Attachment F.1 Treatment, Abatement and Control Systems

Greenport Environmental Ltd designed a fully enclosed facility using best available technology to ensure the processes proposed for the facility are treated, controlled and abated to ensure there will be no impact of environmental significance outside the site boundary.

Waste Acceptance Controls

All waste entering the facility will be strictly controlled. The sources of the material will be assessed in advance of delivery and all sources will be pre-approved. Upon arrival at the facility the delivery will not be accepted unless all relevant records are provided with the delivery and the load meets all waste acceptance criteria. The load will be permitted to enter the site where it will be weighed before entering the enclosed delivery area. Negative air pressure is maintained within the building which ensures there are no emissions from the building through open doors. The delivery area is designed to ensure the truck wheels cannot be contaminated with the raw material upon tipping. Following delivery, the load will be inspected to confirm the material is as described in the delivery records. The empty truck will leave the facility and the site.

AD Process Controls

Each AD tunnel consists of a fully enclosed, sealed concrete structure equipped with a specially designed door with a pressurised rubber seal. Each vessel is designed to ensure any process emissions are contained within the tunnel. Optimum conditions for biogas production are monitored and controlled using a computer based control system.
As soon as the material is fed to the AD tunnels and the door is closed and the high pressure fan starts to re-circulate the tunnel air through the spigot floor. This induces a preliminary aerobic process which rises the temperature quickly to the mesophilic level required in the AD process. Furthermore the oxygen level in the air is dropping leading rapidly the process to anaerobic conditions.
Gas generated from the system is fed into gas storage tanks until there is sufficient gas available to run the CHP unit. This unit uses the gas to generate electricity and heat energy. The electricity will be used to run the facility and any excess will be fed into the national grid. The heat generated from the CHP unit will be utilized to preheat the in vessel tunnels and to heat the pasteurization system.
At the end of the process, when the gas production lowers, fresh air is reintroduced to the tunnel. All air removed from the tunnel at the end of the process will pass through the scrubber/biofilter system. Any process water generated from the system will be contained within the fermentation tanks and re-circulated back into the process. There will be no wastewater emissions from the process.
When the analysing system indicates that the system is fully purged, the door safety interlock opens and the tunnel can be reopened. The material is retrieved from the AD tunnels with the wheel loader and transferred to the next stage.

Composting Process Controls

Each composting tunnel consists of a fully enclosed, sealed concrete structure equipped with a specially designed door with a pressurised rubber seal. Each vessel is designed to ensure any process emissions are contained within the tunnel. Optimum conditions for composting are monitored and controlled using a computer based control system.

Each tunnel has its own centrifugal fan which blows a mixture of fresh air and process air through the air plenum via the spigot pipes through the composting material ensuring optimum contact between the air and the material. The mixture of fresh air and process air is set using the computer controlled, pneumatically actuated, valves. In this way, the composting process can be controlled and aerobic conditions can be maintained in the complete batch of material being processed.

In the composting tunnels, negative pressure is maintained throughout the process in order to prevent air emissions from the process tunnels. Air from the tunnels flows through the scrubber/ humidifier/biofilter system to ensure there are no emissions of environmental significance from the facility.

Air Abatement Equipment Controls

Greenport Environmental in association with technology provider WTT, has designed a fully enclosed facility using the best available technology for treatment of air emissions from the building and the process. The composting technology selected is aerated in-vessel composting which will ensure potential odours will be minimized.

As a back-up control measure, the extraction system and abatement technology selected will ensure all air within the building and from the composting tunnels will be fully treated prior to discharge ensuring there will be no significant impact on the external environment.

The abatement technology selected is best available technology and comprises of three components, a scrubber system, a humidifier & a biofilter system. The extraction system and abatement technology are all controlled by a computerized air flow management system which can be monitored from the centralized control room.

The biogas generated from the anaerobic technology system will be fed into a CHP system to generate electricity and heat energy. The electricity will be used in the process and any excess energy will be fed into the national grid. The heat energy will be used to supplement the heating of the tunnels and the pasteurisation system.

Building ventilation

Air is continuously drawn from the facility building in order to keep the building under negative pressure at all times (i.e when a door is opened air flows into the building through the door) preventing fugitive emissions. A computerised air flow management system will control the ventilation system based on air flow, pressure and temperature. This system is interlinked with the scrubber, humidifier and biofilter control system to ensure optimum conditions are maintained at all times.

Air scrubber

This system will be used, as required, in the event that basic gases are generated. The H_2SO_4 will neutralise any basic gases that may be in the air prior to secondary treatment in the humidifier. The scrubber will also reduce any dust or bioaerosols that is present in the air. The exhaust air exiting the tunnels is conveyed to the acid scrubber which uses H_2SO_4 as reagent. The reagent is controlled by a dosing pump controlled by pH. The water discharge is automatically controlled whereas the water make-up in the scrubber is controlled by level sensors. The scrubber is also equipped with a reagent storage tank and a scrubber liquor holding tank.

Air humidifier

Before the collected exhaust air flows through the biofilter, it is moistened with water using the air humidifier. A high air humidity level is essential for the correct operation of the biofilter. The air flows through the humidifier where nozzles spray water through the air increasing the humidity of the air. Guide plates for the droplet discharger are mounted on the output side to prevent water droplets entering the biofilter. In the air humidifier, any remaining dust/basic gases are further removed from the air.

Biofilter

The humid air is blown into an air plenum which distributes the air evenly under the biofilter. The air flows under the biofilter floor and from here through a biologically active, solid media bed. In this humid environment, residual gases in the air are removed from the airstream by absorption and diffusion into a moist film on the filter media known as a biofilm. Any particulates and compounds either accumulate in the biofilm, or are consumed by the resident microorganisms. Bio-oxidation, occurs when microorganisms consume the gases, particulate matter or volatile organic compounds in the presence of oxygen. Water, Carbon dioxide and other non odorous gases, are the end products. The result of the biofiltration process is an elimination of odour emissions. A computerised control system is used to monitor to biofilter to ensure optimum conditions of temperature humidity and air flow and substrate composition are maintained. The optimum temperature of the biofilter is between 20 – 40°C with humidity between 40 and 70%. In addition to the control system, regular inspections of the system will be carried out to ensure the system is operating.

Bird Control

The process is fully enclosed and will not attract birds. Material entering and leaving the premises will be in enclosed vehicles. There will be no material left outside the facility that could attract birds.

Dust Control

The building is fully enclosed with negative air pressure ensuring no dust will be emitted from the facility. The composting/biogas process operates under optimum conditions of moisture in sealed vessels and this will ensure the dust from the process is retained. All air from the building and from the process vessels will be treated using best available technology which comprises of three components. The scrubber system, humidifier and biofilter will all serve to remove all dust from the air within the facility. Truck wheels will

be cleaned at the reception and dispatch areas. The delivery area is designed to prevent contamination of wheels thereby minimizing dust.

The screening plant will include a dedicated dust extraction filtration system to ensure dust is minimised within the building at this location.

Fire Control

A computerised control system will be installed to monitor and control temperatures optimal for composting within the in-vessel tunnels. All tunnels are provided with a water sprinkler system to maintain a damp environment and which can be used in the unlikely event of an emergency. The biogas tunnels operate under low oxygen conditions which are controlled by gas monitors.

An Emergency Response Plan will be developed to account for all likely emergency scenarios. The Foynes Port Authority has an established Emergency Response Plan for the Foynes Port which includes all emergency services. There is a local Fire Station located within one mile of the facility. All staff will be trained in emergency response procedures including evacuation to dedicated assembly points.

The building will be designed and equipped to meet relevant fire regulations.

Litter Control

There will be no litter issues associated with the development as the facility is full enclosed with all delivery and processing occurring indoors. Regular inspections will be completed to ensure there is no litter impact from the facility.

Traffic Control

The movement of trucks and other vehicles associated with the facility will be in line with the attached drawing 061-306-120 in Attachment E6.

Vermin Control

The process is not conducive to attracting vermin. All deliveries of biodegradable will be transferred immediately to a process tunnel which will be sealed and temperatures in the range of 50-60^{o}C. Vermin such as flies, or mice would not survive in such an environment and therefore will not be attracted to the facility. There will be no long-term storage of incoming or outgoing material on-site. As a precautionary measure, a pest control company will be employed under contract to maintain and monitor bait traps on a monthly basis.

Road Cleansing

As the facility is fully enclosed with all processing operations being conducted within the building, no road cleaning will be required. The vehicles leaving the building after delivery will undergo a cleaning procedure to ensure no debris leaves the building on the truck wheels.

Attachment F.2: Air Emissions Monitoring

Biofilter & Potential Odour Monitoring
Due to the careful design and the use of the best available technologies, there will be no emissions of environmental significance from the biofilters. To ensure the process technology and the biofilter are operating efficiently, as a control check, it is proposed to monitor the outlet air directly above the biofilter for odour causing compounds which potentially could be generated in the process - ammonia, hydrogen sulphide and total mercaptans. It is proposed to monitor for these compounds using colourimetric indicator tubes on a biannual basis. The proposed location for the monitoring point is identified in Drawing Number 061-306-042 in Attachment E1.

Dust
There will be no dust emissions of environmental significance to atmosphere from this process due to the enclosed facility, the process technology and controls in place and the back-up abatement equipment proposed. It is not proposed to install dust monitoring at the perimeter of the facility for the following reasons:

- As indicated in the EIS, background dust monitoring at this location confirmed other significant sources of dust exist outside the proposed facility. The sources are likely to affect any ambient monitoring conducted at the perimeter of the facility. Some of the background value measurements were in excess of any potential ELVs that would be imposed on the proposed development under the waste licence.
- Greenport has invested significant additional capital in the design and technology of the proposed facility associated with this application to ensure there are no emissions of significance from this facility. There will be no dust emissions to atmosphere of significance from the proposed development associated with this application due to the fully enclosed facility design, the process technology/controls in place and the back-up abatement equipment proposed.

Therefore on this basis there is no environmental benefit in conducting ambient dust monitoring at the perimeter of the facility.

Attachment F.3 Surface Water Monitoring

Due to the facility design and additional controls proposed in this application, there will be no emissions of environmental significance to surface water. There will be no process wastewater emissions from the facility as the process is fully contained and al the water from the process will be collected and reused in the process. The toilets/showers/canteen will discharge to sewer via an upgraded “Envirocare” wastewater treatment unit or equivalent. As a precautionary measure, any hardstanding surfaces around the perimeter of the building will discharge to an oil interceptor attenuation tank and controlled discharge value. This emission point is identified in Drawing Number 061-306-043 in Attachment E2.

As a control check, a visual inspection will be conducted at the outlet of the oil interceptor weekly and the following tests are proposed to be conducted annually at points directly upstream and downstream of the discharge:

- Ammoniacal Nitrogen
- BOD
- pH
- Total Suspended Solids
- Total mineral oils

Attachment F.4: Sewer Discharge monitoring

There will be no emissions to sewer from the process as all waste water generated from the process will be collected and reused in the process. The office area will have toilets, a shower and a small canteen. Discharges from these areas will be discharged to an upgraded “Envirocare” wastewater treatment unit prior to discharge to the sewer via emission point as indicated in Drawing Number 061-306-044 in Attachment E3.

As there are no process discharges to sewer, no monitoring is proposed.

Attachment F.5 Groundwater Monitoring

As the process is fully contained with significant additional investment in containment and wastewater reuse technologies to prevent discharges to surface water or to sewer, there will be no discharges to groundwater of environmental significance from this proposed development and monitoring of groundwater is not proposed.

Attachment F.6 Noise Monitoring

The nearest noise sensitive locations are identified in Fig 8.4 of EIS.

The proposed development is designed to be fully enclosed with all operations including loading and unloading operations taking place within the building ensuring there will be no impact off-site from noise within the facility. The proposed development will be located in an industrial area beside a busy port within the Port Authority area. The facility is surrounded by industry such as outdoor coal, clinker, storage processing, engineering firms, grain processors, larger warehousing facilities and other port related industry. East of the facility is Aughinish Alumina. As indicated by the EIS, there will be no noise of environmental significance generated from the facility.

Traffic to/from the facility will be via the Port Road, east of Foynes town and no traffic will access the facility through the town of Foynes. The traffic volumes associated with the facility is predicted to be low relative to the existing traffic volumes accessing the Port Authority area.

To monitor the impact of passing traffic associated with the facility, it is proposed to conduct annual noise monitoring at the noise sensitive locations.