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MINING AND MINERAL PROCESSING  
MINERAL ESTATES  
WASTE RESOURCE MANAGEMENT



**ENDLESS ENERGY LIMITED**

**ENDLESS ENERGY FACILITY**

**ODOUR MANAGEMENT PLAN**

**SEPTEMBER 2018**

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## **1 INTRODUCTION**

1.1.1 The development site is located on the valley bottom on vacant brownfield land, approximately 3km to the east of Keighley town centre, and 12km to the north west of Bradford City Centre. The site is bordered by the A650 Airevalley Road to the north and east, a railway line to the south and existing industrial works to the west. Green belt land is located to the north and south of the site.

1.1.2 In summary, the proposals comprise:

- A Endless Energy Facility with an expected throughout of approximately 148,800tpa and a stack of 60m height above ground level. Power generation of approximately 11.35MW of electricity;
- Grid connection cables, plant and equipment including a high voltage power distribution system to enable electricity to be supplied to the public supply network;
- Infrastructure to enable CHP including the provision of a steam take off
- A workshop and store, office facilities and administrative building, compressed air room and fire water tank;
- Two storey office building with capacity for 99 personnel for commercial let;
- Installation of weighbridges, access and internal roads and parking facilities; and
- The provision of SuDS system.

1.1.3 This OMP has been prepared as part of the permit application for the development.

## **2 OBJECTIVES OF THE ODOUR MANAGEMENT PLAN**

2.1.1 In accordance with the Environment Agency (EA) H4 guidance<sup>1</sup>, an OMP should be designed to:

- Employ appropriate methods, including monitoring and contingencies, to control and minimise odour pollution;
- Prevent unacceptable odour pollution at all times; and
- Reduce the risk of odour releasing incidents or accidents by anticipating them and planning accordingly.

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<sup>1</sup> Environment Agency (2011) H4 Odour Management: How to Comply with your Permit  
SH11087  
September 2018

- 2.1.2 An effective OMP should consider the sources of odour associated with the relevant process, how odour may be released as a result of activities taking place and what the related impacts might be. The OMP should demonstrate the competence and commitment of the operator to controlling these potential odour releases, through a range of measures.
- 2.1.3 It should also be noted that an OMP is a working document which requires continuous review and, where necessary, revision.

### **3 SITE AND SURROUNDING AREA**

#### **3.1 Development Site**

##### *Current Use*

- 3.1.1 As previously discussed, the site is currently comprised of vacant brownfield land across an area of approximately 3.5 hectares, with the site access from Airevalley Road to the north. All above ground structures associated with the site's former use as a gasworks have been removed, with the exception of a single brick building structure. The site has been remediated.

##### *Description of Energy Recovery Technologies*

- 3.1.2 The following section provides a summary of the processes that will be used within the Clean Energy Facility, with a focus on the identification and description of the activities which are considered to be potential sources of odour release.

##### *Delivery of Waste*

- 3.1.3 The EfW facility is designed for the incineration of refuse derived fuel produced from commercial and industrial wastes. Waste that consists entirely of high concentrations of only one component (e.g. plastic, biowaste, rubber etc.) can adversely affect the performance of the installation and will be avoided.
- 3.1.4 Waste will be delivered to the facility by bulk haulage vehicle (20 tonne), accessing the site from Airevalley Road to the north.
- 3.1.5 Vehicles will enter the site and pass through the weighbridge. Following acceptance, they will travel to the Waste Reception Hall and will be directed to an area for tipping.

- 3.1.6 The process of vehicles accessing the Waste Reception Hall, to deliver their waste load, is one of the main potential sources of odour associated with the operation of the facility. To minimise the potential for odour releases, the delivery door will open only as the vehicle reverses into the Waste Reception Hall.
- 3.1.7 Once the vehicle is fully within the Waste Reception Hall, the door will close immediately to minimise any escape of process air from within the fully enclosed building. This should ensure that the potential for odour releases are minimised.
- 3.1.8 Once the vehicle has discharged its load and has been cleared to leave the Waste Reception Hall by the Mobile Plant Operator or Operations Technician, the driver will be directed to exit by site signage through the same reception door to return to the weighbridge.

#### *Storage of Waste*

- 3.1.9 Incoming waste will be stored in an enclosed waste storage bunker. The bunker will facilitate the continuous operation of the plant, as it enables material delivered during the day to be stored and used on a 24 hour basis. The bunker will also provide sufficient storage to allow weekend and bank holiday operation when there are no waste deliveries, and for deliveries to continue during maintenance or plant shutdown.
- 3.1.10 Waste will be turned and mixed whilst in the bunker to prevent heating. A crane will be mixing waste for 60% of the time, which equates to over 14 hours per day. During the remaining time the crane will be loading waste to the hopper.
- 3.1.11 The enclosed nature of the waste storage bunker should ensure that the potential for odour releases are minimised.

#### *Feeding of Waste into Processes*

- 3.1.12 Waste will be transported from the storage bunker to the feed grate hopper by a travelling crane equipped with a mechanical grab, operating on tracks running across the width of the Waste Bunker Hall.

3.1.13 As a result of the enclosed nature of this step of the process, the potential for odour releases is considered to be low.

#### *Processing of Waste*

3.1.14 Once within the feed grate, the waste is converted to gases, which are cooled and cleaned. This takes place in three stages: firstly through the drying, gasification, ignition and combustion of the waste; then through its oxidisation; and finally through cooling. The gasses complete the combustion process as they pass through the boiler stage of the process, where air is added.

3.1.15 The boiler serves to transfer the energy/heat in the flue gases to the water cooling circuit where steam is raised. The high temperature and high pressure steam is then fed into a steam turbine linked to a generator producing electrical power for export to the national grid.

3.1.16 The end products are flue gases, which are cleaned and discharged to atmosphere, and residual ash (Bottom Ash) which falls from the end of the grate and is quenched in a discharger water bath situated under the grate.

3.1.17 These processes take place within an enclosed environment and therefore the potential for odour release is considered to be low.

#### *End Products*

3.1.18 As detailed within the Waste Minimisation Plan, the end products associated with these processes are flue gases, bottom ash Air Pollution Control (APC) residues (solid residues comprising fly ash, lime and carbon), ferrous metals, process water, oil and boiler dust.

3.1.19 Exhaust gases from the combustion process are normal products of gas combustion and are not considered to be a source of odour.

3.1.20 The bottom ash is quenched and cooled in the discharger water bath, which make it possible to remove without odour nuisance. Once it has been treated, to remove metals, it can be used as an aggregate replacement.

- 3.1.21 The APC residues are transported off site for disposal under the relevant regulations, as this is considered to be a hazardous waste. These residues are not considered to be a source of odour.

#### *Facility Control Systems*

- 3.1.22 Process control at the facility will be an important factor in odour control. The facility will be equipped with an automatic process control unit (the Distributed Digital Control System, DCS), which measures and records various process parameters that indicate whether the process is operating within design parameters. The facility operator can control the process via the Human Machine Interface (HMI) which delivers a complete overview of the process components, reports system status and shows any alarms.
- 3.1.23 The Emergency Shut Down (ESD) system is a separate system that is used to detect emergency situations and perform emergency shutdowns.

### **3.2 Existing Sensitive Receptor Locations**

- 3.2.1 The Endless Energy Facility is bordered by Airevalley Road to the north and east, with green belt land located beyond including Marley Activities Coaching Centre and Airedale Cricket Club. As a result, there are no existing residential properties located in the vicinity of the facility in these directions.
- 3.2.2 The facility is bordered to the south by a railway line, beyond which lies green belt land. There are however residential dwellings located at 'The Croft', approximately 0.1km to the south west. In addition, the settlements of Thwaites Brow and Thwaites are located approximately 0.5km to the south and south west, respectively.
- 3.2.3 To the west of the facility lies an operational gasworks and Dalton Lane Industrial Estate. There are a small number of residential properties located approximately 0.2km away.

### **3.3 Existing Odour Sources in the Local Area**

- 3.3.1 The Endless Energy Facility is located on the edge of the Keighley urban area, in a predominantly industrial area but surrounded by open land on three sides. Existing source of odour could include:

- Existing industrial uses to the west of the site, including the operational gas works along Gas Works Road;
- Existing agricultural uses at nearby farms; and
- The existing Marley Sewage Treatment Works (STW) located to the east.

## **4 ODOUR MANAGEMENT AND RISK ASSESSMENT**

### **4.1 Introduction**

- 4.1.1 This section sets out the control measures/operational procedures that will be put in place at the Site in order to reduce the potential for odour releases and associated nuisance for local residents. In addition, a risk assessment has been undertaken to consider the effectiveness of these measures and procedures.
- 4.1.2 Table 4:1 taken from EA guidance<sup>2</sup>, sets out the measures and procedures to be put in place, as well as the residual risk of odour nuisance, during normal operational practices. Table 4:2 includes the same details, but for abnormal operational practices.
- 4.1.3 The risk assessment indicates that the residual risk of odour nuisance should not be significant.



Table 4:1 Odour Risk Assessment and Management Plan for Normal Operation Conditions						
Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the Overall Risk?
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? (Who is responsible?)</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	<i>What is the risk that still remains?</i>
Odour from waste being delivered to the Waste Reception Hall	Care home and residential properties at The Croft. Residential properties off Murdoch Street, Aire valley Road and in the settlements of Thwaites and Thwaites Brow	Air	<p><b>Physical Control Procedures</b></p> <p>Ensure that all vehicles delivering waste to the facility are fully enclosed</p> <p>Ensure that roller doors on the Waste Reception Hall are only opened for the arrival of a delivery vehicle and that they are closed once the vehicle is fully within the building</p> <p><b>Procedural/Managerial Control Measures</b></p> <p>Continuous monitoring of the process using the Distributed Digital Control System.</p> <p>A complaints procedure will be put in place to ensure that potential issues are identified and rectified as soon as possible</p> <p>A preventative maintenance programme will include the regular inspection of all plant and control measures</p>	Unlikely	Odour annoyance	Not significant, if managed carefully
Odour from storage of waste in storage bunker	Care home and residential properties at The Croft. Residential properties off	Air	<p><b>Physical Control Measures</b></p> <p>Ensure all incoming waste is stored within the enclosed storage bunker</p> <p>Ensure that all waste is managed to minimise the time between initial receipt of waste and input into the grate.</p>	Unlikely	Odour annoyance	Not significant, if managed carefully

Table 4:1 Odour Risk Assessment and Management Plan for Normal Operation Conditions						
Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the Overall Risk?
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? (Who is responsible?)</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	<i>What is the risk that still remains?</i>
	Murdoch Street, Aire valley Road and in the settlements of Thwaites and Thwaites Brow		<p><b>Procedural/Managerial Control Measures</b></p> <p>Continuous monitoring of the process using the Distributed Digital Control System</p> <p>A complaints procedure will be put in place to ensure that potential issues are identified and rectified as soon as possible</p> <p>A preventative maintenance programme will include the regular inspection of all plant and control measures</p>			

Table 4:2: Odour Risk Assessment and Management Plan for Abnormal Operation Conditions						
What Do You Do That Can Harm and What Could Be Harmed			Managing the Risk	Assessing the Risk		
Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the Overall Risk?
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? (Who is responsible?)</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	<i>What is the risk that still remains?</i>
Odour from accidental spillage or leak of odorous material	Care home and residential properties at The Croft. Residential properties off Murdoch Street, Aire valley Road and in the settlements	Air	<p><b>Procedural/Managerial Control Measures</b></p> <p>Continuous monitoring of the process using the Distributed Digital Control System</p>	Very unlikely	Odour annoyance	Potentially significant

**Table 4:2: Odour Risk Assessment and Management Plan for Abnormal Operation Conditions**

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What Do You Do That Can Harm and What Could Be Harmed			Managing the Risk		Assessing the Risk	
Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the Overall Risk?
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? (Who is responsible)</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	<i>What is the risk that still remains?</i>
outside designated storage areas	of Thwaites and Thwaites Brow		<p>A complaints procedure will be put in place to ensure that potential issues are identified and rectified as soon as possible</p> <p>A preventative maintenance programme will include the regular inspection of all plant and control measures</p>			
Odour as a result of unplanned downtime	Care home and residential properties at The Croft. Residential properties off Murdoch Street, Aire valley Road and in the settlements of Thwaites and Thwaites Brow		<p><b>Physical Control Procedures</b></p> <p>Stop waste deliveries until the plant is back online</p> <p>Containerised carbon filters will be hired and placed at doorways to prevent the escape of odour if required</p> <p>The bunker will be emptied to prevent the generation of odour in the event of a plant shutdown lasting for longer than 3-4 days</p> <p><b>Procedural/Managerial Control Measures</b></p>			

**Table 4:2: Odour Risk Assessment and Management Plan for Abnormal Operation Conditions**

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What Do You Do That Can Harm and What Could Be Harmed			Managing the Risk		Assessing the Risk	
Hazard	Receptor	Pathway	Risk Management	Probability of Exposure	Consequence	What is the Overall Risk?
<i>What has the potential to cause harm?</i>	<i>What is at risk? What do I wish to protect?</i>	<i>How can the hazard get to the receptor?</i>	<i>What measures will you take to reduce the risk? (Who is responsible)</i>	<i>How likely is this contact?</i>	<i>What is the harm that can be caused?</i>	<i>What is the risk that still remains?</i>
			<p>A complaints procedure will be put in place to ensure that potential issues are identified and rectified as soon as possible</p> <p>A preventative maintenance programme will include the regular inspection of all plant and control measures</p>			

## **5 REPAIR AND MAINTENANCE**

- 5.1.1 The Site will be inspected daily by the operator by means of a visual check and will be serviced and maintained by a competent third party in regular intervals in accordance with the operational manual and manufacturer's instructions.
- 5.1.2 Results of the daily visual check will be recorded in the site log book. Records of all servicing and maintenance visits will be held on site.

## **6 MONITORING**

- 6.1.1 It is proposed to undertake olfactory once the facility is operational. It is proposed that a site operative will undertake the survey and record the results daily in a log book.
- 6.1.2 The route of the survey will be along the site boundary. Log book entries will comprise the following details:
- Time and date of test;
  - Name of surveyor;
  - Weather conditions, including wind direction; and
  - Intensity of the odour at various test locations. This should include notes on the duration of the test and whether odour was constant or intermittent during that period, as well as a description of the odour and the likely source).
- 6.1.3 We are aware that this sort of testing may prove insufficient due to staff being more used to site odours, or having become more adapted to them. As a result it is possible that subjective issues, such as the intensity and the description of the smell (offensiveness), may not be same as perceived by a nearby sensitive receptor.
- 6.1.4 Monitoring should be undertaken by a member of office or off-site staff, as appropriate, to ensure that they will not be acclimatised to the odour on site.

## **7 NEIGHBOURHOOD ENGAGEMENT**

- 7.1.1 Endless Energy Limited is committed to developing a good relationship with the public and is committed to deal with any complaints, including those with regard to odour, in an open and timely manner.
- 7.1.2 Visitors, customers and neighbours expressing dissatisfaction with the facilities or operations carried out at the site will be invited to enter a record in the Complaints File. The complaint will be dealt with by the facility operator for analysis and actions required, engaging specialist third parties wherever needed.
- 7.1.3 The complainant will be informed of the results of the investigation and any corrective actions proposed.

## **8 STAFF COMPETENCY/TRAINING**

- 8.1.1 The facility operator will be fully trained by the technology provider, or a chosen training provider, in the correct operation of all elements of the Clean Energy Facility. The facility operator will be equipped with an operations manual which will support him during the day to day running of the plant. It will also contain all necessary details regarding inspection and maintenance intervals, and contact details of contractors.
- 8.1.2 All involved staff will be trained in emergency and incident response relating to the operation of the facility. Training records will be held at the site as part of the operations manual.

## **9 SUMMARY AND CONCLUSIONS**

- 9.1.1 The Endless Energy Facility is located to the east of Keighley. Existing sensitive receptors are located more than 80m away.
- 9.1.2 The facility will utilise commercial and industrial refuse derived waste to generate electricity for export into the national grid. The additional end products include flue gases, bottom ash, sediments and APC residues.
- 9.1.3 The main source of odour at the facility is associated with the delivery and storage of waste prior to treatment. Waste will be delivered by bulk haulage vehicles, which will

access the Waste Reception Hall through roller shutter doors. These doors will only open to allow vehicles to enter and exit the building, thus minimising the potential for odour releases.

- 9.1.4 Incoming waste will be stored in an enclosed storage bunker and will be managed in accordance with strict management procedures. It is not therefore considered likely that there will be a significant potential for odour releases.
- 9.1.5 The remainder of the process will take place in an enclosed environment and is not therefore considered likely to have the potential to lead to odour emissions.
- 9.1.6 The facility will be equipped with an automatic process control unit, which measures and records various process parameters that indicate whether the process is operating within design parameters. A separate emergency shut down system is used to detect emergency situations and perform emergency shutdowns.
- 9.1.7 The odour management plan presented in this report, comprising physical control measures combined with management procedures, is considered to reduce the risk of odour emissions so that odour nuisance is considered to be not significant.

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