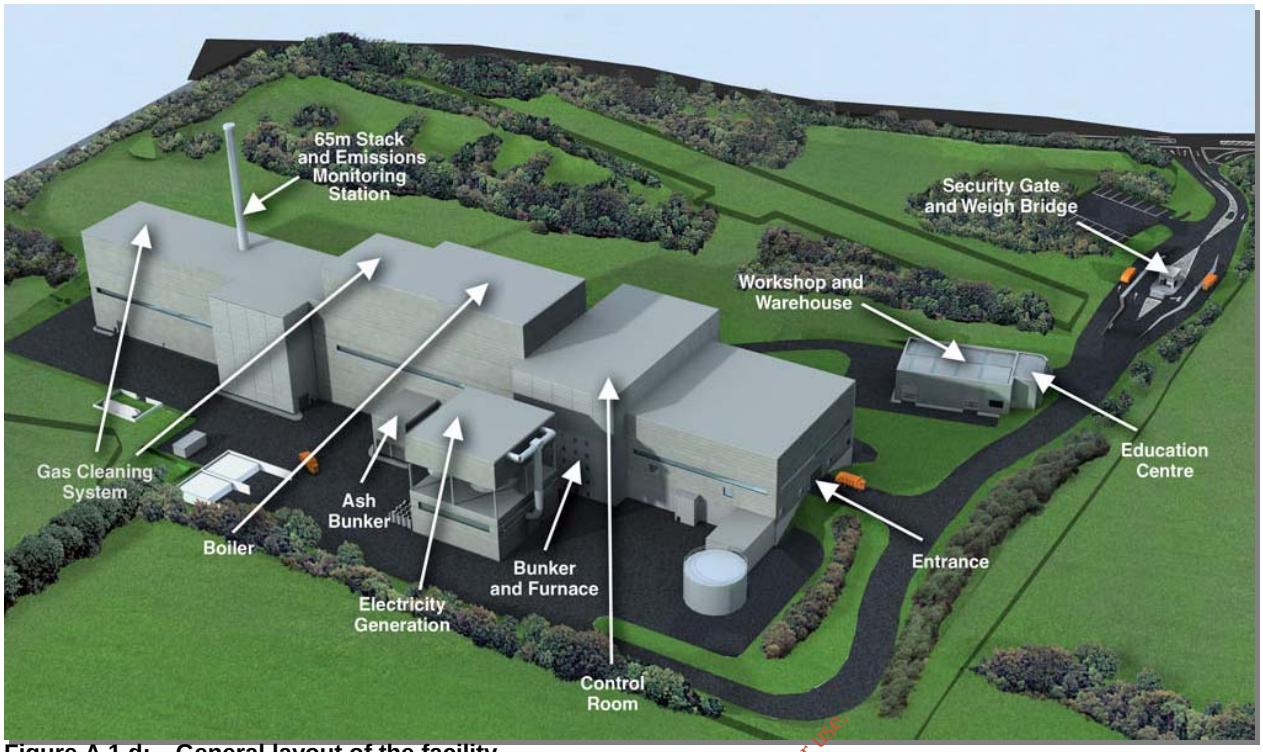


Figure A.1.d: General layout of the facility

A.1.6.b Site Infrastructure Modifications

The principle modifications to the site infrastructure approved in WL 167-1 include the:

- realignment of the main process building along the north-east boundary fence. The maximum height of the building has increased by approximately 10m.
- removal of an administration building and community recycling park
- removal of the sorting plant and residue solidification unit from the main process building
- movement of the water tank and pumphouse to the south
- addition of a bottom ash handling building
- movement of the transformer compound to the north
- movement of the sewage treatment system to the east
- movement of the warehouse towards the rear of the site

A.1.6.c 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 17.2MW electricity of which approximately 14.7MW will be exported to the distribution network.

A schematic of the process is provided in Figure A.1.e.

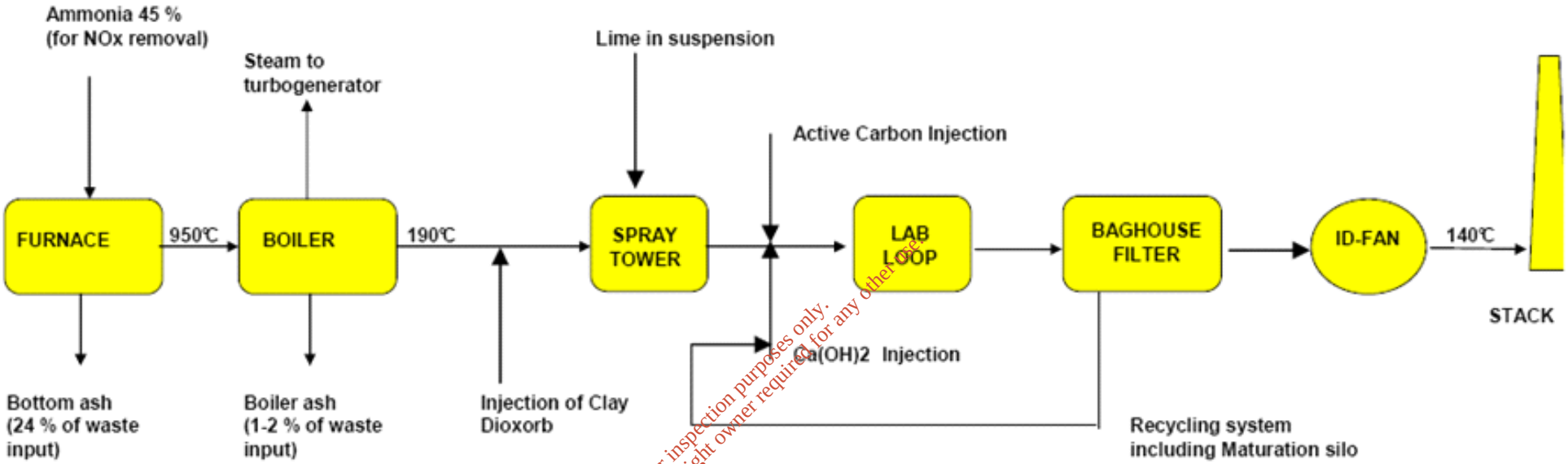


Figure A.1.e: Schematic of the process

Waste acceptance and handling

Deliveries will only be accepted at the facility from authorised carriers holding relevant waste collection permits.

All trucks entering the site will have to 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 will then drive to the enclosed waste acceptance hall and discharge loads into the bunker through one of the five discharge chutes. Sludges will be received in a dedicated pit area and pumped directly into the furnace.

Frequent inspections of waste will take place in the reception hall to ensure all waste is in compliance with Indaver Ireland's waste acceptance criteria. Any non-conforming waste will be consigned to a waste quarantine area in the service yard where it will be held until alternative disposal arrangements are made. Bulky residual waste will be shredded in the acceptance hall before being discharged to the bunker.

Operators located in the control room overlooking the bunker will 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 will be enclosed and maintained under negative pressure to ensure there are no odour or litter emissions. The bunker will have an approximate capacity of 5,600 tonnes, which will facilitate 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 will be three days.

Moving Grate Furnace

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

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

Oxides of nitrogen (NO_x) will be treated using Selective Non Catalytic Reduction (SCNR). This will involve injecting a SCNR reagent (ammonia or urea) at two levels into the post-combustion chamber.

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

Boiler

The boiler immediately follows the furnace and is designed to recover energy from hot flue gases to produce steam. In the process, the flue gases will be cooled from about 950°C to about 190°C. The total residence time of gases in the boiler will be 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 will be used where necessary to ensure these conditions are met, for example during startup. The burners will not be in use under typical operation.

The velocity of gases in the boiler will be 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 will be sent to the steam turbine, which drives a generator set to give an electrical output of approximately 17.2MW. As approximately 2.5MW is required for use within the plant, the amount available for export to the national grid will be about 14.7MW.

To maximise energy recovery, steam leaving the turbine will be 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 will be approximately 82 tonnes per hour at nominal load of 26.7 tonnes of waste per hour.

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

Flue gas treatment system

The flue gas treatment system is designed to ensure emissions from the stack will be 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 SO_2. 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 25% of waste input by weight or 50,000 tpa.
- Boiler ash from the boiler ash hopper. This will constitute about 0.5% of the waste input by weight or 1,000 tpa.
- Flue gas treatment residues from the spray drier absorber and baghouse filter hoppers. This will constitute about 5% of the waste input by weight or 10,000 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 bunker 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.d Process Modifications

The principle modifications to the process approved in WL 167-1 include the:

- reconfiguration of the plant to have a single incineration line with a single furnace and boiler leading into a single flue gas treatment system,
- increased capacity of the waste bunker, furnace, boiler and flue gas treatment systems in line with the increased plant throughput,
- increase in electricity production from 14MW to 17.2MW,
- reconfiguration of the flue gas treatment system, including:
    - moving the first stage dioxin and heavy metals removal to upstream of the spray drier absorber and using expanded clay rather than activated carbon/lime,
    - the replacement of the wet scrubbing system/tail end cleaning with a second stage dioxin/heavy metals/acid gas removal in the reaction duct before the baghouse filter,
    - the removal of the reheat of gases prior to discharge, as the temperature of the gases at the end of the treatment system will be sufficiently high to avoid the formation of a visible plume
    - an overall increase in energy efficiency and decrease in reagent consumption.

A.1.6.e Compliance with the Waste Incineration Directive

The facility 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

Under the Waste Management Act 1996 to 2003, the Agency cannot grant a waste licence unless it is satisfied that the conditions outlined in Section 40(4) have been met. Compliance with these conditions is outlined in the following section.

A.1.7.a Impact of facility on environment and health

Emissions from the facility will not cause environmental pollution and will comply with all of the relevant standards including:

- General Operations Standards: The facility has been designed in line with the principles of Best Available Technology (BAT), the Waste Incineration Directive 2000/76/EC and health and safety standards.
- Air emissions and ambient quality standards: All emissions leaving the stack will be well below the limits set out in the Waste Incineration Directive 2000/76/EC. Air dispersion modelling shows that the cumulative impacts on air quality from the facility (factoring in neighbouring industries) will be well within Ambient Air Quality Standards set out in EU Directive 1999/30/EC, even at maximum or abnormal operating conditions.
- Human health standards for dioxins: The predicted worst-case impacts of dioxin and furan emissions on human health (based on a theoretical "Maximum At Risk Individual") are well below the values set in the EU Tolerable Weekly Intake standards for both worst case and abnormal operating condition scenarios.
- Effluent emission standards: The facility has been designed to prevent the unauthorised or accidental release of polluting substances to soil or groundwater in line with the EU Groundwater Directive 80/68/EEC and the Waste Incineration Directive 2000/76/EC. The only emission to ground will be treated sanitary effluent from staff and visitor facilities, which has been designed in line with EPA Guidelines on Wastewater Treatment Systems. Surface water emissions will consist of clean surface water runoff, which will be controlled in line with recommendations set out in the Dublin City Council Storm Water Management Policy and the Waste Incineration Directive 2000/76/EC. There will be no discharge of process effluent from the facility.
- Noise standards: Noise emissions from the facility will not exceed the standards set out in the EPA Guidelines on Noise.
- Protection of habitats standards: The facility will not have an adverse impact on any sites protected under the EU Habitats Directive 92/43/EEC or other areas within or near the site covered by a scientific or conservation designation as recognised by the National Parks and Wildlife Service.
- Residues standards: In line with the Waste Incineration Directive 2000/76/EC, dry residues will be stored in enclosed containers, bottom ash will comply with relevant limits and materials will be recovered from bottom ash insofar as practicable.

A.1.7.b Application of Best Available Techniques

The facility has been designed in line with recommendations in the European IPPC Bureau Reference Document (BREF) on Best Available Techniques (BAT) for Waste Incineration and will be operated in line with Waste Licence conditions and the Waste Incineration Directive as required. Local factors have been taken into account in the design such as the requirements to produce no process effluent and to minimise water consumption.

A.1.7.c Compliance with the Waste Management Plan

One of the reasons for re-applying for planning permission and for a review of the waste licence was to extend the capacity of the facility in line with the 2005-2010 *North East Region Waste Management Plan*. This plan states that, to achieve its goal of thermally treating 39% municipal waste arising:

It is an objective of the Plan to develop a Thermal Treatment Plant with a capacity of 150,000 to 200,000 tonnes per annum by 2007. A licence has already been obtained for the development of a facility at Carranstown in County Meath.

It is therefore submitted that the scale and nature of the facility is consistent with the requirements of the Waste Management Plan for the North East Region.

A.1.7.d Fit and Proper Person

Indaver Ireland has never been convicted of any offence under the Waste Management Act 1996 to 2003, the EPA Act 1992 and 2003, the Local Government (Water Pollution) Acts 1997 and 1990 or the Air Pollution Act 1987 or any other environmental legislation in the 30 years it has operated in Ireland either as Indaver Ireland or as Minchem Environmental Services Ltd.

Staff responsible for operations and management of the facility will be suitably qualified and will receive specialist training at existing waste-to-energy plants owned and operated by the parent company, Indaver NV, in Flanders, Belgium. Staff based in Indaver NV will also provide support to management, operations and quality, environment, safety and health staff based in Ireland.

Indaver NV has over 20 years experience in waste management and waste-to-energy facility operations. In 2007, the company handled over 1.87 million tonnes of waste throughout Europe.

At its largest facility in Flanders, Belgium, over 700,000 tonnes MSW, industrial wastes and sludges are treated annually. This facility has both grate furnace and fluidised bed furnace plants to cater for different waste types. Indaver NV also operates a waste-to-energy facility for hazardous waste with both static and rotary kilns, giving the company a broad range of experience in materials management and waste-to-energy technologies.

A.1.7.e Meeting Financial Commitments and Liabilities

Indaver NV has been operating since 1985 and is in a strong financial position to invest in waste management infrastructure in Ireland. Due to its extensive operations and continual expansion, it is also in a position to understand and meet any financial commitments or liabilities incurred by the activity relating to this application.

Indaver NV's global insurance policy includes public liability, product liability, legal expense and environmental liability and onsite cleanup costs. The Meath waste management facility will be covered under this global scheme.

Furthermore, in line with planning condition 28 of PL 17.219721, Indaver Ireland will lodge a bond with the planning authority to secure final restoration measures if required (under the terms of condition 27) and will enter an agreement empowering the planning authority to apply this security or part of it to the satisfactory completion of any part of the restoration plan.

A.1.7.f Efficient use of Energy

Energy efficiency has been taken into account wherever possible in order to maximise electricity exports from the facility. Such measures include:

- Minimising flue gas heat losses by ensuring that the temperature in flue gas treatment components decreases from the boiler to the stack, optimising flue gas flow and primary/secondary air distribution and using flue gas condensation at the boiler exit.
- Pre-heating primary air and boiler feedwater with waste heat.
- Ensuring the thermal conversion efficiency of the boiler is greater than 80%.
- Selecting a highly efficient turbine for the maximum extraction of energy.
- Minimising onsite demand by selecting equipment with low energy demand.

In addition to these design considerations, the efficient use of energy and resources is one of the 11 key objectives in the Indaver Improvement Plan. This plan covers all facilities and includes objectives such as regular electrical inspections, energy efficiency audits and running awareness campaigns.

A.1.7.g Noise Emissions

Noise emissions from the facility will not exceed the limits given in the EPA Guidelines on Noise. The limits set out in these Guidelines reflect EPA policy, developments in legislation, licensing requirements and BAT.

A.1.7.h Waste Management Act Compliance Modifications

The principle modifications to the plant's compliance with the Waste Management Act Section 40(4)(a) to (g) as approved in WL 167-1 include the:

- Addition of further measures in line with BAT to improve the plant's energy efficiency, reduce residue production and reduce water and energy consumption
- Increase in capacity of the plant in line with the 2005 – 2010 North East Regional Waste Management Plan
- Improvement in the energy efficiency of the flue gas treatment system

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

There will be one main emission point at the stack through which the treated flue gases will be discharged. This will mostly consist of carbon dioxide (CO_2) and water vapour but may also contain a number of substances regulated by EU and Irish legislation.

The process has been designed 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 will also be one minor emission source from the emergency generator, which will only be 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 uncontrolledemissions 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 drainage water from the main process building will be recirculated within the plant.

There will be one emission source from the drainage system, which will consist 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 will 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 will also be installed at the discharge point.

The undeveloped area of the site will continue 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 will be no emissions to sewer. All sanitary effluent from staff and visitor facilities will be treated onsite in a Puraflo treatment system, which will discharge a treated effluent to ground as described below.

A.1.8.d Groundwater Emissions

There will be one minor emission to ground, which will consist of treated sanitary effluent from staff and visitor areas. The emission will be discharged into the overburden via an engineered percolation area, following treatment in a Puraflo Liquid Effluent Treatment System.

This 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 noise limits.

Traffic noise was found to have little impact on overall noise from the site 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 will take place in fully enclosed environments, the main process building will be maintained under negative pressure and the facility will be kept clean and tidy at all times. Roads, parking areas and service yards will be paved to minimise the potential for dust emissions. Measures for limiting the impact of traffic movements on the road network 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 will be 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 will include smoke/heat detectors, an alarm system, onsite storage of water for fire fighting purposes and manual call points.

A.1.8.g Emissions Modifications

The principle modifications to emissions from the facility as approved in WL 167-1 include the:

- increase in total emissions from the stack in line with the increased throughput. However, expected emissions remain well within EU Waste Incineration Directive (2000/76/EC) emissions limit values.
- storage of consumables in a separate room of the main process building to better contain any emissions that could arise.
- increase in the discharge of surface water runoff to the drainage ditch, as collected waters will no longer be recirculated within the plant. Increased attenuation capacity has been provided to ensure the discharge rate will mimic agricultural runoff.
- inclusion of two monitoring chambers to monitor surface water flows and ensure any discharge is strictly uncontaminated.
- change in noise emissions location and volume due to the revised layout of the facility and updated information on equipment. Most expected equipment noise emissions have decreased.

A.1.9 Impacts of Emissions from the Facility

A.1.9.a Air Emissions

Air emissions from the stack will be controlled through both process optimisation and physical / chemical treatment in the flue gas treatment system. These systems have been designed to ensure emissions will be significantly lower than the limits set out in the EU Waste Incineration Directive (2000/76/EEC).

To limit fugitive emissions from the facility, the main process building will be maintained under negative pressure. The storage, treatment and handling operations for waste, consumables and residues will be 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 will be isolated from the main process building to contain any emissions that may arise from this area.

To study the impacts of air emissions from the stack, detailed air dispersion modelling was carried out using the United States Environmental Protection Agency regulatory model, AERMOD. This is in line with recommendations outlined in the Waste Incineration Directive (2000/76/EC).

Throughout the study, 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 worst-case 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 will consist only of clean surface water runoff and will mimic natural discharge rates from agricultural land. There will be no discharge of process effluent to surface water.

The monitoring stations or fire alarm system will automatically divert any potential contamination 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

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 and ash bunkers and spill tank will be fitted with a double containment system to ensure that any leaks are collected and removed. The contaminated water storage tank will also be fitted with extra containment. All bunkers and attenuation tanks will be integrity tested to confirm they are watertight.

The only emission to ground will be treated domestic sewage. This will discharge into the overburden via a percolation area. There will be no other discharge to ground from the facility.

The planned groundwater extraction for domestic and process water requirements will not have any negative impacts on the aquifer.

A.1.9.d Noise Emissions

To limit noise emissions, key items of equipment will be provided with acoustic insulation and located within the main process building.

Due to these and other measures, noise modelling 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 1dB and was therefore considered to be imperceptible.

Anti-vibration mounts will be installed 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 main impacts of the development on the ecology of the site will be the removal of arable crop land, improved agricultural grassland and a number of hedgerows in the area. With the recommended mitigation measures, there will be no negative impact on the ecology of the site or surrounding area. Such measures included for example maintaining the existing network of hedgerows and treelines wherever possible, scheduling tree felling for the spring or autumn months, planting native species and putting in place a bat box scheme.

Overall, it was found that the proposed landscaping of the site may result in a net gain in biodiversity value of the site.

A.1.9.f Impact Modifications

The principle modifications to mitigation measures and impacts as approved in WL 167-1 include the:

- decrease in most of the predicted emissions concentrations at ground level (apart from annual mean NO_2) due to an increase in the stack height, and revised figures for flue gas volume and exit speed.

- increase in the overall quantity of surface water discharged, though not in the rate of discharge
- addition of information on noise modelling, which was not previously conducted.

A.1.10 Monitoring and Sampling

A.1.10.a Air Monitoring and Sampling

Continuous monitoring on stack emissions will measure, in line with the EU Directive 2000/76/EC, the following parameters:

- Total dust
- Total Organic Carbon (TOC)
- Hydrogen Chloride (HCl)
- Hydrofluoric Acid (HF)
- Sulfur dioxide (SO_2)
- Oxides of nitrogen (NO_x)
- Carbon Monoxide (CO)
- Temperature
- Oxygen (O_2)

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

Grab samples will also be taken from the stack on a quarterly basis to monitor for heavy metals and their compounds. These will be taken and measured by an external accredited laboratory. Furthermore, although not required by EU or Irish legislation, a dioxin sampling system will be installed. This will enable the collection of dioxin samples over a fortnightly period for analysis in an independent laboratory.

Ambient odour monitoring will be carried out at two locations on an annual basis. It is also proposed to carry out an instantaneous olfactometric (smell) assessment at various locations within the site on a weekly basis.

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.

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. Samples will be analysed for Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and Total Suspended Solids (TSS).

It is also proposed to carry out groundwater monitoring at three wells on the site, in line with EPA guidelines. Samples will be collected twice a year for analysis by external consultants for a range of pollutants specified by the EPA.

A.1.10.d Noise Monitoring and Sampling

Noise monitoring will be carried out at the main sources of noise as part of the first annual noise survey. Every year thereafter, noise monitoring will be carried out at four locations on and near the site. Daytime (30 minute duration) and night time (15 minute duration) noise measurements will be taken at each of the monitoring points.

A.1.10.e Meteorological Monitoring and Sampling

A meteorological monitoring station will be installed to monitor wind speed and direction and atmospheric pressure on a continuous basis. Precipitation volume and temperature will also be monitored on a daily basis. All measurements will meet World Meteorological Organisation Standards and Recommendations.

A.1.10.f Monitoring and Sampling Modifications

The principle modifications to monitoring and sampling as approved in WL 167-1 include:

- Changes to the naming system for emissions and monitoring points, in line with Waste Licensing Guidance Notes.
- The addition of two monitoring chambers in the surface water drainage system. There was previously no monitoring proposed for surface water emissions.
- Changes to the location of equipment to be monitored as part of the first annual noise survey, with the revised plant layout.
- Identification of a potential location for the meteorological monitoring station

A.1.11 Waste Arisings

A.1.11.a Handling of Waste Arising

Bottom ash is typically non-hazardous and will consist 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 for recycling, which will be sent off-site to an appropriate and licensed recycling facility. It is currently envisaged that the remainder of the bottom ash will be sent to a non-hazardous landfill. The volume of ash produced by a waste-to-energy plant requires significantly less landfill capacity to dispose of than 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.

Boiler ash is also expected to be non hazardous, and will be sent for non-hazardous disposal. If test results show that the material is hazardous, it will be sent for hazardous waste disposal with the flue gas treatment residues.

It is expected that the flue gas treatment residues will be classified as hazardous waste. In the absence of hazardous waste landfill capacity in Ireland, this material will be exported for disposal in an appropriately licensed facility. 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.1.11.b Waste Arising Modifications

The principle modifications to waste arising as approved in WL 167-1 include the:

- increase in quantities of residues arising in line with the increased throughput of the facility. The overall quantity of residues produced has increased by approximately 23,000 tpa and the quantity of ferrous metals to be recovered has increased by approximately 2,900 tpa.
- consideration of new information available on acceptance criteria for landfill and for reuse opportunities for bottom ash residues

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.

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.

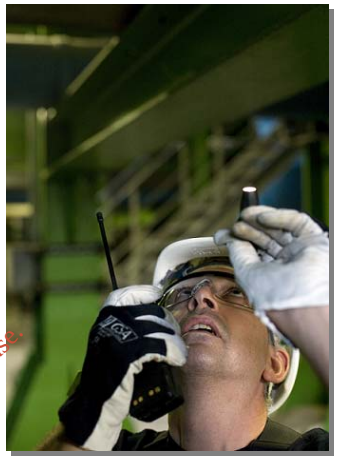
To improve safety and minimise the risk of emergency situations, the plant design will include:

- 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 will be 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 will be conducted to systematically identify hazards and draw up 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 will allow potential hazards to be easily identified. Wherever possible, Indaver will 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 will be well maintained and cleaned at all times. A preventative maintenance system will also be put in place, which will incorporate routine checks and maintenance of key equipment to ensure they remain in good working order.

A Site Emergency Plan will be prepared before the plant is commissioned. This will set out the response measures to be taken by personnel in the event of an emergency. Measures will be designed to 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.

The Site Emergency Plan will have four basic components:

- prevention, involving identification of potential hazards and taking measures to remove the hazard or reduce the potential for the hazard and its adverse effects
- preparedness including emergency planning, training, drill and exercise programmes
- response, addressing the immediate and short term effects of an emergency
- recovery, involving the restoration of site services and systems to normal status.

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.1.12.b Accident Prevention and Emergency Response Modifications

The principle modifications to accident prevention and emergency response measures as approved in WL 167-1 include the:

- inclusion of up to date regulations in determining measures for the safe and operation design of the facility

A.1.13 Closure, Restoration and Aftercare

A.1.13.a Closure, Restoration and Aftercare Measures

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.1.13.b Closure, Restoration and Aftercare Modifications

There are no modifications to closure, restoration or aftercare provisions as approved in WL 167-1.

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
UPS	Uninterruptible Power Supply

Nominal load	typical operating load
Waste-to-energy	Incineration with energy recovery