APPLICATION FOR AN ENVIRONMENTAL PERMIT UNDER THE ENVIRONMENTAL PERMITTING (ENGLAND AND WALES) REGULATIONS 2016 (AS AMENDED)

NON TECHNICAL SUMMARY

DESCYCLE
metals made new

TDA
Wilton Centre - Pioneer Group
Wilton
Lazenby
Redcar
TS10 4RF

ECL Ref: DESC.01.01/NTS
Version: Issue 2
11/12/2025

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ACRONYMS/TERMS USED IN THE TEXT

BAT	**Best Available Techniques**
BRef	**Best Available Techniques Reference Document**
DAA	**Directly Associated Activities**
DES	**Deep Eutectic Solvent**
DSEAR	**Dangerous Substances and Explosive Atmospheres Regulations 2002**
EA	**Environment Agency**
ECL	**Environmental Compliance Limited**
ELV	**Emission Limit Value**
EMS	**Environmental Management System**
EP Regulations	**Environmental Permitting (England and Wales) Regulations 2016 as amended**
EP	**Environmental Permit**
EPTR	**Environmental Permitting Technical Requirements**
ERA	**Environmental Risk Assessment**
FPP	**Fire Prevention Plan**
HAZOP	**Hazard and Operability**
MMH	**Mixed Metal Hydroxides**
NTS	**Non Technical Summary**
PCB	**Printed Circuit Boards**
POPs	**Persistent Organic Pollutant**
PPMR	**Planned Preventative Maintenance Regime**
The Installation	**Solvent-Based Metal Recovery Installation**
UKAS	**United Kingdom Accreditation Service**
VOC	**Volatile Organic Compound**
WEEE	**Waste Electrical and Electronic Equipment**

1. INTRODUCTION

1.1. Overview

1.1.1. Environmental Compliance Limited ("ECL") have been commissioned by DEScycle to prepare a Non Technical Summary ("NTS") to form part of the Environmental Permit ("EP") application at their Solvent-based metal recovery installation, hereafter referred to as "the Installation", located at the Wilton Centre, Redcar, TS10 4RF ("the Site").

1.1.2. The activities undertaken at the Installation will comprise two listed activities and a bespoke waste operation that fall under Schedule 1 and Schedule 9 of the Environmental Permitting (England and Wales) Regulations 2016 as amended ("EP Regulations") respectively.

1.1.3. Issue 2 of the NTS has been updated to confirm that all process effluent will be contained and sent off site for hazardous waste disposal. DESCycle however, request that an improvement condition be added to any permit that the EA may be minded to issue, such that process effluents can be fully characterised, and alternative disposal methods investigated.

1.1.4. In addition, some parts of the application are considered to be Commercially Confidential. Redacted copies of all application documents have been provided to the Environment Agency ("EA"), however, for ease of review, any text considered confidential has also been highlighted in grey.

1.2. Installation Location

1.2.1. The Installation covers an area of approximately 0.88 hectares.

1.2.2. The Site Location Plan (DESC.01.01-01) details the Environmental Permit Boundary (outlined in green) and is provided with this application submission.

1.3. The Applicant

1.3.1. The applicant is Argo Natural Resources Limited (11151531) trading as DEScycle.

1.4. Pre-Application Advice

1.4.1. Pre application advice from the Environment Agency ("EA") was received on the 6th of March 2025, following a MS Teams meeting held on 4th March 2025. A Nature and Heritage Conservation Screening Report for the site has also been undertaken. Copies may be found in Appendix 1 in the EPTR as part of this application.

2. INSTALLATION ACTIVITIES

2.1. Activities

2.1.1. The activities proposed are listed in Table 1:

Table 1: Permitted Activities

Activity Reference	Activity	Description of Activities	Limits of Activities
AR1	**Schedule 1** Section 2.2 Part A(1)(a)	Producing non-ferrous metals from secondary raw materials by chemical activities	From receipt of raw materials and shredded WEEE waste to the storage and despatch of product
AR2	Section 4.2 Part A(1)(a) (v)	Producing inorganic chemicals such metal oxides	From receipt of raw materials and shredded WEEE waste to the storage and despatch of product
AR3	**Schedule 9** Bespoke Waste Operation	**R4**:Recycling/ reclamation of metals and metal compounds. **R5**:Recycling/ reclamation of other inorganic materials **R13**: Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced D15: Storage pending any of the operations numbered D1 to D14 (excluding temporary storage, pending collection, on the site where it is produced)	Shredding of WEEE waste (printed circuit boards) The maximum quantity of waste to be treated at the site shall not exceed 75 tonnes of non-hazardous waste or 10 tonnes of hazardous waste per day. No waste shall be stored on site for longer than 6 months.

2.1.2. Two Directly Associated Activities ("DAAs") are proposed as listed in Table 2.

Table 2: Directly Associated Activities (DAAs)

Activity Ref	Directly Associated Activity	Description of Specified Activity	Limits of Specified Activity
DAA1	Treatment and Storage of waste	Waste Electrical and Electronic Equipment for storage and recovery (R4/R5/R13/D15)	Treatment and Storage shall be within a building or with weatherproof covering: shall be carried out on an impermeable surface with sealed drainage.
DAA2	Drying of mixed metal hydroxides ("MMH")	MMH will be dried in a vacuum oven	Drying will depend on evaluation of filtration and washing performance. The solvents are low volatility' therefore remain with DES after extended drying periods.

2.2. Waste Codes to be Accepted

2.2.1. It is proposed to accept the waste codes as below:

- 16 02 13*;
- 16 02 14;
- 16 02 15*;
- 16 02 16; and
- 20 01 35*.

2.2.2. The total quantity of waste accepted at the Installation will be up to 21,000 tonnes per annum. This is estimated to comprise 18,625 tonnes of non-hazardous waste and 2,475 tonnes of hazardous waste. Whilst this is the maximum the Installation could accept, in reality annual quantities of waste received are likely to be in the region on 300 tonnes per year.

2.2.3. The total storage capacity of incoming waste will be approximately 45 tonnes.

3. MANAGEMENT TECHNIQUES

3.1. Technical Competence

3.1.1. Under the EP Regulations, AR2 is classified as a relevant waste operation, and, accordingly, a Technically Competent Manager will be required. Paul Hewett will fulfil this role.

3.1.2. All employees will be appropriately trained to ensure they can undertake their roles and responsibilities in a safe manner. All employees will undertake an induction programme, as well as job role specific training. All certificates are held on record for the individual.

3.1.3. The design and maintenance of infrastructure, plant and equipment is undertaken by competent people in-house, or where required specialist contractors are employed.

3.2. Management System Overview

3.2.1. DEScycle will operate a management system which is appropriate to the Installation and its operations and complies with the EA's Online Guidance "Develop a management system: environmental permits[1].

3.2.2. It is envisaged that the Plant Manager will have overall responsibility for environmental matters at the Installation.

3.2.3. Senior management are committed to high standards of protection for people and the environment which is further defined in company policies and procedures.

[1] https://www.gov.uk/guidance/develop-a-management-system-environmental-permits

4. OPERATING TECHNIQUES

4.1. Technical Standards

4.1.1. EA online guidance has been considered as part of this application:

4.1.2. The Best Available Techniques ("BAT") Reference Document for the Non-Ferrous Metals Industries has also been followed in the preparation of this application.

4.1.3. A formal Hazard and Operability ("HAZOP") study has been undertaken as the project progressed through the process design and plant design phases.

4.2. Process Overview

4.2.1. DEScycle are developing a novel recycling process that uses a deep eutectic solvent ("DES") to extract base and precious metals from electronic waste. This involves extracting metals from the waste, recovering the metals and finally recycling the solvent.

4.2.2. It should be noted that the process operates as a batch plant and has been designed so that single pieces of equipment can undertake multiple process steps

4.3. Waste Pre-Acceptance Arrangements

4.3.1. DEScycle will implement pre-acceptance procedures to ensure adequate information is known about a waste including composition before arrival at the Installation to assess and confirm the waste can be accepted at the Installation

4.3.2. Copies of any WM3 Assessments undertaken on the wastes will be obtained where relevant.

4.3.3. Verification of pre-acceptance information will be undertaken by periodic visits to the waste producer.

4.3.4. Records of pre-acceptance information will be kept following receipt of the waste. Waste pre-acceptance checks will be reassessed every 12 months or if there is a change or non-conformity.

4.4. Waste Acceptance Arrangements

4.4.1. DEScycle will only accept specific, well-defined waste material from known clients that have passed pre-acceptance checks. DEScycle will not accept, for example mixed metal wastes, or accept wastes from 'walk-up' clients.

4.4.2. On arrival at the Installation, wastes are inspected visually to ensure what has been delivered agrees with what was expected, else rejected. It is then directed to the specific storage area. Checks will be in place to ensure the physical capacity to accept the waste

4.4.3. All waste containers will be weighed on arrival with waste transfer documentation checked and validated. Discrepancies will be resolved prior to acceptance.

4.4.4. Personnel undertaking the waste acceptance checks shall be trained to comply with relevant EA online guidance documents and Permit conditions.

4.4.5. Written procedures will be developed for waste acceptance.

Quarantine Area

4.4.6. The Installation will have a clearly marked, dedicated internal waste quarantine. Quarantine storage is documented in the EMS and will be for a maximum of 14 days.

4.5. Waste Tracking

4.5.1. A digital tracking system will be used to store information generated regarding the waste material The tracking system will also operate as a waste inventory and stock control system. Back-up copies of electronic documents will be stored on a SharePoint site

4.5.2. Pre-acceptance and acceptance records are held for a minimum of 3 years after the waste has been treated the waste and/or removed it off site.

4.6. Waste Handling and Storage

4.6.1. All wastes are stored and handled appropriately as per EA guidance and best practice. Site is designed to prevent pollution from escaping off site

4.6.2. All incoming items are recorded and reviewed, separated as required and in appropriate containment.

4.6.3. An assessment in accordance with Dangerous Substances and Explosive Atmospheres ("DSEAR") Regulations 2002 has been undertaken which has identified explosive areas. Equipment used in these areas has been designed to be fit for use and protective systems are in place.

4.6.4. All staff will be trained in the correct handling of waste, to minimise any damage to the integrity of containers or individual items.

4.7. Storage of Hazardous Waste

4.7.1. Hazardous wastes are separated based on their European Waste Catalogue ("EWC") Waste code. Where it is unknown it is assumed to be hazardous.

4.7.2. All hazardous wastes are stored in in 1 tonne woven bags, in a fully sealed and lockable shipping container on impermeable hardstanding.

4.8. [redacted]

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4.9. [redacted]

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Figure 1: [redacted]

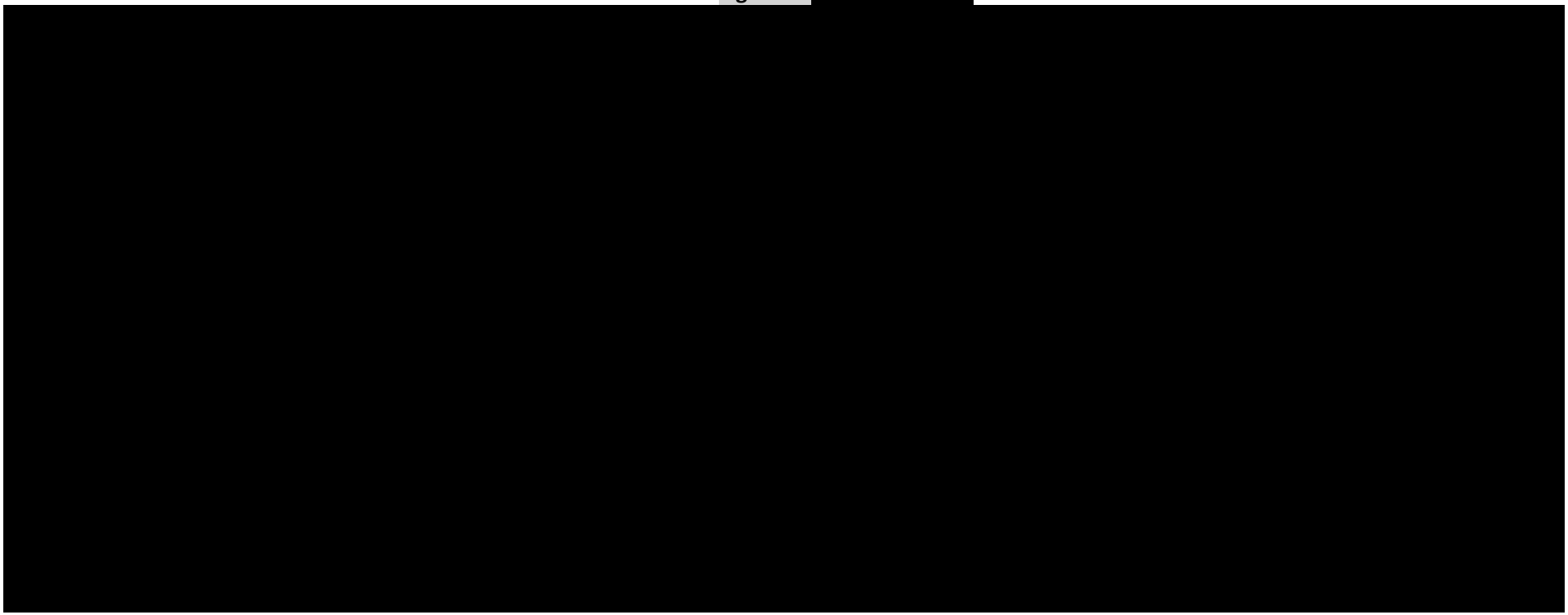


Figure 2: [redacted]

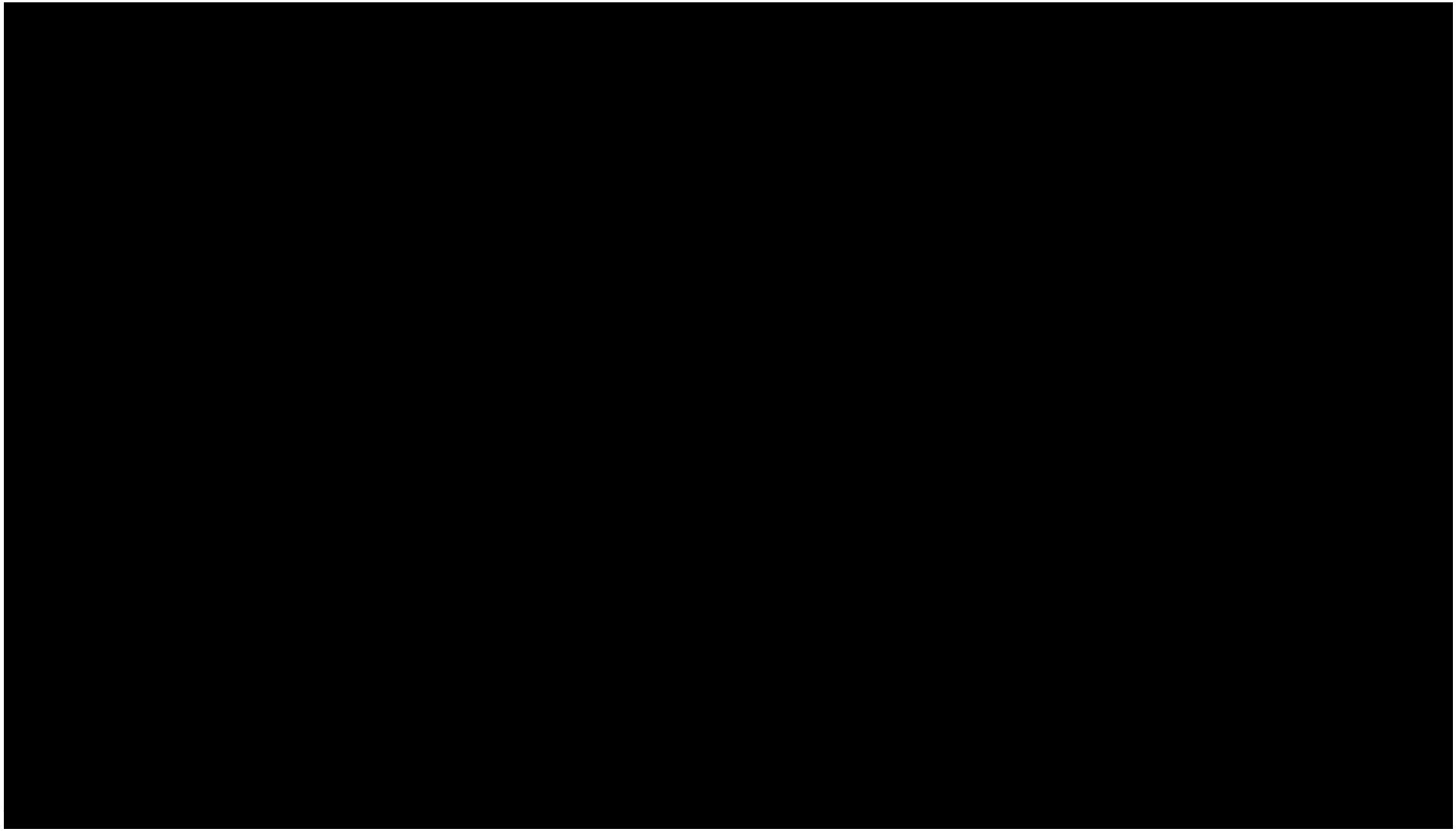
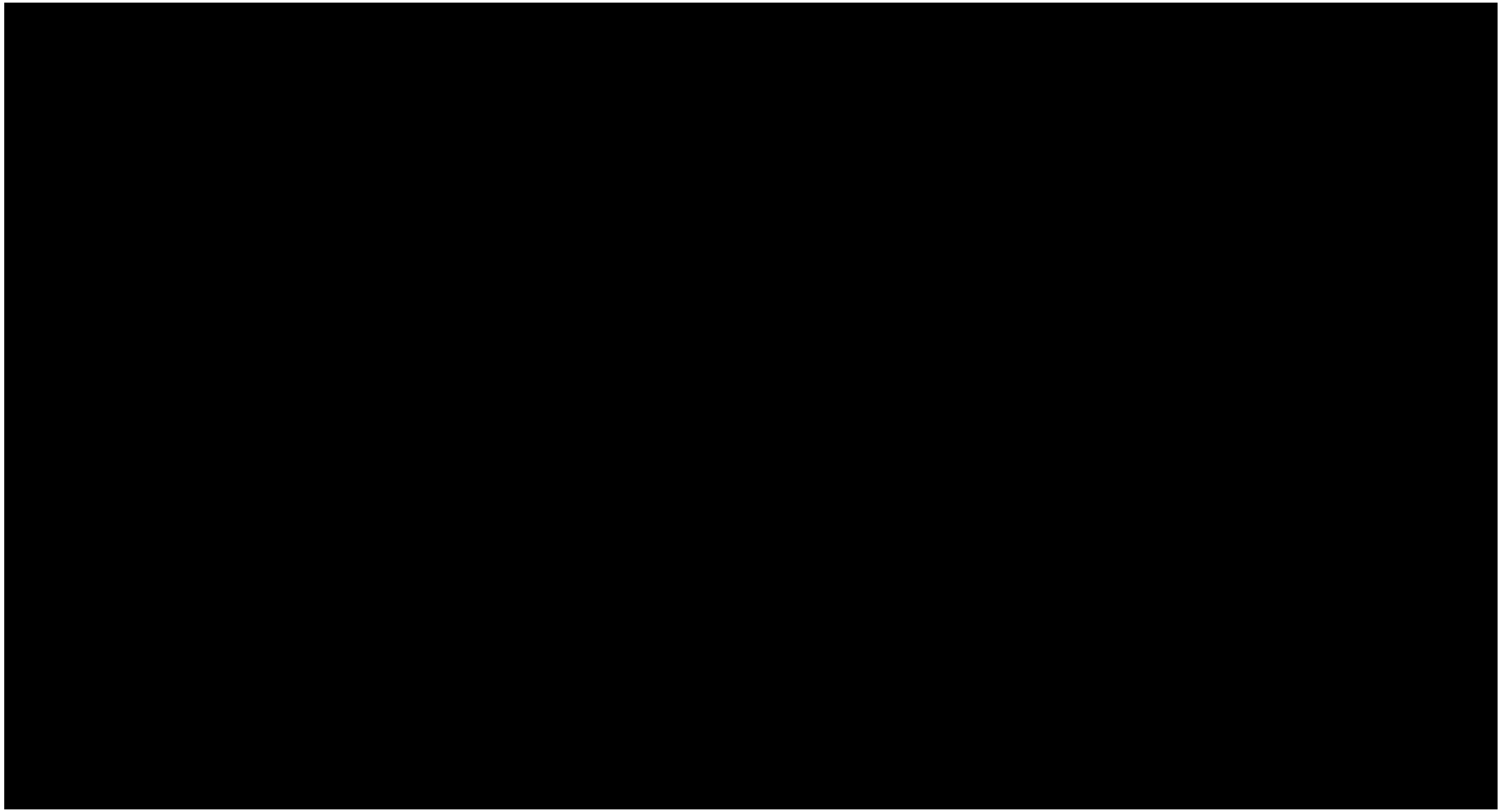


Figure 3: [redacted]



4.11. [redacted]

[redacted]

[redacted]

[redacted]

4.12. Removal of Site Generated Wastes and Wastewater Treatment

4.12.1. All wastes generated by the process will be subject to a comprehensive WM3 assessment to fully characterise the waste stream.

4.12.2. Prior to any waste removal, the waste removal contractor's documentation is checked in accordance with Duty of Care requirements.

4.13. Site Security and Traffic Management

4.13.1. The Installation is located within a large industrial estate. There are security measures in place to prevent unauthorised access to the Installation.

4.13.2. The Installation has speed limits and marked walkways for staff to use

4.14. Contingency Plans

4.14.1. In the unlikely event that site operations are disrupted, contingency arrangements are in place. No further waste will be accepted at the Installation unless there is sufficient capacity or there is a clearly defined method of disposal/recovery.

4.15. Installation Decommissioning

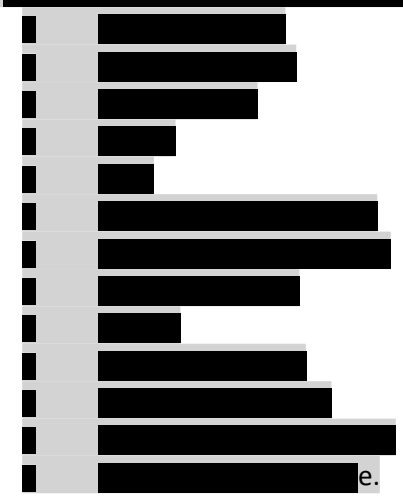
The Installation has been designed to ensure that it can be decommissioned safely in a manner which will avoid any pollution risk and return the site to a satisfactory state

4.15.1. A decommissioning plan will be developed to demonstrate that the plant can be safely decommissioned without causing pollution.

5. RAW MATERIALS

5.1. DES Cycle Raw Materials

5.1.1. [redacted]



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5.1.2. Regular reviews will be undertaken to investigate the availability of alternative raw materials and any suitable ones that are less hazardous or polluting will be used if suitable.

5.1.3. To ensure the quality of raw materials, checks are in place.

6. EMISSIONS

6.1. Point Source Emissions to Air

6.1.1. The emissions to air are listed in Table 3. Initial testing has been undertaken on a laboratory scale and results are summarised in Table 3.

Table 3: Point Source Emissions to Air

Emission Point	Source	Parameter	Concentration
A1	Slurry Vessel DES 1 Vessel DES 2 Vessel	Total aldehydes[iii]	<1.52 mg/m^3
		Total Volatile Organic Compounds ("VOC")[iii]	14.02 mg/m^3
		Total acids[i]	<4.51 mg/m^3
A2	Dryer, LEV, Filtration Hoods	Total aldehydes	See Note iv
		Total VOC	
		Total acids	

Note to Table

i. [redacted]

6.1.2. It is envisaged that an improvement condition will be contained within the Installation's permit to characterise and assess the Installation's point source emissions to air once fully operational. Emissions limit values agreed with the EA will be fully complied with.

6.1.3. Emissions points A1 and A2 will be fitted with appropriate abatement as required following the outcome of emissions testing

6.1.4. Any abatement will be operated and maintained in accordance with the Planned Preventative Maintenance Regime ("PPMR") and the Installations Environmental Management System ("EMS").

6.2. Point Source Emissions to Surface Water and Sewer

6.2.1. The Installation has a combined surface water and foul water drainage system which drains to the effluent treatment plant operated by Sembcorp. All drainage from within the permitted boundary will be directed to the combined sewer.

6.2.2. No process effluent will be discharged into this system until the effluent has been fully characterised. It is envisaged that an improvement condition will be contained within the Installation's permit to characterise and assess the Installation's point source emissions to water once fully operational. Emissions limit values agreed with the EA will be fully complied with.

6.2.3. It is understood that the Sembcorp drainage network has sufficient capacity and buffer storage to contain surges and storm water flows.

6.3. Point Source Emissions to Land

6.3.1. There are no emissions to land.

6.4. Fugitive Emissions to Air

6.4.1. The wastes received at the Installation are not considered to be dusty wastes.

6.4.2. The release of diffuse emissions to air from the shredding activities is minimised by appropriate measures.

6.5. Fugitive Emissions to Surface Water, Sewer, and Groundwater

6.5.1. All proposed activities will be undertaken in areas sealed with an impervious barrier to prevent a pollution pathway to groundwater.

6.5.2. The Installation benefits from a combined sealed drainage system which is part of the wider Sembcorp drainage system. Any fugitive emissions would be contained via a penstock valve within the DEScycle Site.

6.5.3. All potentially polluting liquids will be appropriately bunded

6.5.4. All plant and equipment will be subject to regular maintenance and servicing

6.5.5. All indoor treatment areas have an impermeable surface and spill kits are located at strategic locations appropriate to the materials being handled. All relevant employees are suitably trained in spill response. The spill response plan is regularly tested.

6.6. Fugitive Emissions to Land

6.6.1. To minimise any fugitive emissions to land, all operational areas of the Installation have:

- impermeable surfacing;
- sealed construction joints; and
- spill containment kerbs.

6.6.2. All external areas have a sealed combined drainage system.

7. GENERAL REQUIREMENTS

7.1. Emissions Management

7.1.1. There is little likelihood of any significant emissions of dust. Consequently, a Dust Management Plan is not considered to be required.

7.2. Odour Management

7.2.1. It is not considered that there is a significant risk of odour, consequently, an Odour Management Plan is not considered to be required.

7.3. Noise and Vibration Management

7.3.1. Site operations that produce noise are limited. The shredder is fully enclosed within the main building. Consequently, it is not considered that a Noise Management Plan is required.

7.4. Fire Prevention Plan

7.4.1. As per the requirements of the EA's Fire Prevention Plan ("FPP") online guidance[2], a FPP has been prepared and is submitted with this application.

7.5. Pest Management Plan

7.5.1. It is not considered that the activities proposed will result in any risk of pest attraction to the Installation nor nuisance being experienced by sensitive receptors in the surrounding area. Consequently, a Pest Management Plan is not required.

[2] EA 'Fire Prevention Plans: environmental permits', available online at https://www.gov.uk/government/publications/fire-prevention-plans-environmental-permits/fire-prevention-plans-environmental-permits, accessed January 2024.

8. MONITORING

8.1. Monitoring of Emissions to Air

Periodic Monitoring Arrangements for Emissions to Air

8.1.1. All periodic monitoring will be undertaken by an organisation that is suitably accredited and holds the necessary certifications. Any samples collected will be sent to a laboratory that is suitably United Kingdom Accreditation Service ("UKAS") accredited

8.1.2. The frequency for the periodic monitoring for the determinands will be agreed with the EA, but, in any case, will not be less than twice per year.

8.2. Recording and Reporting of Emissions to Air Data

8.2.1. All emissions to air monitoring data is recorded and output in such a manner to allow direct comparison with relevant Emission Limit Values ("ELVs") for releases to air Data will be reported to the EA in accordance with the requirements of the Installation's Permit.

8.2.2. If any of these ELVs are exceeded, the EA will be informed without delay and action taken to ensure that compliance is restored within the shortest possible time.

8.3. Assessment of Sampling Location for Emissions to Air

8.3.1. Assessment of sampling locations will be undertaken to the current requirements of the relevant sampling standards.

8.4. Monitoring of Surface Water and Sewer

8.4.1. Ongoing monitoring for the Installation will be devised with appropriate ELVs to be agreed with the EA and fully complied with.

8.5. Monitoring of Groundwater

8.5.1. It is considered that there will be no risk of fugitive emissions to groundwater arising from the activities that will be undertaken at the proposed Installation. However, groundwater monitoring will be undertaken at least every 5 years.

8.6. Process Monitoring

8.6.1. At least once a year, for every waste stream treated a input vs output mass balance exercise will be undertaken. The first year of operation will be used to set a baseline, and thereafter the results will be compared baseline to ensure optimal performance.

8.6.2. All waste streams produced will be subject to WM3 Waste classification, as appropriate.

8.6.3. Every 6 months, the physically finest non-metallic fraction of the shredded PCBs will be sampled and tested for mercury and cadmium.

8.6.4. Samples of solid products will be dissolved in acid and analysed by ICP-MS to assess quality. Samples of liquid outputs will be analysed by ICP-MS to determine composition. Solid materials will be sampled and samples washed in water with conductivity measurement to determine solvent loss to solids.

8.6.5. Hydrogen detection is present with an audible alarm to alert staff to any potential explosive atmospheres.

9. RESOURCE EFFICIENCY AND CLIMATE CHANGE

9.1. Estimated Electrical Energy Ratings

9.1.1. As the plant is still in the detailed design stage the energy ratings of various components is yet to be determined. The shredder and Microniser will have that largest power ratings. Currently it is envisaged that this will be around 16kW and 50-85kW respectively.

9.1.2. Other items such as the dryer and pumps are likely to have a power rating of 2kW or less.

9.2. Estimated Annual Energy Consumption

9.2.1. The estimated annual energy consumption is 945MWh of delivered electricity.

9.3. Energy Efficiency Arrangements

9.3.1. The plant has been designed to be energy efficient.

9.3.2. Regular maintenance under the Installation's PPMR programme will ensure continued high efficiency operation.

9.3.3. An energy efficiency plan will be incorporated into the Installation's EMS. The plan will be underpinned by, and reviewed regularly, as part of the EMS.

9.3.4. During normal operation, procedures will be reviewed and amended where necessary, to include improvements in efficiency.

9.4. Climate Change Levy Agreement

9.4.1. The Installation will not be party to a Climate Change Agreement but will implement all energy saving measures as detailed in the section above.

9.5. Efficient Use of Raw and Other Materials - Water

9.5.1. The primary use of fresh mains water at the proposed Installation is as DES make up and wash water.

9.5.2. Approximately 1,000 m^3 of water will be used annually. Daily records will be kept of water consumption within the first year of operation and a water mass balance will be produced to devise efficiency objectives with realistic timescales.

9.5.3. All wastewater will be collected and contained appropriately and reused or recycled where possible.

9.5.4. The use of water at the Installation, will be recorded annually and reviewed every 4 years

9.5.5. Water minimisation techniques will be used at the Installation

9.6. Waste/Residue Minimisation

Optimisation of Operating Conditions

9.6.1. Operating conditions for the plant will be optimised as part of the plant Commissioning Programme

Residue Management

9.6.2. Any packaging will be re-used, where possible to minimise waste. Any wastes that are sent off site will be subject to the principles of the waste hierarchy. Where waste recovery is not possible, all wastes will be disposed of correctly after being subjected to comprehensive WM3 assessment.

9.6.3. A Residue Management Plan will be implemented to minimise the generation of wastes from all activities.

Waste Minimisation Audits

9.6.4. A waste minimisation audit will be carried out within two years of the commissioning of the proposed Installation and at least every four years thereafter to identify opportunities for improved efficiency and reduced waste production

10. COMPLIANCE WITH TECHNICAL STANDARDS

10.1. Overview

10.1.1. It is considered that the Installation will be operated in accordance with the techniques detailed in the relevant appropriate standards and will constitute appropriate measures including BAT.

10.1.2. The technical standards for the proposed application have been taken from the following:

- BAT for Waste Treatment[3];
- Waste electrical and electronic equipment (WEEE): appropriate measures for permitted facilities[4];
- Treating metal waste in shredders: appropriate measures for permitted facilities[5]
- Non-Ferrous Metals and the Production of Carbon and Graphite (EPR 2.03)[6];
- The Inorganic Chemicals Sector Guidance (EPR 4.03)[7]
- Non-ferrous Metals Industries BAT Conclusion Document[8]; and
- Speciality Inorganic Chemicals Bref[9].

10.1.3. It is considered that the techniques will be appropriate and proportionate to the scale of the activities at the Installation and the risks that are posed to the environment by the activities.

[3] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.208.01.0038.01.ENG&toc=OJ%3AL%3A2018%3A208%3ATOC

4 https://www.gov.uk/guidance/waste-electrical-and-electronic-equipment-weee-appropriate-measures-for-permitted-facilities

5 https://www.gov.uk/guidance/treating-metal-waste-in-shredders-appropriate-measures-for-permitted-facilities/5-waste-treatment-appropriate-measures

6 https://www.gov.uk/government/publications/non-ferrous-metals-and-the-production-of-carbon-and-graphite-additional-guidance

[7] https://assets.publishing.service.gov.uk/media/5a7c343d40f0b67d0b11f8e5/geho0209bpit-e-e.pdf

8 https://eippcb.jrc.ec.europa.eu/reference/non-ferrous-metals-industries-0

9 https://eippcb.jrc.ec.europa.eu/sites/default/files/2019-11/sic_bref_0907.pdf