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MINERAL ESTATES  
WASTE RESOURCE MANAGEMENT



**ENDLESS ENERGY LIMITED**

**ENDLESS ENERGY FACILITY**

**WASTE MINIMISATION**

**SEPTEMBER 2018**

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## 1 INTRODUCTION

- 1.1.1 This report details how wastes are minimised, stored and handled at the Endless Energy facility and their subsequent recovery or disposal. Wastes will be managed in accordance with the requirements of Environment Agency guidance, including S5.06 and S5.01. The procedures described are in compliance with indicative Best Available Techniques (BAT) described in these documents.
- 1.1.2 Careful control of the processes on site, such as combustion of waste, re-circulation of water, and re-circulation of lime, will ensure that waste production is minimised.
- 1.1.3 Where process wastes arise they will be recycled as far as possible. Waste will be sent off site for disposal where there are no other practical options for its management. Waste will be managed carefully in accordance with written procedures at all times in order to minimise potential impacts on the environment.
- 1.1.4 Wastes will be handled and stored in a safe manner to ensure that they do not escape the site or otherwise cause harm. All wastes will be stored within designated areas and where appropriate within sealed containers. Wastes are stored on impermeable pavement with a sealed drainage system.
- 1.1.5 Wastes will be sent off-site in accordance with the Duty of Care, with transfer notes prepared for each waste stream and copies kept at the site office. These will identify the waste, how it is contained, the quantity, any specific measures required in its handling and the date it was sent off site, along with the details of the waste producer, carrier and disposal site.
- 1.1.6 Where any waste product has hazardous properties, it will be handled in accordance with the Hazardous Waste Regulations 2005 as amended. The site will be registered as a hazardous waste producer and appropriate consignment notes will be raised.
- 1.1.7 A site record will be maintained in order to record details of the wastes that enter and exit the site, including:
- quantity of waste;
  - type of waste;
  - process that generated the waste;

- classification under the list of waste regulations;
- chemical analysis (if necessary); and
- details of the receiving site.

## 2 WASTE STORAGE

2.1.1 Table 2:1 below identifies the waste that will be produced at the site and may require off-site removal. Information regarding the waste's management, storage and handling is included.

Table 2:1 Waste Arisings, Waste Chemical Composition and Waste Storage				
Waste	Hazardous Properties	Approximate Annual Tonnage	Source	Storage
Bottom ash	Non-hazardous	37,824 with LHV 9.5MJ/kg	Combustion process	After quenching with recycled water, the cooled ash will be discharged onto a platform, forming a dedicated bottom ash storage area, which is housed inside a building
APCR (air pollution control residues)	HP4 irritant HP8 corrosive	5,616	removed from filter bags within flue gas cleaning plant by compressed air pulses	The APCR (which includes unreacted lime and PAC, as well as pollutants such as dust and dried reaction salts) will either be recycled back to the reaction duct or stored in final residue storage silos with filters in place to prevent emissions of dust.
Ferrous metal	Non-hazardous	3,000	Ferrous metals recovered from the bottom ash stream by magnets	Ferrous metal will be stored in a dedicated storage area inside the building
Rejected wastes	Potential for some hazardous. To be assessed on case by case basis	<3	Material rejected for treatment at the plant	Waste which is unsuitable for treatment will be reloaded onto the delivery vehicle and rejected from the site.
Oil wastes	HP7 carcinogenic	15	Plant maintenance	Stored in drums or other suitable container within a bunded area.
Boiler dust	Non-hazardous	1,300	Fine ash removed from boiler tubes	Combined with bottom ash
General wastes	Non-hazardous	<1	Rags, sweepings etc. from cleaning and maintenance	Materials placed in waste reception bunker
Process water	Non-hazardous	0 except in exceptional cases as boiler drained every 3 years.	Boiler water, water from processes such as ash quenching	Water is reused on site as far as possible. Excess water is treated via pH adjustment and settlement prior to discharge to the foul sewer.

### 3 WASTE MINIMISATION

3.1.1 Endless Energy will seek to minimise the wastes produced by the combustion processes at the plant, and to limit the environmental impact of those wastes. Further detail on minimising the use of raw materials and reuse of materials on site is given in the “Raw Materials” report and “Operating Techniques” report.

3.1.2 Endless Energy will undertake waste minimisation audits at least once every four years to identify opportunities to further minimise waste production.

3.1.3 There is a programme of planned preventative maintenance, which helps to limit the frequency of replacing equipment.

### 4 RECOVERY AND DISPOSAL

4.1.1 Table 4:1 below identifies the fate of wastes from the site. Where possible wastes will be segregated for recycling. Where wastes are not suitable for recycling, they will, be fed into the plant for energy recovery. Only where there are no other practical options will waste be sent for disposal at an authorised landfill.

Table 4:1: Recovery and Disposal of Waste	
Waste	Fate
Bottom ash	Wherever possible this waste will be recovered and used in aggregate production.
APCR	APC residues will be loaded into sealed trucks and disposed of at an appropriate authorised hazardous landfill. Options will be reviewed on a regular basis to identify any recycling opportunities. Handling will be in accordance with the Hazardous Waste Regulations 2005 (as amended).
Boiler Dust	Recycled with bottom ash
Ferrous metal	Metals will be collected and transferred to metal recycling sites for recycling.
Rejected wastes	Each rejected waste type will be assessed on a case by case basis. Wastes will be sent to permitted local treatment plants for reuse or recycling, wherever possible. Otherwise waste will be sent for disposal at an appropriate disposal site. Where rejected wastes have hazardous properties, they will be handled in accordance with the Hazardous Waste Regulations.
Oil wastes	Waste oil will be sent to an oil recycling site for reprocessing in accordance with the Hazardous Waste Regulations.
General wastes	General waste, such as cleaning rags, will be placed in the waste reception bunker for recovery on site.
Waste water	Waste water is reused on site wherever possible. Where necessary water will be discharged to foul sewer.

- 4.1.2 The Clean Energy plant is designed to recover ferrous metal from the bottom ash stream, ensuring that this waste is able to move up the waste hierarchy by being recycled into other metal products. Bottom ash will be recycled as aggregate.
- 4.1.3 Historically the most appropriate means of managing APCR has been for them to be landfilled at a suitable hazardous waste facility. There is limited potential to recycle these materials, due to their very high pH and fine powdery nature. However, technologies are emerging that allow APCR to be treated and then recycled as aggregate or building blocks.
- 4.1.4 Initial plans are to send APCR to hazardous landfill. However, Endless Energy will explore options for recycling this material as plasmarok or C8agg, products that neutralise or immobilise the hazardous constituents, making APCR suitable for use in construction materials. Where there is no immediate off-taker this will be kept under review on an annual basis as this new market expands. Should opportunities arise to move the handling of this waste up the waste hierarchy these will be adopted.
- 4.1.5 The duty of care for waste will be followed and all waste carriers will be registered with the Environment Agency. All waste recovery / disposal facilities utilised will be checked to ensure that they hold the correct environmental permits and that waste is recovered or disposed of correctly and without harm to the environment.
- 4.1.6 Options for waste recovery / disposal will be reviewed at least once every 4 years to ensure that the chosen route continues to reflect the best environmental option.

## 5 CONCLUSION

- 5.1.1 The measures described above are in accordance with Sector Guidance Notes EPR5.01 and EPR5.06 and relevant legislation. All appropriate measures are applied to prevent emissions, and steps have been taken to treat waste in accordance with the Waste Hierarchy and minimise the impact on the environment. As a consequence, these measures are considered BAT for the installation.

STOKE-ON-TRENT  
Sir Henry Doulton House  
Forge Lane  
Etruria  
Stoke-on-Trent  
ST1 5BD  
Tel: +44 (0)178 227 6700

BIRMINGHAM  
Two Devon Way  
Longbridge Technology Park  
Longbridge  
Birmingham  
B31 2TS  
Tel: +44 (0)121 580 0909

CARDIFF  
22 Windsor Place  
Cardiff  
CF10 3BY  
Tel: +44 (0)292 072 9191

CARLISLE  
Marconi Road  
Burgh Road Industrial Estate  
Carlisle  
Cumbria  
CA2 7NA  
Tel: +44 (0)122 855 0575

EDINBURGH  
Great Michael House  
14 Links Place  
Edinburgh  
EH6 7EZ  
Tel: +44 (0)131 555 3311

GLASGOW  
2 West Regent Street  
Glasgow  
G2 1RW  
Tel: +44 (0)141 433 7210

LONDON  
46 Chancery Lane  
London  
WC2A 1JE  
Tel: +44 (0)207 242 3243

MANCHESTER (City Centre)  
76 King Street  
Manchester  
M2 4NH  
Tel: +44 (0)161 817 5038

MANCHESTER (Greater)  
41-50 Futura Park  
Aspinall Way  
Middlebrook  
Bolton  
BL6 6SU  
Tel: +44 (0)194 226 0101

NEWCASTLE UPON TYNE  
City Quadrant  
11 Waterloo Square  
Newcastle Upon Tyne  
NE1 4DP  
Tel: +44 (0)191 232 0943

SHEFFIELD  
Unit 5  
Newton Business Centre  
Newton Chambers Road  
Thornccliffe Park  
Chapelton  
Sheffield  
S35 2PH  
Tel: +44 (0)114 245 6244

TRURO  
Baldhu House  
Wheal Jane Earth Science Park  
Baldhu  
Truro  
TR3 6EH  
Tel: +44 (0)187 256 0738

International offices:  
ALMATY  
29/6 Satpaev Avenue  
Regency Hotel Office Tower  
Almaty Kazakhstan  
050040  
Tel: +7(727) 334 1310

MOSCOW  
21/5 Kuznetskiy Most St.  
Moscow  
Russia  
Tel: +7(495) 626 07 67