Accident Management Plan

Plastics to Oil Facility

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1. INTRODUCTION

This document has been prepared by Sol Environment Ltd on behalf of Endolys Ltd (referred to as 'Endolys' hereafter) to provide an Accident Management Plan (AMP) in support of a Bespoke Installation Permit application for the proposed operation of a chemical recycling facility that converts waste plastics to oil utilising proprietary advanced thermal treatment (pyrolysis) technology.

The Site is located at the former Cleveland Bridge Premises, Yarm Road, Darlington, DL1 4DE (National Grid Reference: NZ 32060 13554).

The proposed development is for a waste plastics thermal treatment pyrolysis facility which will import and process circa 120,000 tonnes of waste plastic film per annum. The proposed facility will process the waste plastic film through a pre-treatment process followed by pyrolysis to produce pyrolysis oil (Pyoil) which is exported for further refinement.

Non-condensable synthetic gas (syngas) produced by the process will be either combusted within the process or utilised within an onsite boiler for steam generation. By virtue of the fact that the syngas is produced from the thermal treatment of waste plastic, the combustion of the syngas meets the definition of a co-incineration activity. At this stage, End of Waste status is not being sought for the syngas, though this may be undertaken in the future..

The proposed site activities will fall under the scope of the Environmental Permitting Regulations (England and Wales) 2018 (as amended) meeting the definition of an Installation as defined by the following Schedule 1 references:

- Chapter 1.2 Gasification, Liquefaction and Refining Activities Part A(1)(f)(iv) *Activities involving the pyrolysis, carbonisation, distillation, partial oxidation or other heat treatment of other carbonaceous material*

  This relates to the pyrolysis process as the primary purpose of the facility is the conversion of waste plastics into pyrolysis oil.

- Chapter 5.4 Disposal, recovery or a mix of disposal and recovery of non-hazardous waste Part A(1)(b)(ii) *Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 75 tonnes per day*

  This relates to the incoming plastics pre-processing including shredding, metals removal, agglomeration and densifying, on the basis that once project is at full capacity approximately 198 tonnes of feedstock per day will be utilised within the pyrolysis units.

This Accident Management Plan (AMP) has been produced in accordance with EA guidance Document 'How to comply with your Environmental Permit (EPR 1.00)'.

It is stipulated under this guidance document that the Accident Management Plan fulfils the following four key requirements:

- Identifies events or failures that could damage the environment;
- Assesses how likely they are to happen and the potential environmental consequences;
- Actions to minimise the potential causes and consequences of accidents; and
- The actions that are required to be carried out if an accident happens.

This AMP will be implemented and maintained at the site as part of the company's Environmental Management System and will ensure the site and all operatives within are fully prepared for such incidents.

The AMP and all associated procedures will be reviewed at least every four years or as soon as practicable after an incident, with changes made accordingly to minimise the risk of occurrence / recurrence

2. RISK MAGNITUDE ESTIMATORS

The AMP has adopted a risk assessment approach to each potential hazard by combining the probability and magnitude of the potential risk to give an estimation of the risk prior to any mitigation measures. The risk management measures, which are designed to reduce the likelihood of occurrence, are then detailed followed by an estimation of the actual risk post-mitigation (Residual Risk Rating).

The DEFRA guide to risk assessment[1] indicates the approach of subjectively classifying the magnitude of potential consequences into four categories depending upon the degree of the impact that the potential risk could have and the context in which the risk is being assessed. The classification is used as a guide in this Risk Assessment.

The four categories are as follows:

- **Severe**: Possible irreparable damage to environmental resources;
- **Moderate**: Possible damage to environmental resources which are limited within a regional context;
- **Mild**: Possible effects might be transient damage to environmental resources which are commonplace on a regional basis and alternative sources are readily available;
- **Negligible**: The effects are negligible or might cause very slight temporary deterioration in the current environmental resource quality.

The matrix shown below, in **Table 2.1**, considers the probability of the potential risk against the magnitude of the potential impact, thereby giving an estimation of the resulting likelihood of the risk occurring.

Table 2.1 - Risk Estimator Matrix

Probability of potential risk	Magnitude of Potential Impacts			
	Severe	Moderate	Mild	Negligible
High	High	High	Medium/Low	Near-zero
Medium	High	Medium	Low	Near-zero
Low	Medium	Medium	Low	Near-zero
Negligible	Medium	Medium/Low	Low	Near-zero

The qualitative risk assessment for the Accident Management Plan has been based on the matrix outlined above.

The final stage of the risk assessment is the judgment of the severity of the residual risk following implementation of the mitigation measures

[1] A Guide to Risk Assessment and the Risk Management for Environmental Protection, 1995.

3. ACCIDENT MANAGEMENT PLAN

Accident Scenario	Probability of Accident Occurring	Magnitude of Potential Impact	Risk Rating before mitigation	Risk Management	Residual Risk Rating (following Mitigation)
1 - Spills and Leaks / Loss of containment / transfer of Substances / Overfilling of Vessels	Medium	Moderate to Severe Spillage and leakage could occur during fuel deliveries, vehicle refueling, oil collection, vehicle breakdowns/ accidents and or damage to tanks or bunds Loss of containment could result in potentially polluting materials (including oils and chemicals) being discharged in surface water drainage systems	Moderate	• The site is entirely sealed hardstanding with fully contained and sealed drainage and therefore considered to have a low potential for impacts to groundwater. • All process effluents will be contained within a bunded storage vessel and the waste water removed from site by a third-party contractor for offsite disposal. • In the event of a fire, the drainage system would be isolated to prevent any fire water escaping off site. • Uncontaminated clean surface water runoff captured from roof drainage and external roadways / car parking areas will be discharged to the existing surface water drainage system. • The unloading of delivery vehicles will take place upon a sealed hard standing internally. In the event of a spillage, the spillage will be contained within this area. • All feedstock will be delivered to site in pre-prepared bales. Bales will be stored internally within the building. • All processing and storage of waste takes place internally. • All oil condensing and separation processes take place internally within a dedicated area of the building. Any spills / leaks would be contained within the building. • Oil storage is within the external tank farm. The tank farm sits within a dedicated bund designed and constructed in accordance with CIRIA 736. • Tanker filling (oils and wastewater) is undertaken within a dedicated bunded area of site. • A sealed drainage and containment system for all tanks containing potentially polluting liquids will be constructed so that any leaks / spills are contained. • All storage vessels will be constructed to the appropriate British Standards.	Low

				• Tanks will be inspected visually on a daily basis by site staff to ensure continued integrity of tanks and identify any necessary remedial action. • Minor spills to be cleaned up immediately, using sand or proprietary absorbent. Resultant materials to be placed in container for off-site disposal to appropriate facility, if necessary. • Immediate action to be taken in event of major spill which is likely to cause polluting emissions to the environment to prevent liquid from entering surface water drains or any adjacent unsurfaced ground. Spillage to be cleared immediately and placed in containers for offsite disposal. EA to be informed. • The plant has been designed in order to include an automated shutdown facility.	
2 - Vandalism	Low	Moderate The site could be subject to intentional vandalism and damage by intruders/ trespassers who could cause damage or harm to the plant and equipment, spills and leaks to tanks or cause fires.	Low	• The site will be well lit and secured by a perimeter fence. • Fencing is maintained and repaired to ensure continued integrity. If damage is sustained, repair will be made within the same working day. If this is not possible, suitable measures will be taken to prevent unauthorised access to the site and permanent repairs will be affected as soon as is practicable. • All visitors to the site are required to register in the visitor's book and sign out again on exit, thereby minimising the risk of unauthorised visitors on the site. • Operational procedures have been implemented including regular inspections, ensuring continual monitoring of security provision at the site.	**Low**
3 – Flooding & Extreme Weather	Medium	Severe Extreme weather including flooding and snow can not only effect the site itself but prevent access to supplies of abatement reagents, back up equipment etc.	Medium	• The site is equipped with a sealed drainage. Uncontaminated clean surface water runoff captured from roof drainage and external roadways / car parking areas will be discharged to the existing surface water drainage system. • The flood risk map indicates that the site lies within Flood Zone 1; an area where there is a low risk of flooding from rivers and the sea. This is land assessed as having a chance of flooding of less than 1 in 1000 (0.1%) each year. • Weather forecasts will be monitored and the operations manager will ensure extreme weather forecasts are prepared for in advance.	**Low**
4 - Fire in combustion plant.	Medium	Severe	Medium	• All plant is subject to a planned preventative maintenance schedule	**Low**

Plant malfunction; Electrical equipment that could provide an ignition source; Waste products / raw materials that may support combustion.				• The plant has significant control and safety systems all of which are interlocked to ensure a very controlled shutdown in the event that the plant undergoes operational difficulties. • All plant has been specified to be intrinsically safe and earthed in accordance to best practice. • All aspects of the plant and buildings are constructed of non-combustible materials. • The plant has been designed to shut down (fail safe) in the event of an emergency. • Containment system: all tanks and vessels containing flammable and potentially polluting liquids are constructed so that any leaks/spillages are contained and responded to in accordance with established emergency procedures. • Fire suppression, detection and monitoring systems have been installed where necessary. • The site operates in accordance with the Fire Prevention Plan. • Separation of combustible materials from the source prior to processing: – All waste is stored within the dedicated storage areas; – All flammable process consumables shall be stored in bunded tanks. • In the event of a fire, the following actions will be taken: – The fire brigade will be notified immediately and the EA as soon as practicable; – All containment valves and systems will be closed; – The site will be immediately evacuated. • Records of fire incidences will be kept on site together with a summary of remedial action taken. • The EA will be advised of all incidents of fire as soon as is practicable. • Smoking will not be permitted in the operations areas of the site. • In the event of a fire, the drainage system would be isolated to prevent any fire water escaping off site.	
5 - Incompatible Waste/ Unwanted Reactions:	Low	Moderate / Severe	Low	The following methods will be implemented to ensure that incompatible feedstocks do not compromise the safe operation of the plant: • All wastes accepted onto site have been subject to 'pre-acceptance' in accordance to established procedure;	Low

Some of the raw materials and waste inputs at the site could contain impurities that impede / prevent the combustion process.				• All incoming wastes are inspected in accordance with established procedure; • When in the waste reception areas, any non conforming waste will be removed prior to acceptance in accordance with established procedure; • Records of incidents involving incompatible wastes will be kept on site together with a summary of the remedial action taken.	
6 – Failure of Services: Failure in the mains services, water or onsite electricity supply system (CHP units).	Medium	Low	Low	In the event that mains services of water and onsite supply of electricity (VHP units) are unavailable, the following actions will occur: • In the event of sudden disconnection of the grid / issue with the onsite CHP unit the ID and combustion air fans will cease to operate, thus combustion cannot take place; • The emergency generator set will connect to keep the ID fan running to remove excess heat from the combustor during shut down or loss of services; • All combustion air fans will stop and flue emissions will instantly cease to be produced; • All feed drives will stop and no more materials will be fed to the plant; • All pump sets will cease operating so no further transfer of material can occur; • The boiler plant shall shutdown, thus rendering the plant inoperable; • On grid / CHP failure, an emergency diesel generator will be used to allow the safe shutdown of the plant.	Low
7. Operator Error / Failure of Equipment: The unexpected breakdown of any part of the plant could result in short term build up of waste in the reception areas or the incomplete treatment of waste. The result of operator error could result in the plant not functioning efficiently or a	Medium	Low	Low	• The site is equipped with spare plant and equipment which can be used in the event of a single plant breakdown. (e.g. loading shovels etc). • The facility has been designed with a number of fail safe and automatic shutdown systems. • Should the facilities storage capacities be exceeded, incoming waste will be diverted. • All equipment is subject to a Planned and Preventative Maintenance Programme (PPM), to minimise unplanned failures; • The plant also has in place a number of Emergency Shutdown Controls to ensure safe shut down in emergency.	Low

risk of fugitive emissions (such as odour) to air through uncontrolled decomposition of waste.					

4. SUMMARY AND CONCLUSION

This document has been prepared to meet the requirements pertaining to Accident Management Plans within the EA guidance document EPR1.00 'How to Comply with your Permit'.

It is concluded that despite the Installation having the potential for a low-moderate environmental impact to the environment, the mitigation measures incorporated into the design of the plant and the site infrastructure are sufficient to mitigate the risks.

The company operates using an established suite of procedures for the control and management of all materials and plant in use in their process. These procedures detail the required actions to be taken in the event of an emergency and should be used in the first instance for any accident and emergency at site.

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