# 15. ACCIDENTAL EMISSIONS

## 15.1 General

In this section the proposed measures, including emergency procedures, to minimise the impact on the environment of an accidental emission or spillage in the facility are described. The provisions, which will be made, for response to emergency situations outside of normal working hours, i.e. during night-time, weekends and holiday periods are also outlined. The methods for the storage, transport and handling of materials on the site are described. The potential points of contamination and areas most at risk are identified and the measures to be implemented to contain the spills are described. The site drainage systems, including storm water and firewater retention provisions are described and drawings of the site drainage systems are provided.

## 15.2 Emergency Response Plan and Procedures

### 15.2.1 General

Indaver will have in place a number of systems to prevent emergency situations arising and minimise their consequence. These will comprise management systems and procedures and plant and equipment, designed to prevent operational failures and accidents and to respond in the event of an incident.

A hazard identification and evaluation study has been carried out, as part of the review of the status of the site with reference to the Council Directive 96/82/EC Control of Major Accident Hazards Involving Dangerous Substances and Regulations SI No. 476 of 2000. This was a systematic study of different accident scenarios, hazards and mitigation measures. The identification of hazards was facilitated by Indaver's experience in the operation of similar plants in Belgium. The findings of the study were used to modify the design of the facility to minimise the risk.



### 15.2.2 Management Practices

Based on the hazard identification study, and on the experience gained in the plants in Belgium, Indaver will implement a comprehensive set of management practices and standard operating procedures for the operation of the plant, which will minimise the risk of accident or emergency situations arising. The standard operating procedures will cover spill prevention, accident and fire prevention, worker health and safety, and will comply with safety, health and welfare regulations.

The good housekeeping practices will ensure that a clean and orderly work environment is maintained in all areas of the facility. Clean and orderly work areas will reduce the possibility of accidental spills caused by mishandling of hazardous materials and equipment, will reduce safety hazards to plant personnel and will reduce the potential for environmental contamination. Well-maintained equipment and materials storage areas will reduce the possibility of accidental spills which could lead to hazardous materials being discharged to the environment.

Indaver has standard operating procedures for good housekeeping practices that include:

- Maintain dry and clean floors
- Keep outside areas free of litter and debris
- Maintain process areas and storage areas in a clean and orderly manner

- Keep materials in storage areas until they are required for operations and return materials to storage areas when they are no longer required
- Make sure equipment is operating properly
- Routine inspection for leaks or conditions that could lead to discharges or spills of hazardous materials
- Ensure that spill cleanup procedures are understood by employees
- Provide adequate aisle and circulation space to facilitate materials transfer and easy access
- Store drums and other containers according to manufacturer's instructions and the IMDG regulations to avoid damaging containers by improper weight distributions
- Stack drums and containers on pallets to prevent corrosion which could result when the drums come into contact with moisture
- Keep an up-to-date inventory of all hazardous and non-hazardous materials on the site
- Identify and properly label all hazardous materials present on site. Clearly mark those that require special handling.
- Compatibility testing for any hazardous liquid wastes to be mixed.

Good housekeeping is a daily concern. All employees, as part of their training, will receive instruction on its importance as part of the preventative maintenance program. Supervisors will routinely monitor for good housekeeping.



### 15.2.3 Workforce Qualifications and Training

Indaver will employ staff with the appropriate qualifications and experience for the function and level of responsibility with which they are entrusted. All staff will receive the training necessary to fulfil their specific duties. The training will include the standard operating procedures, safe work practices, the requirements of the regulatory agencies, environmental protection and emergency response. Where appropriate, training will be in Indaver's plants in Belgium. Refresher training will be provided at regular intervals and as dictated by frequent audits of the standard operating procedures.

Refer to chapter 18 for further information on staff training.

### 15.2.4 Computerised Maintenance Management System

Indaver will have a computerised preventative maintenance system in place. The system will provide systematic and timely inspection, maintenance and replacement of equipment to ensure that manufacturing, utilities and environmental abatement systems function effectively as required and that equipment failures are minimised. Refer to chapter 18 for further information on the computerised maintenance system

### 15.2.5 Standard Operating Procedures

Indaver will put in place a detailed set of standard operating procedures for all process related site activities. These will identify safe operating techniques and procedures, such as using a work permit system, etc. to minimise the risk of spills or emergency situations arising. For the waste to energy plant the standard operating procedures will be based on the procedures in place at Indaver's plants in Flanders. For the waste transfer station, the procedures will be based on the procedures in place at the MinChem waste transfer station in Dublin Port.

A description of the Indaver Quality, Environmental and Health and Safety Management System has been provided in chapter 18.

### 15.2.6 Emergency Response Plan

The applicability of the Seveso Regulations (SI No. 476 of 2000) to the waste management facility is addressed in chapter 5. Articles 6 and 7 of the Regulations will apply to the facility.

A written site emergency plan will be prepared for the facility prior to start-up. The plan will set out the response measures to be taken by Indaver personnel in the event of an emergency, such as a fire or an incident, which could result in a release of hazardous material to the environment. These measures will be designed to ensure the maximum feasible protection for the site employees, site visitors and people in other premises near to the site, to limit property damage, and to minimise the impact of the incident on site operations and on the environment. The plan, as a minimum, will meet the requirements of SI 476 of 2000 article 10 for a major accident prevention policy.

The emergency plan will be based on four essential components:

***Mitigation***

Mitigation activities involve identifying potential hazards and then taking measures to remove the hazard or reduce its potential for adverse effects.

***Preparedness***

Emergency planning, training programmes, emergency drills and exercise programmes will be elements of the preparedness programme.

***Response***

Response activities address the immediate and short-term effects of an emergency. The site will be occupied on a continuous basis and the response will be available on a continuous basis.

***Recovery***

Recovery activities and programmes involve restoring site services and systems to normal status.



**Emergency Response Teams**

The facility will have its own fully trained emergency response teams. There will be one team for the waste to energy facility and one team for the waste transfer station. The emergency team members will be drawn from the entire plant workforce. Any member of staff, who has an interest in participating, may become a member of the team, if numbers allow. There will be a team present on the site at any time during normal working hours, including the team leader or the designated back up person. There will be sufficient trained staff to ensure that at least one full strength team will be available on call outside normal working hours.

**Emergency Centre**

An emergency control centre will be identified in the facility, from where the response to an incident will be directed. The personnel who will man the emergency control centre will be trained in their responsibilities. In the event of personnel being absent, a substitute will be designated to assume their responsibilities.

**Emergency Response Procedure**

Experience from similar Indaver facilities in Belgium has shown that the biggest risk of an incident occurring is during normal working hours as this is when waste is being accepted and waste handling activity is most intense.

Once an alarm is raised during normal working hours, the emergency response team will go to the site of the incident and the emergency control team will go to emergency control centre. The emergency response team leader will evaluate the situation and report to the emergency

control centre. The emergency response team leader will decide on the course of action to be followed – whether the incident can be brought under control using internal resources, or if the external emergency services need to be called. The emergency team and the control centre will have radio communications.

When an alarm is raised all other personnel on site will proceed to their designated assembly point. The person in charge of each section of the plant, will carry out a headcount, to ensure that all staff members of that section are accounted for, and will report to the emergency control centre. The list of visitors present on the site will be printed out in the emergency control centre.

If the external emergency services are required, the emergency response team leader will liaise with them when they arrive onsite. In the case of an emergency to which the external emergency services were not called, it will be the responsibility of the emergency response team leader to decide when the emergency has ended. He will notify the emergency control centre to issue the final alarm.

**Monitoring of the Facility During and Outside Normal Working Hours**

During normal working hours, the operational personnel will be the first people who come across an incident and provide the initial response. They will sound the alarm and call in the emergency response team.

The waste to energy plant will be manned on a 24-hour/ 7 days basis. The waste transfer station will be manned during normal working hours only. At night and at weekends the waste to energy plant shift operators will be responsible for initiating the first response to an incident anywhere in the facility. Fire and smoke alarms and CCTV signals from the waste transfer station and administration building will be monitored from the waste to energy plant control room. In the event of an alarm, the shift operators will contact the external emergency services immediately and then make contact with the emergency response team who will be on call.



**Alarms**

There will be 3 different types of alarm – gas, fire and end of alarm. The alarm starts initially as a fire alarm and will be changed depending on the nature of the incident. Areas that will be too noisy to hear an alarm will be identified and strobe lights will be installed. Alarms will not be continuous, they will only be raised at the start and end of an emergency.

**Training in Emergency Response**

The emergency teams will receive one half day of training per month. This training will cover such topics as evacuation techniques and first aid. All other operational personnel will receive comprehensive fire-fighting training on an annual basis. There will be regular evacuation drills for employees.

There will be regular liaison with the external emergency services. If required by the external emergency services, there will be joint exercises involving the external emergency services and the plant emergency team, which will simulate the likely incidents that could occur. This will serve to familiarise the external emergency services with the facility and the possible scenarios that could arise.

### 15.2.7 Emergency Shutdown Procedure

The emergency shut down will bring one or both incinerator lines to a safe status.

The main objectives of the emergency shut down procedure are as follows:

- To shut down the plant safely, avoiding injury to staff or damage to equipment
- to minimise emissions

- to prevent over pressure in the furnace
- to protect equipment from damage caused by temperatures which are too high.

The emergency shut down will be initialised by situations such as:

- An electric power failure
- Simultaneous occurrence of a flue gas temperature at the outlet of the boiler above 250°C and a failure of the water feed to the flue gas cleaning systems or a temperature at the inlet of the bag house filter of greater than 250°C
- Some plant interlocks including over-pressure in the furnace
- Manual alarm.

The experience of the operators of Indaver's plants in Flanders is that an emergency shut down is not a frequent occurrence. Over pressure in the furnace is the most common reason for an emergency shut down.

In case of failure of electrical power supply, motors and equipment required for the emergency shut down, will be powered by the emergency generator.

The emergency shut down will be automatically executed in two steps.

**Step 1** is the waste burn out. As soon as the emergency shut down commences all waste and fuel supply will be stopped immediately. The ID-fan will be stopped. The water supply to the spray tower and scrubbers will be stopped. An emergency supply may be provided for use in the spray tower, if the temperature of the flue gases exceed 250°C. This option will be decided at the detailed design stage. A valve will be opened to supply water from the scrubber systems' emergency supply into the scrubbers in order to avoid overheating of the resin of the scrubbers.



The injection of activated carbon and lime will stop and may be reactivated by the operator, manually, once the reason for the shut down is known and it is determined that there will be no risk in doing so.

The inertia of the ID-fan will ensure that the flue gases will continue to be evacuated through the flue gas cleaning systems, prior to the start-up of the ID-fan via the auxiliary motor, which will be powered by the emergency generator.

For the fluidised bed furnace, burnout will be complete within approximately 10 minutes and the inertia of the ID fan will maintain under-pressure in the furnace during this time period. Once the ID-fan has been re-started from the auxiliary motor, it will continue for approximately another 30 minutes to ensure evacuation of the flue gases through the gas cleaning systems.

In the grate furnace, air to burn out the residual waste will be drawn into the furnace because the inertia of the ID-fan will maintain under-pressure in the furnace. During this period the flue gas flow will drop quickly to less than 20 % of the normal flow. At this stage the waste in the furnace will be almost completely burned. Only a few bigger waste parts will still be smouldering. The auxiliary motor (with gear box) of the ID-fan will then be switched on and connected to the shaft by means of a clutch. The ID-fan, running on the auxiliary motor will continue for approximately 2 hours. The power of this motor will be enough to evacuate the remaining flue gas through the flue gas cleaning system. The water supply from the emergency water will then be stopped. The temperature in the scrubber will be measured. A fire water supply will be provided through an emergency nozzle, if the temperature is too high.

**Step 2** is the cooling step. A small heat vent after the boiler, in the line before the flue gas cleaning systems, will be opened and the ID-fan stopped. The function of the heat vent will be

to evacuate heat from the furnace to the atmosphere. The vent release will not be pressurised. It is unlikely that the vent release will result in a visible plume. The filter cake in the bag house filter will act as a barrier between the hot and the cold part of the plant.

The plant will now be safely shutdown. The furnace will be cooling down slowly by the natural draft through the heat vent.

When both lines are out of operation the ventilation of the waste bunker will not be guaranteed by forced draft. The ventilation will only be by natural draft through the louvers in the roof. A potential explosion risk in the bunker area could arise if there was methane present. As methane is lighter than air it would be evacuated through the roof vents, thus removing any potential risk of explosion.

While step 1 of the shutdown sequence is underway, the combustion gases will continue to pass through the flue gas cleaning/scrubber systems and particulates will be removed by the bag house filters as efficiently as during normal operations (except in the case of a catastrophic failure of the bag house filter). The activated carbon/lime mixture present on the sleeves of the bag house filter will continue to remove heavy metals, dioxins, HCI, HF and $SO_2$ from the combustion gases.

The combustion gases will pass through the reheater, which will heat the flue gases but not to a particular set point as during normal operation. The flue gases will then discharge to atmosphere via the stack, possibly with a visible plume.

In the event of a loss of mains power, key pumps, fans and other equipment required to ensure the orderly shut down described above, will be supplied with power from the emergency generator.

The fixed installed emissions monitoring equipment located on the stack will continue to monitor the emissions from the stack. In the event of loss of mains power, the monitoring equipment will be supplied with electricity from the Uninterruptible Power Supply (UPS) and emergency generator for a period of at least one hour.

A risk analysis will be carried out on this procedure during the detailed design phase of the project (in the form of a Hazard and Operability Study) during which the final details of the procedure will be decided. Indaver will submit the final procedure to the Agency during this phase.



### 15.2.8 Facilities Design

The plant will be designed and provided with adequate fire protection and detection systems, which will be consistent with the requirements of the Building Regulations and Indaver's Insurer's requirements.

The following measures (based on the experience of successful operation of Indaver's plants in Flanders) will be implemented to improve safety and minimise the risk of emergency situations:

- The plant design will be carried out in accordance with accepted international standards, design codes, regulations, good practice and experience by skilled people.
- The design will be reviewed to check for safety hazards in steady and non-steady state conditions and for operability issues.
- The plant will be designed to reduce to the minimum the number and extent of areas to be classified as explosive risk or high fire risk.
- Escape routes, alternative escape routes and emergency lighting will be provided in compliance with the requirements of the Building Regulations.

- The fire protection systems will be discussed with Indaver's insurance company.
- The facilities will comply with the requirements of the Irish Building Regulations Technical Guidance Document B Fire Safety. Indaver Ireland will apply for Fire Safety Certificates for each building in the facility and have had initial consultations with the Cork County Council Fire Department.

### 15.2.9 Installations

Backup systems will be provided for critical situations for key equipment such as pumps, computers, power supply, instrumentation etc.

Fire detection, alarm and fire fighting systems will be installed. A thorough interlock system will automatically shut down the plant in a safe manner in the event of equipment failure. All signals from explosion limit detection, fire detection and fire fighting equipment will be centralised on a synoptic panel in the control room. The synoptic will show the signals on a process flow diagram. The switch-off, set, reset philosophy will be the same as the existing. (switch-off, set and manual reset from the control room).

Sirens will be provided as necessary for an audible, although not irritating, alarm throughout the plant. In rooms where ear protection is required due to high noise levels, the audible alarm will be supported by a red flashing light.

Each fire alarm will automatically stop the HVAC systems. The HVAC will be controllable manually as well as automatically.

Electrical cables and instrument cables will be strictly separated on pipe racks. Cables will not be located under product piping. This is an Indaver company requirement. Cable racks through dusty areas will be avoided.

The installations will be commissioned according to a schedule that will provide for the testing of safety systems. The installations will be well maintained and tested at regular intervals.



The system for fire fighting and control of the spread of a fire will be as follows:

- Fire detection and alarm systems
- Fire compartmentation
- Fixed water canon
- Water curtains for bulk tanks
- Foam systems
- Fixed sprinkler systems (where necessary)
- Smoke ventilation
- Hydrants and hose reels.
- Dry/Wet rising mains
- Portable fire extinguishers
- On site water buffer
- Hydrocarbon detector in the waste bunker.

### Fire Detection Systems

A fire alarm system will cover the entire plant and will provide a high level of protection for both personnel and property. The fire alarm system will comprise local detectors, manual call points, local alarm bells, remote alarm and a fire alarm/control panel.

In the event of a fire alarm being activated, an audible and visual indication will be provided. A central control panel will be provided in the control room of the waste to energy plant and the waste transfer station. Some fire alarm signals will be relayed to the automation control system and composite fire signals will be relayed to enable emergency response actions to be effected.

### Fire Wall Compartmentation

In general every building will form a separate fire compartment, which may be further subdivided into separate compartments, as required by the Building Regulations or Indaver's insurance company, in order to minimise potential loss and improve fire safety. Special attention shall be paid to fire barriers and the sealing of penetrations through separating walls and floors in the plant.

### Water Canon Systems

The waste bunker will be protected by a fixed water canon system.

### Water Curtain for Bulk Tanks

Water curtains will be provided in the tank farms in the waste to energy plant and the waste transfer station to protect the waste solvent bulk tanks.



### Foam Systems

There will be two foam systems associated with the bulk tanks. In the event of a fire alarm in the tank farm area foam will be injected into the bulk tanks. In the event of a leak of waste solvent from a tank into the bund, a foam blanket will be activated, which will cover the surface of the leaked material with foam to prevent emissions of vapour.

### Smoke Ventilation

Smoke vents will be installed on the roofs of the main process building. Smoke will ventilate using the stack effect generated by the temperature difference of smoke and air. The elevated temperatures generated during a fire will trigger the opening of smoke vents by means of a fusible link. Smoke vents can also be opened manually and from a remote control panel. The smoke vents will meet the requirements of the Building Regulations.

### Rising Mains, Hose Reels and External Hydrants

Rising mains and hose reels will be provided in the buildings in accordance with the Building Regulations. External hydrants shall be positioned around the site in accordance with the requirements of the Building Regulations.

### Portable Fire Extinguishers

Fire extinguishers of an appropriate type, e.g. dry powder, $CO_2$, water/foam, shall be located throughout the building. The type of extinguishers will be determined according to the risk.

### Firewater Supply

Two firewater tanks, of a total capacity of 2000$m^3$ will be located on site. The firewater pumps, with a capacity of 350 $m^3$/h, will be located the in the firewater pump house. The fire water main and pumps will supply the external hydrants, hose reels and wet sprinkler systems and fixed canon systems.

**Hydrocarbon detector in the waste bunker**

A lower explosive limit detector will also be installed in the waste bunker to monitor hydrocarbon levels and will provide an alarm to alert plant operators in the event of levels deviating from set limits. The ID fan will then be ramped up to increase airflow through the bunker, thereby removing any possibility of explosive atmospheric conditions.

### 15.2.10 Fire installations in the waste bunker

**Compartments of the bunker for high calorific value waste:**

Two infrared smoke detectors will be installed in the compartments of the bunker in which waste with a high calorific value (i.e. solid waste except sludge) will be stored. The bunker will also be continuously monitored by the crane operator. A fire will be detected at an early stage by the operator. The automatic detection systems will also monitor the bunker and will activate an alarm in the control room, should the crane operator fail to detect a fire. On activation of an alarm the shift operators will initiate fire fighting.

The experience in the plants in Belgium has been that it is usually quite simple to lift the part of the waste on fire into the hoppers from whence it will go into the furnace. This waste will then be covered by placing another layer of waste in the hopper.

Two water cannon will be available in each of the two high calorific value waste bunker compartments. The capacity of each water cannon will be approximately 300 $m^3$/hr. Local or remote operation of the water cannons will be possible. All firewater, discharged from the water cannons, will be contained within the bunker.

Smoke vents, in the roof over the bunker, will be opened automatically on activation of the alarm.

Dry risers will be installed from the outside wall of the building at + 5.77 mOD to the hopper platform and to the reception hall level.

The hoppers of the shredder and the furnaces will be monitored with infrared smoke detectors. Sprinklers in the hoppers will be started automatically if smoke is detected.

Fire detection and fire extinguishing system will be installed along the path of the waste to the furnaces as follows:

- The hopper of the shredder will be equipped with sprinklers. In case of fire detection the sprinklers will be activated manually.
- The hoppers of the furnaces will be equipped with sprinklers. In case of fire detection the sprinklers will be activated manually.
- The mechanisms for feeding waste to the furnaces, which will be a ram on the moving grate furnace and a dosing screw on the fluidised bed furnace, will be equipped with a fire damper and water injection. These will be activated when the temperature exceeds a preset level.

  In the case of the fluidised bed furnace, the damper will close and water will be injected into the feeder between the hopper and the damper, saturating any waste in the feeder, and isolating the feeder from the furnace and from the hopper containing waste. Hence a water lock will be created, which will act as a plug seal. During the detail engineering design, consideration will be given to using steam instead of water for this function.

  In the case of the moving grate furnace, the damper will be either a hatch at the top of the hopper or a damper in the feeding duct between the hopper and the dosing ram. The damper or hatch will close and water will be injected into the hopper, to form the water lock.

**Sludge compartment of the bunker**

There will be a risk that biogas, methane, will be produced by the sludge in the bunker, although the sludge will not be active.

Dedicated ventilation will be provided to avoid the build up of biogas. The vent air will be drawn into the furnaces for use as combustion air. A ventilation rate of 4 air changes per hour will be provided.

A minimum ventilation rate of 2 air changes per hour will be provided when the entire plant will be shut down. This ventilation will be provided by the Induced Draught fans. In case of a power failure, the ventilation will stop until power will be restored. Vents in the roof over the bunker will open automatically in this situation.

There will be 2 lower explosive limit (LEL) detectors in the sludge bunker. A pre-alarm and alarm will be generated. The pre-alarm will give the shift operator the chance to restore safe conditions. The alarm will shut down all electrically powered equipment inside the bunker and open the smoke vents in the roof above the bunker. Hence it will not be necessary to classify the bunker as an explosion risk area.

The bunker will be constructed in concrete. The wall, separating the bunker area from the incineration section of the plant, will be designed to act as a fire separation wall and the fire protection will extend at least 1m above the adjacent roof of the bunker area.

**Turbine building**

The oil circuit will be monitored by a two fire detectors. The extinguishing system will be activated automatically as soon as both detectors indicate fire.

**Control room, MCC-room, other utility rooms, staircases**

MCC rooms will be designed as separate fire compartments by means of fire resistant walls and doors. There will be no raised floors.

Smoke detectors will be installed in these rooms. Portable fire extinguishers will be installed as required by the Building Regulations. Fire doors will have the fire resistance specified in the Building Regulations.



## 15.3 Storage and Transport of Materials on Site

The materials, which will be stored and handled on the Indaver Ringaskiddy site, can be classified as follows:

| | |
|---|---|
| **Incoming waste materials** | Solid hazardous waste<br>Bulk liquid hazardous waste<br>Drummed liquid hazardous waste<br>Solid non hazardous waste |
| **Utility material** | Nitrogen<br>Sand<br>Activated carbon and lime or lignite coke<br>Urea/ammonia solution<br>Lime or limestone<br>Cement/iron silicate<br>Diesel<br>Filter spares etc.<br>Foam (for tank bund foam blankets)<br>Lubricating and vacuum pump oils<br>Laboratory gases |

| | |
|---|---|
| | Maintenance workshop gases such as acetylene, argon, $CO_2$ and $O_2$.<br>Boiler additives<br>Water treatment additives<br>Packaging materials and drums in transfer station<br>Laboratory chemicals<br>Maintenance workshop spares<br>Personal protective equipment and clothing<br>General office/canteen materials<br>Pallets |
| **Recyclable materials** | Materials in community recycling park |
| **Outgoing solid residues** | Gypsum<br>Bottom ash<br>Ferrous metals |
| **Outgoing waste materials** | Boiler ash<br>Electrofilter ash<br>Flue gas cleaning residues<br>Laboratory wastes<br>Drummed waste from transfer station<br>Bulk liquid waste from the transfer station<br>General office/canteen residual wastes<br>Pallets |



The storage and handling of these materials are described in chapter 3, where the function of each material in the process is described. The particular provisions in place to prevent spills, leaks or emissions are described in this section.

**Incoming Solid Waste**

Incoming solid waste will be in compacter trucks, or covered skips or containers. The trucks will be off loaded in the enclosed reception hall. Drummed solid wastes, arriving at the transfer station, will be in sealed containers and will be off loaded by forklift and stored in the warehouse.

The solid waste bunker will be reinforced concrete and will be divided into several separate compartments. Each compartment will have a sump in the floor. The sump will be constructed of concrete to a water retaining specification. The floor of each bunker compartment will be laid to falls so that any leachate will drain to the sump.

**Bulk Liquid Hazardous Waste**

Bulk liquid hazardous waste will arrive at the site in road tankers. Following completion of the waste sampling and acceptance procedures, the tankers will drive via the site road into the service yard and park at one of the tanker unloading bays. The containment of the tanker unloading bay is described below. The tanker will be connected to piping and liquid waste will be transferred, via a sieve, to the appropriate tank. The liquids will be transferred from tank to tank or from tank to the post combustion chamber by pipelines on overhead pipe racks. Some hazardous liquid wastes will be pumped directly from the road tanker to the furnace and will not be stored on site.

The liquid wastes may contain residues. The residues will be separated from the liquids, and retained in a storage container. The residues will be discharged to the bunker compartment for hazardous waste or sent off site for disposal.

Liquid wastes will be transferred from bulk tanks to road tankers in the transfer station. The tankers will park on a loading bay, the containment of which is described below.

**Drummed Liquid Wastes**

Drummed waste, arriving at the transfer station, which is suitable for treatment in the waste to energy plant, will be pumped into bulk tanks. Some drummed liquid wastes for onward shipment will also be pumped to the bulk tanks. The bulk tanks will be bunded. A tanker loading bay will be located in the transfer station service yard, adjacent to the bulk tanks. The bay will be laid to falls and will drain to the tank bund sump.

Drummed liquid wastes will be stored in the warehouse in the waste transfer station. The floor slab of the warehouse will be concrete, laid to falls to a floor sump. All spills will be collected in the sumps. The sumps will not be connected to the drainage system. Any spillage will be pumped out from a sump and repacked for disposal.

**Diesel**

Diesel for the reception hall loaders, forklift trucks, fire water pumps and the emergency generator in the waste to energy plant will be stored in a bunded tank. There will be a separate diesel tank in the waste transfer station for the fire pumps and the nitrogen generator. This tank will also be bunded.

**Laboratory Chemicals**

The laboratory chemicals will be stored in appropriate storage cabinets in the laboratory. There will be spill kits located in the laboratory, which will be used to deal with any spills or leaks.

**General office/canteen materials**

General office materials will be stored in appropriate covered containers as required in offices on site.

**Community Recycling Park**

The materials, which will be accepted in the community recycling park, will be deposited directly in the appropriate dedicated containers. The containers will typically be steel skips, and will have covers, or be under cover, where the contents could become airborne in the wind, or would deteriorate due to rain, or would attract vermin. Once full, the containers will be removed.

**Utility Materials**

Utility materials will be stored in silos, tanks or bags as appropriate, at dedicated locations within the waste to energy plant. Any leaked or spilled materials will be collected and will not be emitted to the atmosphere.

## 15.4 Potential points of contamination/areas most at risk, spill containment measures

### 15.4.1 General

The provisions, which will be in place, to prevent spills and contain emergencies will comprise the following components:

- physical containment to prevent or contain spills
- standard operating procedures which will be followed to prevent and contain spills
- emergency response procedures to mitigate spills which occur.

The physical infrastructure in place to contain spills is described in this section. The emergency response provision is described in section 15.2 above.

### 15.4.2 Potential Points of Contamination

The potential points of contamination and areas most at risk from a spillage will be:

- areas where liquids will be loaded or unloaded
- areas where liquids will be stored
- areas where powder materials, such as lime or activated carbon, will be loaded or unloaded
- areas where powder material will be stored.

There will be a lower level of risk associated with the transport of materials around the site, which is described in section 3.4 and 3.6 above.

**Areas where liquids will be loaded or unloaded**

The unloading of liquid waste from road tankers in the waste to energy plant, or the loading of drummed waste into bulk tanks or from the bulk tanks to road tankers, in the transfer station, are potential areas where spills could occur. The point where samples will be taken from road tankers, in the waste to energy plant, will be another point of potential spillage.

For loading or unloading, tankers will be parked on a hard standing, which will be laid to falls and will drain to a containment tank. The tanker sampling bays will have impervious surfacing, any spillage would be of a very small quantity which will be dealt with using a spill kit. The contents of the containment tanks will be sampled. If uncontaminated, the run-off will drain to the storm water system. If contaminated, the contents will be pumped to the post combustion chamber or stored for off site disposal.



The tanker loading bay in the transfer station will be a hard standing in the service yard. It will drain to the same collection tank as the bulk tank bunds. Refer to 15.5 below.

**Storage of liquids - Bulk Tanks**

In the waste to energy plant and waste transfer station, liquids will be stored in bulk tanks The bulk storage tanks will incorporate a number of safety systems to minimise the risk of an accident occurring and also, to confine any damage to the immediate area should an accident happen. In particular, all of the tanks will be double walled and fabricated from mild steel, with the exception of the speciality tank in the waste to energy facility tank farm which mayl be stainless steel. The double-walled design feature provides secondary containment for the tank contents and will help to prevent catastrophic failure of the tank.

The tanks will be designed in accordance with current Irish and European standards and in addition to the tanks being double walled, they will be contained within a bund. Each bund will have the capacity to hold 110% of the volume of the largest tank or 25% of the total capacity of all the tanks in the bund, which ever is the greater.

As the waste tanks will be in bunds, liquid leaking from a tank would collect in the bund. Foam injection systems will be installed which will be activated in the event of the detection of a leak. The foam will rapidly cover the surface of the liquid in the bund to prevent vapours being emitted to the air.

Other safety features on the bulk liquid waste tanks will include:

- weak shell to roof seam (see below)

- all tanks will have a nitrogen 'blanket'. Nitrogen, an inert gas, will fill the headspace of the tank thereby ensuring that flammable or explosive vapours will be suppressed (see below)
- tanks will be earthed and there will be an interlock on the tank mixers to avoid the build up of static electricity if the tank is empty
- in the event of a fire occurring, the tanks will have foam injection
- in the event of a fire, a water curtain on the outside of the tank to cool the tank walls
- the tanks will have high and low level alarms as well as overfill protection
- temperature monitoring
- over/under-pressure protection.

Ammonia/urea will be stored in a bunded, double walled tank located in the waste to energy process building. The tank for HCl will also be double walled. The other utility liquids will be stored in bunded, single walled tanks.

The tanks will be under a blanket of nitrogen at a constant pressure of 10mbarg. All of the headspaces of the tanks will be linked to allow vapour/nitrogen exchange during loading/off-loading operations.

If the pressure in the headspace of a tank drops below 8mbar, nitrogen is automatically introduced to the tank until the optimum pressure of 10mbar is reached. If the pressure rises above 13mbar, this overpressure will be released to the post combustion chamber for use in the incineration process, or to an alternative abatement system if the PCC is down.

Each tank will also have a pressure release device capable of allowing inflow of air to the tank below -3mbar and venting to atmosphere above 18mbar. Extra overpressure protection will be provided by a 'floating man lid' on the top of the tank which will vent to atmosphere at pressures above 20mbar. Each tank will also have a weak shell to roof seam so that in the event of gross overpressure, the lid of the tank will give way.



In the transfer station liquid wastes will be stored in drums or bulk tanks. The transfer station bulk tanks for waste will be to the same specification as the waste to energy bulk tanks. The drums will be stored in the transfer station warehouse. The warehouse floor will be laid to falls. Any spillage from a drum, which is not wiped up by a spill team, will drain to a floor sump, from where it will be removed for treatment.

**Sumps and bunds**

The collection sumps, for drainage from the tanker loading bays and the tank bunds will be tested for water-tightness.

The waste bunker will be concrete. The compartments of the waste bunker will each have the floor laid to falls to a sump, into which any leachate will drain. The sump will be constructed in concrete to a watertight specification.

Bunding will be provided for electrical transformers located in the transformer rooms.

**Transport of liquids around the site**

Liquids will be transported around the site in overhead pipelines or in sealed containers. The over ground pipeline will be checked on a regular basis for visible leaks. Any in ground process pipelines will be double contained.

**Transport of solids**

Solid waste will be unloaded in the enclosed reception hall, where any litter will be contained. Powder materials will be transported in enclosed conveyors. Depending on the nature of the powder, dust filters or HEPA filters will be used to contain any emission.

Solids handling will take place inside the reception hall in the waste to energy building. All operations will be contained by the building envelope. The building will be under negative pressure, as air will be drawn into the furnaces.

## 15.5 Drainage systems

### 15.5.1 Description

The surface water from the proposed facility will be collected in a number of separate drainage systems. The design of the surface water drainage network for the development is based on a rainfall return period of 1 year with a maximum rainfall intensity of 50mm/hr. Refer to section 15.7 below for a description of the firewater and rain water run-off retention system.

**Roofs**

All of the surface water run-off from the roofs of the buildings in the waste to energy facility will be collected and stored in a rainwater storage tank. The collected rainwater will then be used in the process. There will be an overflow from the rainwater tank to the storm water retention tank.

Rainwater from the roofs in the waste transfer station and the roof of the building in the community recycling park will discharge directly to the Cork County Council surface water sewer.



**Drainage of Hard Standings**

The surface water runoff from the roads and hard standing areas in the waste to energy plant will be collected in a dedicated system and discharged to the Cork County Council surface water sewer via a monitoring chamber. Continuous monitoring for TOC and pH will be undertaken. If an elevated level of either parameter occurs, the outlet valve will be closed and the run off will be directed to a storm water retention tank. The contents of the retention tank will be tested for contamination. If contaminated, the contents of the tank will be pumped to the furnace or taken offsite for treatment or disposal. If no contamination is found, the contents will be discharge to the surface water sewer.

Surface water run off from the waste transfer station hard standings and marshalling areas will be collected in a dedicated system and discharged to the Cork County Council surface water sewer via a monitoring chamber. Continuous monitoring of TOC and pH will be undertaken. If an elevated level of either parameter occurs, the outlet valve will be closed and the run off will be directed to the surface water retention tank. The contents of the retention tank will be tested for contamination. If contaminated, the contents of the tank will be pumped to a road tanker for transfer to the furnace or to be taken offsite for treatment or disposal. If no contamination is found, the contents will be discharge to the surface water sewer.

Run off from car parking areas in the waste transfer station and from the community recycling park will be collected in a separate system and discharged via a hydrocarbon interceptor to the surface water sewer.

**Bunded Areas Drainage**

The surface water run-off from tank bunds and bunded areas, the tanker unloading areas and the direct injection hard-standing area in the waste to energy plant will be collected in a

dedicated sump and tested. Uncontaminated water run-off will be discharged to the hard standings storm water system. Contaminated run-off will be sent to the post combustion chamber for disposal, or sent offsite for treatment or disposal.

The tank farm bund and tanker loading area in the waste transfer station will drain to a sump, from which it will be collected and disposed of to the post combustion chamber, or sent offsite for treatment or disposal, if the run off is found to be contaminated. Uncontaminated rainwater will be discharged to the service yard storm water system.

Drum washing operations, in the waste transfer station, will take place in an enclosed unit, with a tank to collect the wash effluent. The effluent will not be discharged to the drainage system. The effluent will be collected in a container and transferred to the waste to energy plant for disposal or disposed off site to a licensed facility.

### 15.5.2 Drawings of Drainage Systems

The drawings of the site drainage systems are provided in appendix 15.

## 15.6 Catchment areas for each run-off collection system

The separate run-off catchment areas are as follows:

| Catchment | Area ($m^2$) |
|---|---|
| Roofs of the waste to energy building, security building, laboratory, pump house, turbine building | 14,521 |
| Roofs of transfer station warehouse, drum wash building, pump house, administration building, community recycling park security hut | 2,705 |
| Hard standings, service yard and roads and car parking areas of waste to energy plant | 14,405 |
| Hard standings and marshalling areas of transfer station | 4,831 |
| Community recycling park road and skip bays, and car parking areas of the administration building | 3,710 |
| Tanker sampling bays in the waste to energy plant | 218 |
| Bulk tank bunds and tanker unloading bays in the waste to energy plant | 1395 |
| Bulk tank bunds and tanker loading bay in the transfer station | 218 |



## 15.7 Storm Water and Firewater Retention

### 15.7.1 Storm water retention

**Waste to Energy Plant**

At the waste to energy plant site, the water retention strategy is based on direct water retention in the main underground retention tank with a capacity of 1500$m^3$ and an underground collection tank for surface run-off from roofed areas with a capacity of 780$m^3$. The 780$m^3$ tank will have an over flow connection to the 1500$m^3$ tank. The total direct retention capacity will be 2,280$m^3$ when both tanks are empty. In addition there will be residual retention capacity in the underground storm drainage system and in the tank farm bund. The underground tanks will be constructed as watertight concrete tanks.

The storm water run-off from the roofed areas of the process building will channel the water through the underground drainage network and into the 780$m^3$ tank for use in the process. The total water demand will be 16$m^3$/hr of which approximately 1$m^3$/hr will be for potable use and will not be taken from the rainwater storage tank. The total daily water demand for the process will thus be 360$m^3$. A common daily rainfall event of 10mm of rain in 24hrs would

generate approximately 175m³ of water for process use. The process would use this in less than 12 hours. A more severe rainfall of 25mm of rain (which may occur on a small number of days per year) in a day would generate approximately 420m³ of water for reuse and the process would consume this within 28 hours. It is therefore reasonable to assume that the tank for storage of run-off from roofed areas will normally be empty except in the period immediately following a severe rainstorm. Another severe rainstorm within the period required to draw down the water for recycling is considered to be highly unlikely.

The 1500m³ retention tank will collect fire water run-off from the paved areas, the tank farm bund and from within the building. Here it will be tested and discharged to the Cork County Council storm sewer if found to be within the limits set by the operating licence. If found to be outside of the limits, it will be disposed of in the waste to energy plant, or taken off-site for alternative treatment. Rainwater, collected in the main storm water drainage system will be continuously monitored. It will only be directed to this retention tank if monitoring indicates that it has become contaminated.

Rainfall from bunded areas, such as the tank farm and tanker unloading bunds will drain to a separate collection sump where it will be tested. If found to be within the limits set by the operating licence, the storm water will be discharged to the main storm water system where it will again be tested prior to being discharged into the Cork County Council Storm sewer on the adjacent road. If found to be outside of the limits, it will be pumped to a storage tank in the main tank farm before being sent to the post combustion chamber or disposed of, off-site, at a licensed facility.

It is expected that sampling will normally show the rainwater run off to be uncontaminated so the retention tank will be empty.

The total area of roof and paved surfaces will be approximately 32,800m². The split is approximately 50:50 between roofed areas and paved areas. With no firewater, the combined capacity of the two tanks will provide retention capacity of approximately 70mm of rainfall on the site.



**Waste Transfer Station**

At the transfer station site, direct water retention is based on an above ground water retention tank with a capacity of 300m³ and the yard area which will be surrounded by a 300mm high kerb. Additional water retention is provided in the underground storm drainage system.

The storm water from the yard areas will collect into a sump sized for a normal rainfall event where it will be tested and, if found to be within the limits set by the operating licence, it will be discharged constantly into the Cork County Council Storm sewer on the adjacent road. If found to be outside of the limits or if it needs to be held on site, it will be pumped into the 300m³ retention tank where it will be tested again. From here it will be discharged into the Cork County Council Storm sewer on the adjacent road if found to be within the limits set by the operating licence. If found to be outside of the limits, it will be sent to Waste to Energy plant for disposal or taken off-site for alternative treatment.

The surface water run-off from the bulk tank bund will be collected in a sump located between the storage tank bund and the Drum Wash/Repack building. This will be tested and discharged into the main drainage system if found to be within the limits set by the operating licence. If the water in the sump is found to be outside the limits, it will be pumped to storage tanks and incinerated in the Waste to Energy plant or taken off-site for alternative treatment.

In the absence of a fire, the 300m³ tank will provide retention capacity for in excess of 40mm of rainfall while the kerbed yard will provide retention capacity for an additional rainfall.

### 15.7.2 Fire Water

In the event of a fire alarm in either the transfer station or the waste to energy plant, discharge from the storm water system of the facility, in which the alarm is raised, to the Cork County Council storm sewer will be prevented. All firewater will be retained in the facility, in which the alarm is raised, until the incident has passed and the contents of the retention tanks have been tested and passed as being within the limits set by the operating licence. If contaminated, the firewater will be sent for disposal to the waste to energy plant or to an off-site licensed disposal facility.

The total volume of firewater storage on the site will be 1500m³, for the waste to energy plant and 300m³ for the waste transfer station. This satisfies the requirements of both BS5306 part 2 and the National Fire Protection Agency guidelines for firewater storage.

**Scenario 1**

There will be two water cannons with a capacity of approximately 300m³ per hour located in the bunker of the main process building in the waste to energy plant. In the event of a fire, firewater will be retained in the bunker, which will have a total volume of 12,400m³. Even if the bunker were full of waste, there would be a significant capacity to retain the firewater from the water cannons as the waste would absorb much of the water. If a 50% void ratio is assumed, both water cannons could operate for a period in excess of 10 hours before there would be any spillage from the bunker.

**Scenario 2**

Fire hydrants will also be used to fight any fires around the building and each hydrant will have a capacity of 170m³ per hour. Firewater will be collected in the storm water drainage system and pumped to the 1500m³ retention tank. Hence 1500m³ of firewater could be used by the hydrants and retained within the site while fighting a fire assuming that there is no significant rainfall during the fire event.



**Scenario 3**

A 90-minute fire would be viewed as a typical period in which to fight a fire. 3 hydrants operating would generate 765m³ of firewater. The direct retention capacity on site can cater for this in addition to 46mm of rainfall.

**Scenario 4**

If a fire started at a tank in the tank farm, the water curtain would protect the tank and the adjacent tank on either side. In the absence of rain, the water curtain could operate on the three large storage tanks for a period of almost 4½ hours. If a 90-minute fire were considered as a typical duration for a fire, the direct retention capacity would cater for the firewater flow plus approximately 46mm of rainfall.

**Scenario 5**

At the transfer station site, fire hydrants would be used to fight a fire. Three hydrants could operate for a period of 5 hours in the absence of rainfall. Using a 90 minute fire duration for three hydrants there is sufficient retention capacity for the firewater plus 238mm of rain. The operating duration of the hydrants would be similar if there was a fire in the tank farm at the transfer station.

It should be noted that in the case of the waste to energy site, no account has been taken of the potential retention from kerbing around the service yard given the varying levels of the connecting roadways and the proximity of the building.

### 15.7.3 Flooding

The level of the site is above the water table and there is no natural tendency for the site to flood.

For flooding to occur on the site following development of the project, a combination of extreme events would need to occur simultaneously.

The section above describes the capacity of the facilities to contain rainwater and firewater. The risk of a fire occurring in the waste bunker and tank farm simultaneously is not significant. The EPA document Fire-Water Retention Facilities (Draft) Guidance Note to Industry on the Requirements for Fire-Water Retention Facilities, EPA 1995, states that the volume of contaminated firewater to be retained should be calculated on the basis of the largest single incident, if there is not a significant risk of a fire occurring in more than one area. The firewater from either a fire in the bunker or in the tank farm can be retained within the retention tanks along with a significant amount of rainfall. There will also be residual capacity in the underground drainage network and in the tank farm bund, which would increase the overall retention capacity of the site.

The quantities of rainfall that can be accommodated with each of the fire incidents are extreme events in themselves with a low probability of occurrence.

Flooding could only occur in the highly unlikely event of an extreme rainstorm occurring during a fire on the site. The risk of flooding is considered to be extremely low.

## 15.8 Copy of public liability insurance policy

Indaver NV has a global insurance policy, which includes public liability, product liability, legal expense, environmental liability and on-site clean up costs. The waste management facility site will be covered under this global insurance scheme. A copy of the Certificate of Insurance is included in appendix 15.2



## 15.9 Appendix 15

Appendix A15.1 Drainage Drawings

Appendix A15.2 Copy of Indaver's Public Liability Insurance Policy