NON-TECHNICAL SUMMARY

Recycling Technologies Ltd (the '*Applicant'* or the *'Operator'*) is making a New Bespoke Installation Permit Application for the proposed operation of a Plastics Recycling Facility at their site on Binn Farm, Glenfarg.

The proposed Installation is located on land at Binn Farm, Glenfarg, PH2 9PX (Grid Reference (NO 17229 13411).

The proposed development consists of a continuous thermal cracking plant used to create wax and oil products, termed 'Plaxx®', from unrecyclable plastic residues for reconversion to plastics. The Installation has been designed to process approximately 12,000 tonnes of non-hazardous residual mixed plastic waste per annum.

The facility will typically contain the following key components:

- Reception and Processing Building containing: - Reception Bunkers;
  - Material Preparation Module (including trommel screen, over-band magnet, optical scanner and shredder); and
  - Transfer and Conveyor Plant.

- External Main Processing Plant: - Thermal Cracking Module;
  - Regenerator Module;
  - Distillation Modules;
  - Gas Treatment;
  - Flue Gas Treatment and Heat Integration Module
  - Associated Utilities and Ancillary Plant; and
  - Oil / Plaxx® Storage Tanks.

The proposed process will be permitted by the Scottish Environmental Protection Agency as a Waste Incineration Activity and will be operated in accordance with the Pollution Prevention and Control (Scotland) Regulations 2012 and Chapter IV of the Industrial Emissions Directive (IED).

The proposed process meets the definition of an Installation as defined by Section 5.1 *'Incineration and Co-Incineration of Waste'* paragraph A(1)(b) namely:

'The incineration of non-hazardous waste with the exception of waste which is biomass or animal carcasses in an incineration or co-incineration.'

co-incineration" means—

(a)
the use of waste as a regular or additional fuel in a co-incineration plant, or

(b)
the thermal treatment of waste for the purposes of disposal in a co-incineration plant.

General Overview

All residual plastic waste (RPW) will be delivered directly into the reception and plastics conditioning building via electrically operated roller shutter doors. RPW will be transferred into a material preparation module. The Material Preparation Module consists of industry standard, "off-the-shelf" equipment, including a trommel screen, over-band magnet, optical sorter and a shredder. This equipment is not bespoke and does not form part of Recycling Technologies' core technology. The purpose of the plant is to remove undesirable material such as biomass, glass, metals, moisture and undesirable polymers / plastics prior to processing.

The continuous thermal cracking process is split into two circuits:

- The primary circuit – where hydrocarbon vapour generated from thermally cracking residual plastic waste (RPW) is circulated; and
- The secondary circuit – where a combustion reaction generates the thermal energy for the cracking process.

The primary circuit utilises a fluidised bed of sand-type material where the thermal cracking of RPW takes place resulting in hydrocarbon vapours being generated. The hydrocarbon vapour product from the Thermal Cracker is treated to remove solids and chemical impurities. The treated hydrocarbon vapour product then flows to the Distillation Modules where four hydrocarbon products are extracted (Wax, Heavy Oil, Medium Oil, and Light Oil).

After the Distillation Modules, the resulting hydrocarbon gas mixture is heated above its saturation point to prevent condensation in the Gas Treatment Module. The heated hydrocarbon gas mixture flows through a fixed adsorbent bed (Halide Guard). The fixed adsorbent bed is able to remove impurities that would produce undesirable emissions, such as halides, nitriles and sulphides from the combustion process.

A Blower unit provides the motive force for fluid flow in the primary circuit. The primary use of the treated hydrocarbon gas mixture is for fluidising the bed of sand-type material in the Thermal Cracker. The temperature of the hydrocarbon gas mixture is raised, via a heat exchanger, before being pumped into the Thermal Cracker. An Electric Heater is required for start-up and to ensure that the temperature of the hydrocarbon gas mixture pumped into the Thermal Cracker is constant.

The excess hydrocarbon gas mixture generated in the process (after using a proportion in the Thermal Cracker) is used as a fuel source for the combustion process in the secondary circuit. Combustion occurs in the Regenerator, which operates a high temperature fluidised bed of sand-type material. The sand-type material is circulated between the Thermal Cracker and the Regenerator, to maintain a constant fluidised bed temperature and volume within the Thermal Cracker. The sand-type material is transferred pneumatically from the Thermal Cracker to the Regenerator, where a cyclone separator is used to remove lighter material from the sand-type material.

The air for the combustion process in the Regenerator is provided by a Blower unit. A fuel gas burner is located upstream of the Regenerator to provide the heat input during start-up. The exhaust gas from the Regenerator goes through a gas-solids separator to recover sand-type material entrained from the Regenerator. The Regenerator exhaust gas is thermally treated in an Oxidiser before undergoing heat recovery. The Oxidiser exhaust gas is then vented to atmosphere after being filtered for particulates in a hot gas filter.
The process requires water circuits to ensure temperature control of the distillation process. Additional thermal energy in the water circuits is not recovered and is discharged to the local atmosphere.

Emissions to Air

The plant will have a 25m tall stack (A1) for the discharge of exhaust gas to atmosphere.
The exhaust gas will mainly comprise carbon dioxide, water vapour, nitrogen and excess oxygen. Carbon monoxide emission is controlled by ensuring complete combustion of hydrocarbons in the Regenerator and the Oxidiser. Temperature in the Regenerator and Oxidiser is not sufficient to generate nitrogen oxides. Dioxins and furans are eliminated by controlling the temperature in the Oxidiser at 850°C and allowing 2 seconds residence time for the exhaust gas. The flue gas treatment system is also provided with a Hot Gas filter with dosing capability (with activated carbon) to safeguard against reformation of dioxins via the De Novo Synthesis process.

The hydrocarbon gas mixture from the thermal cracking of RPW is treated in the Halide Guard to remove impurities such as halides, nitriles and sulphides. This ensures clean combustion of the hydrocarbons in the secondary circuit.

Exhaust gas arising from the combustion of fuel gas and excess hydrocarbon gas from the primary circuit, is treated for chemical and physical impurities at different stages in the secondary circuit, as listed below.

- A gas-solid separator for particles recovery from the Regenerator exhaust gas;
- Oxidiser to maintain exhaust gas at 850°C for 2 seconds to ensure complete combustion of all hydrocarbons and eliminate dioxins and furans; and
- A hot gas filter with the capacity for dosing of activated carbons or other reagents prior to discharging the exhaust gas via Stack A1.

Therefore, all emissions to atmosphere will be comfortably within the stipulated Emission Limit Values (ELVs) for Chapter IV IED activities.

Please refer to the Air Quality Assessment provided within *Annex C2 – Air Quality Assessment and HHRA* for more information.

Odour

Due to the design of the building structure, the enclosed processing activities and the nature of the waste feedstock materials stored and processed on site, there is very little potential for offsite odour emissions and impacts to arise from the site.

The waste plastic material is stored in waste storage bays within the material preparation building. There are no open external storage areas for waste.

Emissions to Controlled Water

There will be no direct process emissions to controlled water arising from the Installation.
All surface water run-off will be captured from the proposed development areas. Run-off will be captured and attenuated within swales located around the periphery of the yard areas. Water will then be conveyed to the attenuation pond, which will discharge to the adjacent watercourse via another swale. The swales provide attenuation storage as well as conveying run-off to an attenuation pond.

All surface water run-off from the yard areas will pass through an oil separator prior to discharging into the swale.

The attenuation pond will be located south west of the proposed yard which has a storage volume of 300m3. The combined storage of the swales and pond is 343m3. The pond will discharge via a swale to the surface watercourse located southeast of the site (W1).

Any foul drainage will be treated by a Klargester Kingspan Bioficient 4 or similar on site. Outfall from this will discharge to the same watercourse located southeast of the site (W1).

In the event of a fire, all potentially contaminated fire water will be contained with the attenuation pond via use of a penstock valve. All fire water will then be tankered away to a suitable water treatment facility.

Emissions to Land

There will be no emissions to land arising from the Installation.

Waste Management

The thermal cracking process will not inherently produce significant quantities of waste. The main types of waste produced from the operation of the facility are as follows:

- Ash removed from the flue-gas treatment system;
- Waste water with traces of oil;
- Spent adsorbents from the Halide Guard;
- Spent activated carbon from the flue-gas treatment system; and
- Sodium chloride from treatment of the hydrocarbon vapour in the primary circuit.

There will also be material removed from the incoming RPW via the material preparation module. This will mainly consist of non-conforming plastic, metals, stone, glass and biomass.
The process produces four main products, listed below:

- Heavy Wax Product – Plaxx® 50;
- Heavy Oil Product – Plaxx® 30;
- Medium Oil Product – Plaxx® 16;
- Light Oil Product – Plaxx® 8.

Impact

The air emissions from the proposed development have been modelled using ADMS 5.2 atmospheric dispersion modelling software.

The air quality impact assessment considered the air impact to all identified residential, sensitive habitat and ecological receptors.

It is the conclusion of the modelling that the Installation is unlikely to have a significant impact at any of the receptor locations examined and is unlikely to have a significant impact on the environment.

All of the air emissions from the Installation have been risk assessed against their potential impact on human health. The results of the assessment are that the proposed installation will not present any risk to human health.