ATTACHMENT NUMBER A1

Non-Technical Summary

Contents

NON-TECHNICAL SUMMARY

1. INTRODUCTION

Indaver Ireland is submitting this application for a Waste Licence for a proposed waste management facility at Carranstown, Co. Meath. The application is being made to the Environmental Protection Agency (EPA) under the Waste (Licensing) Regulations 1997 as amended.

The principal class of activity at the facility is listed under the **Fourth Schedule** of the Waste Management Act, 1996, namely:

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

The following other activities will take place at the facility:

Third Schedule

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

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.

Fourth Schedule

2. Recycling or reclamation of organic substances which are not used as solvents.

3. Recycling or reclamation of metals and metal compounds.

4. Recycling or reclamation of other inorganic materials.

6. Recovery of components used for pollution abatement.

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

Indaver has received a notification from Meath County Council in July 2001 of a decision to grant planning permission for this proposed waste management facility. This is currently subject to an appeal with an Bord Pleanala.

Indaver intend to apply their experience of waste management to construct a waste management facility consisting of the following elements:

- A community recycling park serving the local community with an estimated throughput of 2,000 tonnes per annum
- A materials recycling facility for non hazardous waste with an anticipated throughput of 20,000 tonnes per annum
- A waste to energy plant for non hazardous waste with a nominal capacity of 150,000 tonnes per annum

Indaver Ireland aims to reduce any potential emissions and environmental impacts by incorporating Best Available Technologies and Techniques. Indeed, Indaver NV has extensive experience of operating incineration plants which not only comply with the new EU Regulations, but operates to levels well below the regulatory limits. For example, two dioxin removal steps will be installed in the waste to energy plant to ensure that dioxin emissions are well below the new EU limit of 0.1 ng/m^3.

1.1 SITE LOCATION

The proposed development will be located on a c.25 acre green-field site in the Carranstown, County Meath (see Figure 1.1 overleaf). A comprehensive site selection exercise was carried out. The Carranstown site was chosen due to its central location with respect to waste production, proximity to existing industrial activity, access to electricity export facilities and major access routes.

1.2 COMPANY PROFILE

Indaver is a company that specialises in Waste Management. Indaver recycle and treat both domestic and industrial waste and provide advice on how to prevent waste as an integral part of our service. 'Sustainable Waste Management' is Indaver's philosophy that demonstrates their commitment to establishing long-term relationships with customers and the community.

Indaver employs more than 800 people and handled over 800,000 tonnes of waste in year 2000. Of this, approximately 400,000 tonnes was recycled, approximately 350,000 tonnes went for waste to energy and approximately 50,000 tonnes went for treatment or disposal.

Since its establishment, Indaver has given a high priority to environmental management, quality and safety. Indaver has over 100 licences for the treatment of a broad range of waste materials. Complying with the most stringent standards all installations have been designed to minimise the residue burden on the environment.

Indaver is involved in a comprehensive range of waste management activities at their various plants in Flanders. A selection of such activities are as follows (see also Figure 1.2):

- Sorting and purification of packaging waste
- Sorting of paper and cardboard for recycling
- Solvent recycling
- Recovery of wood waste
- Composting
- Sorting and recovery of tyres
- Ash treatment
- Glass recycling
- Physio-chemical treatment of liquid waste
- Treatment of chlorinated waste
- Sludge treatment
- Landfill
- Hazardous waste incineration
- Non hazardous waste incineration

Indaver Ireland is a wholly owned subsidiary of Indaver NV, and is registered as a branch of Indaver NV at the Companies Registration Office in Dublin Castle. Indaver owns a 60% share of MinChem Environmental Services Limited, an Irish hazardous waste management company with offices in Dun Laoghaire, Dublin Port and Cork. MinChem has been operating in Ireland since 1977 and currently employ 35 people.

Figure 1.1 Site Location Map

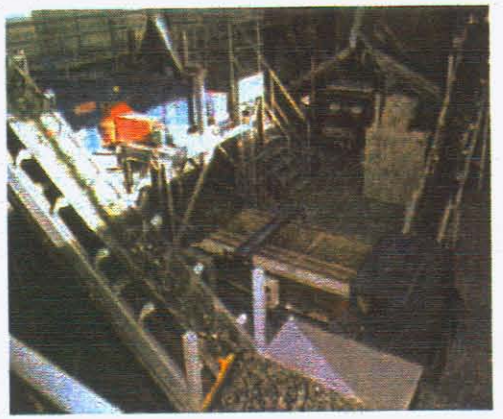
Composting

Paper Recovery

Solvent Recovery

Fluorescent Tube Treatment

Incineration



Glass Recovery

Figure 1.2 Some of Indaver's Activities

2. PLANT DESIGN

The waste management facility will consist of three separate areas, which are addressed in the following sections.

2.1 COMMUNITY RECYCLING PARK

The community recycling park will be located inside the entrance to the facility and will be open to the public six days a week. The park will allow members of the public to deposit items of waste for recycling into specially designed containers. The facility will accept recyclable waste such as:

- Cardboard
- Newspaper
- Aluminium drink cans
- Glass and wood
- Waste oils and batteries
- Textiles and footwear

Through comparison with similar facilities, it is estimated that the park will accept approximately 2,000 tonnes per annum. The community recycling park will be manned during opening hours to monitor deliveries of waste and ensure that inappropriate waste, such as kitchen waste, will not be accepted. The area will be kept clean and odour free through good housekeeping practices, such as regular washing and sweeping of the area, provision of hand washing facilities for members of the public and monitoring of waste deliveries. There will be no raw or ancillary material requirements at the park and there will be no requirement for fixed items of plant in the park, however mobile shredding units (for garden waste) and a forklift may be required from time to time.

There will be no emissions arising from the waste recovery activities at the park and therefore there will be no monitoring or sample points located in this area. All surface water runoff will pass through a petrol interceptor before entering the underground water storage tank.

All materials collected will be transported for further recycling to appropriately licensed facilities. Materials such as plastic and cardboard may be compacted and baled in the materials recycling facility located on site prior to being shipped for further recycling. All recovered materials leaving the recycling park will be enclosed in containers or will be covered. This requirement will prevent littering as a result of transport. It is anticipated that residual waste arising from the park will be minimal due to assistance provided by Indaver Ireland staff.

Environmental literature will be available to members of the public from the recycling park staff. The literature will provide details to members of the public on issues relating to Composting and Household Waste Management.

2.2 MATERIALS RECYCLING FACILITY

The materials recycling facility will provide for deliveries of approximately 20,000 tonnes of unsorted dry recyclable commercial and industrial waste per annum. All waste delivery trucks will be weighed and recorded upon arrival at the facility. Each load arriving at the facility will be required to have a waste certificate, which will detail the name of the carrier/collector of waste and vehicle registration, a description of the waste, the quantity of waste collected and the name of the person inspecting the delivery.

Dry recyclable waste will be accepted into the recycling hall, where it will be stored prior to processing. The waste recycling area will be maintained under negative air pressure to prevent potential odours being released from the hall. Air drawn from outside through the main doors of the building will be used as part of the primary air source in the furnace of the waste to energy plant.

The typical composition of recyclable waste is as follows:

- Paper
- Cardboard
- Plastics
- Wood
- Metals

The dry recyclable waste will be discharged from the trucks in the recycling hall and large items, such as bulky pieces of wood or metal, will be removed and put directly into containers, which will be sent to licensed recycling facilities off-site.

The remaining waste will then be lifted onto conveyors and passed through a large rotating screen to remove small particles, which will be disposed of in the waste to energy plant. Paper, plastic and cardboard will be manually removed by sorters who will be located within a picking station. The manually removed items will be dropped through chutes within the picking station and will be collected in bunkers located at ground level. These materials will then be either put in containers or baled, and sent onwards for recycling.

Metals will then be removed from the waste stream. These metals will then be placed directly into containers or may be baled and sent for recycling. The remaining, residual fraction of the stream will be sent to the incinerator for disposal. The total residual waste will represent approximately 20% of the input.

Items of plant such as front loaders and forklifts will be diesel-powered while all other material handling equipment will be electrically powered. The material recycling facility will require no raw materials or preparations, however there will be a requirement for rolls of baling wire which will be used to hold compacted bales of material in shape during transport.

The plant will be designed to sort 20,000 tonnes of waste per annum. This plant will operate between 8am to 6.30pm Monday to Friday and from 8am to 2pm on Saturdays, however additional working hours may be required depending on incoming

waste volumes. The sorting plant will be operated by up to 16 personnel consisting of 13 sorters, a foreman, a forklift driver and a front loader truck driver.

There will be no solid, liquid or gaseous emissions arising from this activity. The only potential emission that may be considered is that of noise, however owing to the fact that all items of plant will be located within a building, the impact arising from this will be negligible. Indaver Ireland will carry out noise monitoring at agreed intervals and locations around the site boundary.

As with the community recycling park, all materials leaving this process will be either within enclosed containers or will have to be covered to prevent the risk of litter during transport off site.

2.3 WASTE TO ENERGY PLANT

The waste to energy plant is based on conventional grate incineration technology, with modern flue gas treatment techniques employed. The plant will accept 150,000 tonnes of non-hazardous waste per annum and heat produced as a result of the incineration process will be used to generate approximately 14 mega watts (MW) of electricity, of which approximately 11 MW will be exported to the ESB distribution network, which is enough to power approximately 16,000 homes. The principle unit processes in the plant are described below.

2.3.1 Reception

All waste delivery trucks will be weighed and recorded upon arrival at the facility. Each load arriving at the facility will be required to have a waste certificate, which will detail the name of the carrier/collector of waste and vehicle registration, a description of the waste, the quantity of waste collected and the name of the person inspecting the delivery. Trucks will then drive into the enclosed waste reception hall where the waste will be tipped into the waste bunker. This area will be enclosed and maintained under negative pressure (air will be drawn into the building through the entrance doors and used as combustion air in the furnace) and as a result there will be no odours or littering outside this area.

The waste reception hall will be supervised to ensure that the waste arriving at the facility is in accordance with Indaver's waste acceptance procedures. The reception hall will contain a waste inspection area in which visual checks can be carried out on selected deliveries. In the event of material arriving at the facility that is not suitable for the process, this waste will be held in a waste quarantine area while transport off site is arranged. Any large or bulky items will be mechanically shredded prior to entering the bunker.

The waste materials will enter the storage bunker via one of five discharge chutes. The capacity of the bunker will be sufficient to allow waste deliveries to continue during periods of maintenance shutdown and during long weekends, etc.

The waste in the bunker will be mixed before it enters the furnace. The operation of mixing and loading will be carried out by a plant operator located in the control room directly above the bunker. The plant operator will use a semi-automatically controlled grab crane.

The only potential for unexpected emissions in the bunker would be due to a fire in the waste. In practice, the grab operator would remove this burning waste and place it into the furnace hopper where it will then enter the furnace. In the event of the fire becoming larger the operator would direct either one of two water cannons at the source. These cannons will have a flow rate of 300 cubic metres per hour which would be sufficient to extinguish a fire. In the event of large quantities of water being used, the bunker would contain this water prior to it being transported off-site for treatment at an appropriately licensed facility.

2.3.2 Combustion

The waste will be automatically lifted into the furnace feed hopper by the bunker's grab crane mechanism. The hopper will transfer the waste into the furnace using a ram system.

The furnace will be a "Grate" type and will continually move the waste from the entrance side to the ash discharge side. Gas-fired burners will be located within the furnace and will be used in start up situations. The burners will also provide auxiliary firing during normal operation to ensure the required temperature of 850 °C is maintained.

The waste will stay in the furnace for approximately one hour, which will ensure that the waste is completely burned. Air will be supplied to the furnace to assist burning, in addition parameters such as temperature and oxygen levels will be measured continuously in the furnace.

Small particles of waste or "siftings" that fall through the grate will be collected in a hopper, cooled using primary air for the furnace and returned by means of a conveyor system to the bunker. This will amount to approximately 1% of the input volume.

The residual ash that will represent approximately 20% of the total weight input is the solid by-product of the incineration stage. This ash will be quenched in a water bath upon leaving the furnace, where metals will be removed and sent off-site for recycling. The ash will be stored in an ash bunker prior to transport off site. This material may be used as a raw material in the construction industry, however if such an outlet is not established it will be disposed of to a non-hazardous landfill.

The waste to energy plant will have two furnace lines, which will allow one line to be shut down for maintenance without effecting the entire process.

2.3.3 Energy Recovery

The hot combustion gases leaving the furnace will enter a boiler to recover the heat generated by burning the waste, where the boiler water will be converted into superheated steam. The gas temperature at the inlet to the boiler is required, under the EU Directive on Incineration of Waste (2000/76/EC), to be a minimum of 850 °C with a residence time of at least two seconds.

The superheated steam will leave the boiler at a pressure of 40 bar, a temperature of 400 °C and will be expanded through a electricity generating turbine which will supply an output of approximately 14 MW. The steam exiting the turbine will pass through an air-cooled condenser where the remaining heat will be removed. The condensed

boiler water will then pass through a re-heating economiser before re-entering the boiler.

This closed loop process reduces the requirement for large volumes of boiler make-up water and instead, smaller volumes of boiler blowdown will be regularly removed to prevent the build up of salts in the system, this boiler blowdown will be diverted to the evaporating spray tower for recycling. All water entering the boiler water system will be of a high purity, which will be achieved using a de-ionised system or a combined de-ionised/reverse osmosis system. In addition, chemicals will be added to the water to inhibit corrosion of the pipework.

NO_x will be removed in the first pass of the boiler by the injection of ammonia or urea. These chemicals will react with nitrogen oxides to produce nitrogen and water. As a result the plant is expected to operate below the EU limit of 200 mg/m^3.

The only emission from the boiler will be boiler ash, which will represent approximately 1-2% or 1,500 to 3,000 tonnes per annum of the input weight. Depending on analysis of this ash, this material will go to either a hazardous or non-hazardous landfill. However, from Indaver's experience of operating a similar facility, it is expected that this ash will be classified as non-hazardous.

The waste to energy plant will have two boilers, which will allow the plant to shut down one line for maintenance without effecting the entire process.

2.3.4 Flue Gas Cleaning

The flue gases leaving the boiler will enter a five stage cleaning process involving cooling, dioxin and heavy metal removal, dust removal, acid gas removal and a final stage of dioxin and heavy metal removal. The final stage of flue gas cleaning will ensure that all emissions are well below the new EU limit values (EU Directive on Incineration of Waste (2000/76/EC)).

The plant will be equipped with a continuous dioxin sampler to provide records of any dioxin emissions from the plant.

Gas Cooling

The combustion gases leaving the boiler at a temperature of approximately 230°C will pass into an evaporating spray tower where they will be cooled to approximately 170°C. Cooling will be provided by spraying the liquid effluent from other process operations into an evaporating tower as the gases pass through, and therefore the tower will serve as both a gas cooling stage as well a recycling stage for the plant's effluent.

The tower will require approximately 5m^3 of water per hour. The required temperature of the flue gases will be achieved by controlling the rate of water to the tower. A small amount of solid residue will be deposited at the base of the tower due to evaporation. This residue will be removed and combined with the flue gas cleaning residues removed from the baghouse filter.

As with the furnace and boiler, the facility will operate two evaporating spray towers to avoid disruption to the process during times of maintenance.

Dioxin & Heavy Metal Removal

Activated carbon/lime mixture will be injected into the cooled flue gases exiting the spray tower. The activated carbon/lime mixture will be injected at a rate of 15kg/hr for each line when the plant is operating at a nominal capacity of 150,000 tonnes /annum. The activated carbon/lime mixture will adsorb heavy metals, organics and dioxins. The activated carbon/lime mixture will become entrained in the flue gases and will be removed along with other particulates in the baghouse filter.

Dust Removal

The baghouse filter will consist of 1,000 individual fabric filters, which will allow the flue gas to pass through while solid particulates will be captured on the filter sleeves. The removal of the solid cake from the sleeves will be undertaken at regular intervals using compressed air, and the cake now termed "flue gas cleaning residues" will be conveyed to a storage silo. The flue gas cleaning residues will amount to between 2-3% or 3,500 to 5,000 tonnes /annum of the input weight.

The plant will operate two baghouse filters, to avoid disruption to the process during times of maintenance.

Gases generated from both furnace lines will be combined after the baghouse filtration stage.

Acid Gas Removal

The combined flue gases will now enter a wet scrubbing system to remove any hydrochloric acid (HCl), hydrofluoric acid (HF), sulphur dioxide (SO_2) and heavy metals in the gas stream. The acid gas removal system will use lime/limestone as the reagent. Either reagent will be equally effective and the decision to use either one will be made on the basis of potential suppliers. It is anticipated that approximately 1,600 tonnes/annum of limestone or approximately 900 tonnes/annum of lime will be required for this process. The lime/limestone will be mixed with water in a blending tank to form a solution prior to entering the scrubbers. There are two options for this treatment stage and both options are described below.

Option 1

The flue gases will pass through two wet scrubbers. The gases will enter the first scrubber from the bottom and pass up through the tower against the falling reagent liquid. This scrubber will remove hydrochloric and hydrofluoric acids (HCl and HF). A controlled amount of reagent will be regularly removed from the circulating stream, which will pass through a neutralisation tank and will then be recycled in the evaporating spray tower. Lime/limestone will be used as the neutralisation solution in this scrubber.

In the second scrubber, lime/limestone will react with SO_2 to produce gypsum. A proportion of the circulating liquid from the second scrubber will be regularly removed and will pass through a vacuum belt filter to remove the gypsum. Approximately 1,000 tonnes/annum of gypsum will be produced from this treatment stage.

An alternative within this option would be to use water only in the first scrubbing tower. This would not effect the removal efficiency for HCl, HF and heavy metals. The balance of lime/limestone would, however, be required in the neutralisation tank.

Option 2

The second option for this treatment step would involve removing the first scrubbing tower and instead adding the lime/limestone solution into the evaporating spray tower.

The second scrubber would operate as per Option 1.

Tail End Cleaning

An Induced Draught (ID) fan will draw the combustion gases through the flue gas cleaning plant and maintain the plant in underpressure. This will ensure that no combustion gases escape from the process without going through the flue gas cleaning plant.

The tail end flue gas treatment will involve either (a) a second activated carbon/lime mixture injection with a baghouse filtration unit or (b) a fixed bed of lignite cokes known as a carbon bed.

In the case of (a) above, the principle will be the same as that mentioned above. In the case of (b) the flue gases will be forced through the bed of cokes, where the cokes will absorb trace dioxins, heavy metals and acid gases. Approximately once a week a small fixed amount of cokes will be extracted from the bottom of the filter. During commissioning of the plant, a rate of removal of the cokes will be established in order to ensure optimum performance of the bed. All removed cokes will be disposed of in the incineration process.

In the case of the carbon bed, the ID fan will be located between the wet scrubbers and the tail end flue gas cleaning system, as the carbon bed operates more effectively in overpressure. In the case of the baghouse filter, the fan will be located downstream of the tail end flue gas cleaning system as the baghouse filter operates more effectively in underpressure.

The use of wet scrubbers in the plant will both cool the flue gases and saturate them with water, which would result in a visible plume at the discharge of the stack. In order to reduce this plume the gases will be reheated from about 60 °C to 100 °C via a heat exchanger.

A tabulated summary of the expected stack emission concentrations from the waste to energy plant are included overleaf, along with a comparison to the appropriate EU limits.

Table 2.1 Comparison of Anticipated Stack Emissions versus EU Limits

Emission	Typical Emission Concentration (mg/Nm^3)	EU Emission Concentration Limits (mg/Nm^3)*
NO_x (as NO_2)	150	200
SO_2	20	50
Dust	1	10
CO	20	100
TOC	1	10
HCl	1	10
HF	1	1
PCDD / PCDF (ng/m^3)	0.01	0.1
Cd & Tl	0.025	0.05
Hg	0.025	0.05
Sum of 9 Heavy Metals: Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V	0.25	0.5

* These emission concentration limits are those specified in the EU Directive on Waste Incineration (2000/76/EC).

2.3.5 Operation

The waste to energy plant will generally operate twenty-four hours a day, seven days a week for approximately 7,500 hours per year. The plant when operating will generally run at full output, which results in optimum efficiency. However, for approximately 2 weeks each year, a single line will be shut down for maintenance while the other line remains operational.

2.4 Raw Materials

The raw materials to be used in the waste to energy plant are ammonia solution (25%) or urea, activated carbon/lime mixture, lime or limestone, lignite cokes, cement or iron silicate, sodium hydroxide (caustic), hydrochloric acid, trisodium phosphate and marketed boiler water treatment chemicals.

2.5 Fuel Supply/Electricity Generation

Waste that is not suitable for re-use or recycling will be incinerated in the proposed plant, with the objective being to recover as much of the energy content of the waste as possible, in line with EU policy. The proposed development contains energy recovery in the form of electricity production through use of a steam turbine, which is standard for waste incineration in Europe and is considered BAT (best available

techniques[1]). The electricity production from the waste to energy plant is expected to be approximately 14 MW, approximately 11 MW of which will be exported to the ESB distribution network. Efficient use of energy at the waste management facility will be a priority and will be a key objective of the Environmental Management Programme for the site.

The plant will use small quantities of natural gas for start up and potentially for auxiliary firing. However, the demand will not be large and gas can be supplied from the nearby natural gas supply.

There will be a gas-fired back-up electricity generator on site, which will only be used in the unlikely circumstance of both the plant not producing electricity and no power supply being available from the ESB distribution network.

3. PREDICTED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

It is Indaver Ireland's policy to avoid any release, disposal or emission that might harm the environment, and to minimise impacts including atmospheric emissions, discharges to water, solid waste and local noise nuisance. Compliance with national and European regulations will be achieved as a minimum expectation. Mitigation measures will be implemented in accordance with Best Available Techniques (BAT). The plant will be operated in accordance with the principles of an accredited Environmental Management System, e.g. EN ISO 14001 or EMAS.

3.1 AIR

The proposed waste to energy plant will have one main emission point through which the combustion gases will be discharged via a 40m stack after cleaning. The discharge, mainly carbon dioxide (CO_2) and water vapour, will potentially also contain a number of substances, the emissions of which are regulated by EU and Irish legislation, and for which ambient air quality standards are specified.

The proposed plant will achieve limits for air emissions well within strict EU legislative requirements by implementing various abatement technologies including ammonia/urea and activated carbon/lime mixture injection, wet scrubbers and filters.

A single stage of dioxin removal is sufficient to meet the new EU limit of 0.1 TEQ ng/m^3. This is usually achieved by activated carbon/lime mixture injection, which adsorbs dioxins, hydrocarbons and heavy metals. However, the proposed plant will be also equipped with an additional dioxin removal process, which acts to reduce emissions even further. As a result, it has been estimated that, for an individual living at the point where dioxin concentrations are predicted to be highest from the waste to energy plant, the person's inhaled intake of dioxins would be equivalent to drinking less than an additional half glass of milk per month, assuming a glass volume of 300ml[2].

[1] As defined in the EC Directive 96/61/EC concerning integrated pollution prevention and control.

[2] It has been assumed that the individual referred to above would be located at this point of highest dioxin concentration 24 hours per day, 365 days per year.

The Irish and US EPA approved Industrial Source Complex (ISC 3) computer model was used to carry out dispersion modelling to assess the potential impact of the emissions from the stack to atmosphere. The results of the modelling showed that the predicted ground level concentrations were significantly below the most stringent Air Quality Standards and therefore the impact of these emissions on the surrounding environment will be insignificant.

There will also be minor atmospheric emissions from the back-up gas-fired generator on site. This generator will never be in continuous operation as it will only be used when electricity supply is unavailable both from the ESB distribution network and from the plant. The back-up generator will also be in operation for a period of half an hour once per month for testing purposes.

The activated carbon/lime mixture silo located externally will be fitted with high quality dust filters which will effectively eliminate any dust emissions. The silos for the purposes of storage of flue gas cleaning residues and boiler ash will be located within the waste to energy plant and will also be fitted with high quality dust filters. Within enclosed areas, bottom ash will be discharged into trucks that will be covered to prevent windblown ash emissions.

Continuous monitoring of oxides of nitrogen (NO_x), sulphur dioxide (SO_2), particulates (dust), hydrocarbons (expressed as Total Organic Carbon (TOC)), carbon monoxide (CO) and hydrogen chloride (HCl) in the flue gases from the stack will be carried out. PCDDs and PCDF's (dioxins and furans) will be continuously sampled and analysed at least twenty times per year. Heavy metal and HF monitoring and analysis will be carried out four times in the first year and twice per annum thereafter.

3.2 CLIMATE

3.2.1 Acidification

The generation of sulphur dioxide (SO_2)and nitrogen oxides (NO_X), which are acid gases, can give rise to acidification and resultant environmental degradation. The power generation sector is the single largest contributor to emissions of SO_2 and is a significant contributor to total NO_X emissions. The problem of acidification and degradation of ecosystems arising from these emissions have long been recognised.

The proposed plant will produce SO_2 and NO_x emissions. However, it will produce less NO_x and SO_2 per unit electricity that is currently produced, on average, by power stations in Ireland (based on figures contained in ESB's Environmental Report, 1997)and will be below current EU limits.

3.2.2 Global Warming

There is a consensus in the scientific community that there is a real and existing problem arising from emissions of carbon dioxide (CO_2) and other greenhouse gases which give rise to global warming. When waste is disposed of to landfill, large quantities of methane are produced, which is an extremely potent greenhouse gas (15 times more powerful than CO_2). By treating the waste in a waste to energy plant, inert ash is produced, avoiding the formation of large quantities of methane. There will be

an overall net reduction in greenhouse gases arising from this facility as compared to landfilling the same amount of waste material.

3.3 WATER

3.3.1 Surface Water

All surface water run-off, such as rainwater, from hard-surfaced areas and building roofs on the site will drain via petrol interceptors into a 1500 m^3 storage tank located underground beneath the main building complex. This water will be used to supplement process water requirements. During flood conditions only (1 in 20 year storm), the capacity of the tank may be exceeded and it may be necessary to discharge to the wet drain currently to the west of the site, which is in turn drains to the River Nanny. Therefore, the existing surface water flow regime will not be significantly altered by the proposed development.

All chemicals or other potentially polluting substances used during the operation of the facility will be stored within bunded areas and will also be handled in a manner to eliminate the risk of any spillages contaminating surface water (or groundwater).

Petrol interceptors will be installed on surface water drains draining hard-surfaced areas (car-parking and marshalling areas) to contain any leakages of petrol/oil from vehicles on site.

3.3.2 Trade Effluent

There will be no trade effluent generated on site.

3.3.3 Groundwater

A domestic effluent treatment system will be used to treat all the domestic effluent from the facility to a very high standard before discharging it to a percolation area. The quality of the water discharged will be well within set limits before entering the percolation area.

Groundwater will be regularly monitored during operation of the plant to ensure that there is no adverse impact on groundwater quality.

3.4 NOISE

During operation of the facility, there will be a number of external noise sources at the plant such as the stack, air-cooled condenser, turbine cooler and noise emitted through louvres from buildings. A noise modelling analysis was carried out based on the anticipated noise emissions from the main noise sources on the site. The anticipated noise emissions are based on a survey of noise sources carried out at a similar plant in Belgium. The predicted noise levels at the nearest sensitive receptors are significantly below the Environmental Protection Agency recommended limit of 45 dBA and therefore the impact from noise generated at the facility on the surrounding area is not considered significant. A noise monitoring programme will be put in place to confirm compliance with the limits.

3.5 TRAFFIC

A detailed assessment of the potential impacts of the traffic due to the proposed development up to 2020 was carried out as part of the environmental impact assessment. The increase in the predicted two-way peak hour traffic volumes due to the proposed development will be no more than 7.1% on any of the roads in the vicinity of the development. The level of service within which these roads operate, will not be affected. The increase in predicted annual average daily traffic flows on the road network will be no more than 4.3%. Therefore it is predicted that the road network will not be adversely affected by the proposed development.

The facility will be provided with a high quality entrance including deceleration lane and right-hand turning lane. A traffic management plan will be implemented to ensure that impacts during construction will be minimal.

3.6 LANDSCAPE & VISUAL IMPACTS

The proposed site is contained within a predominantly agricultural landscape, and is designated as an area of visual quality VQ 11 – Rural and Agricultural, as defined in the Meath County Draft Development Plan, 2000, which can effectively absorb development. The landscape within which the proposed site is located is not significant or valued in a regional or national context. The Boyne valley is not in the same landscape envelope as the proposed development site.

However, the site can be viewed from other vulnerable landscape areas with a low visual absorption capacity such as Bellewstown Ridge (V16 of the 1994 Development Plan and the Draft Development Plan). Given the industrial character of the area, and the distance to these elevated views, it is considered that the impact of the proposed development will not be significant.

During construction, there will be minor and temporary impacts due to constructional works, moving and storage of machinery, etc. This intrusion will be short term and will be typical of any construction site.

The waste to energy plant will be the largest structure on the site (30m tall and a 40m stack) and will be located at the lower, rear section of the site, reducing its apparent scale when seen from the surrounding area. The exhaust gases will be heated to approximately 100 °C to reduce the formation of a visible plume at the stack discharge.

Landscaping measures such as berms and planting of native species of trees and shrubs (50,000 saplings) will minimise the impact of the facility, and should render the facility unobtrusive to passing traffic after the planting has matured (see overleaf for Figures 3.1 to 3.3).

Figure 3.1 Photomontage from R152, immediately south of the proposed entrance

Figure 3.2 Photomontage from R152, north of development

Figure 3.3 Photomontage from the R152 near Duleek

3.7 FLORA AND FAUNA

A baseline study carried out at the site found that flora and fauna present are represented by a few common species which are typical of the agricultural habitat. No rare, threatened or legally protected plant species or fauna of ecological significance were observed within the site. No part of the site or its immediate surroundings is covered by a scientific or conservation designation or proposed designation as recognised by Dúchas, the Heritage Service.

During construction, only on-site flora and fauna contained therein will be disturbed. The removal of this arable habitat during construction is not predicted to have significant ecological impacts. Mitigation measures will be taken to prevent any further damage to hedgerows and to protect the watercourses in adjacent fields.

Emissions from the facility are not predicted to have any significant negative impact on flora and fauna in the surrounding areas. The development will not therefore have any significant ecological impacts.

3.8 CULTURAL HERITAGE

In an archaeological survey of the site, it was established that the site is located in a region of historical importance, however no known archaeological monuments are recorded on the proposed site in the County Meath Sites & Monuments Record or elsewhere. No archaeological remains or artefacts were identified during the field walk, nor was there any evidence of archaeological remains in the trial pits dug on site as part of the soils survey.

It is therefore proposed that all topsoil stripping and groundworks be monitored by an archaeologist licensed under the terms of the National Monuments Act 1930, as amended. Any archaeological discoveries will be immediately reported to the Keeper of Irish Antiquities, National Museum of Ireland, and to Dúchas, The Heritage Service.

3.9 HUMAN ENVIRONMENT

The site is located in the townsland of Carranstown approximately 3 km north-east of Duleek village. The land use in the area is predominantly agricultural with the exception of the Platin cement factory and its associated quarry located to the north-east of the proposed development site. A commercial freight railway line, used to transport freight for Tara Mines and Platin Cement, runs within 50-100 metres of the northern boundary of the site. The area does not have any specific land zoning in either the existing (1994) or proposed Meath County Development Plan and is considered rural and agricultural. The development plans allow for industrial development in unzoned areas. One of the development objectives in the Development Plan for rural areas is to 'ensure that commercial and industrial proposals for rural areas are sustainable'.

The construction and operational phases of the development will result in the change of use of some land (ca. 25 acres) that was previously used for agricultural purposes.

The facility will employ a permanent staff of approximately 50 people and will therefore have a positive impact on employment in the area. Goods and services required during the operation of the plant will be sourced locally where possible which will have a further positive impact on the local economy and employment in the area. The provision of the community recycling park will add to the amenity of the area.

The proposed plant will be designed in accordance with BAT and will be operated in an environmentally sound manner. All discharges from the plant will comply with the relevant regulatory limits designed for the protection of human health and the environment. Therefore, the operation of the development will not have any adverse impact on human health.

4. WASTE MANAGEMENT

While the type and quantity of ash produced from any solid waste incineration process is dependent on the nature of the waste feed, experience has shown that with a typical mix of industrial, commercial and municipal waste, approximately 250 kg of solid waste residue is produced per tonne of waste or 10% by volume. There will be four solid waste residues collected from the proposed waste to energy plant which will be collected from separate parts of the process:

- Bottom ash – collected from the grate of the furnace. Bottom ash will account for the majority of the solid residues produced by the plant (30,000 tonnes/annum or 20% of waste input by weight).
- Boiler ash – collected from the boiler. About 1-2% (by weight) of the waste input (1,500 to 3,000 tonnes) of boiler ash will be produced per annum.
- Flue gas cleaning residues – About 4,000 tonnes of flue gas cleaning residues will be collected from the flue gas cleaning plant each year.
- Gypsum – About 1,000 tonnes per annum of gypsum will be recovered from the flue gas cleaning plant per annum.

A large proportion of the bottom ash is suitable for use as construction material and if an outlet can be found in Ireland it will be used for this purpose. Otherwise it will be disposed of to non-hazardous landfill.

The boiler ash will also be solidified, either on or off site, and disposed of to a hazardous or non-hazardous landfill, depending on analysis.

The flue gas cleaning residues will contain a high percentage of soluble salts as well as some heavy metals and will therefore be classified as hazardous waste. It will be solidified, either on or off site, and will be disposed of to a hazardous waste landfill in accordance with regulatory requirements. If no hazardous waste landfills exist in Ireland, the solidification and/or disposal may take place either in Ireland or abroad.

The gypsum can be used in the construction industry, if a market exists, and is otherwise suitable for disposal to non hazardous landfill.

5. CONTINGENCY PLANNING

5.1 INCIDENT AND EMERGENCY MANAGEMENT

Management of environmental risk is a continuous process. An Environmental Management System (EMS), based on an accredited standard e.g. EN ISO 14001 or EMAS, will be implemented at the facility to continuously monitor and improve the environmental performance of the plant. A quality management system and a safety management system based on the ISO 9002 and OSHAS 18001 standards respectively will also be developed and implemented at the site. Indaver Ireland will regularly identify the hazards and assess, and hence prevent, the risks associated with site activities. The results of the identification and assessment process will be used to develop the necessary measures to prevent unauthorised or unexpected emissions as well as emergency response procedures to limit the potential outcome of such emissions.

A site emergency response plan will be prepared prior to start-up which will set out the response measures to be taken by Indaver personnel and the facilities available for use in the event of an emergency. These measures will be designed to ensure maximum protection for the site employees, site visitors and people in other premises near to the site, to minimise any impacts on the environment, to limit plant damage and to minimise the impact on site operations.

5.2 CESSATION OF ACTIVITY

The plant has a projected life span of a minimum of 20 years, however this can be extended with maintenance/replacement of items of equipment. Should circumstances arise whereby it becomes necessary to abandon the site, then Indaver Ireland will ensure that the site and buildings are left in a secure manner and that all equipment, chemicals and wastes are removed off site to avoid any pollution risk and return the site of operation to a satisfactory state.