



Air Quality Note: Houghton Main Energy Centre (2018/1437)

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Experts in air quality
management & assessment



Document Control

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1 Introduction

- 1.1 This Note provides responses to some queries raised by officers at Barnsley Council and Doncaster Council relating to the air quality assessment undertaken to support the variation of condition application for the consented energy centre at Houghton Main (application ref: 2018/1437).
- 1.2 This Note addresses the following comments:
- The differences between the air emission limits used in the air quality assessment and those that the installation will be required to meet when operational;
 - A description of the emissions abatement technology that will be installed to ensure the installation meets the required emission limits;
 - A summary of a discussion between Laurence Caird (Associate Director at Air Quality Consultants Ltd) and Chris Shield (Technical Officer at Barnsley Council) regarding the air emission limits;
 - A summary of the approach to stack height assessment; and
 - Commentary on the potential for air quality impacts in the village of Hickleton.

2 Note

Emission Limits

- 2.1 Technical data used in the air quality assessment was provided by a technology supplier based on a similar system. These data included emission limits that the similar system has been designed to meet. The emission limits were used in initial air quality modelling to determine the appropriate stack height for the energy centre and were subsequently used as the basis for the air quality assessment submitted with the application.
- 2.2 When the Houghton Main energy centre is regulated (by issue of an Environmental Permit from the Environment Agency), it will likely need to meet more stringent (i.e. lower) emission limits for a number of pollutants than those used in the air quality assessment. By using emission limits that are higher than those the installation will be required to meet once it is operational, the air quality assessment therefore represents a worst-case sensitivity test. The use of sensitivity tests and worst-case assumptions is a common approach in air quality dispersion modelling to ensure a robust assessment. If lower emissions limits were to be used in the dispersion model, this would result in lower predicted concentrations and therefore lower air quality impacts. The air quality assessment submitted in support of the application is therefore robust.

- 2.3 A comparison of the emissions concentration limits used in the air quality assessment and the emission limits likely to be enforced when the plant is operational are presented in Table 1. This shows that, for all pollutants, the regulated emission limits are either the same or lower than those used in the air quality assessment.

Table 1: Emission Concentration Limits from the Proposed Energy Centre

Pollutant	Emission Concentration used in Air Quality Modelling (mg/Nm ³) ^a	Emission Concentration Limit the Installation will be required to meet (mg/Nm ³) ^b
Total dust	15	10
Total Organic Carbon (TOC)	15	10
Hydrogen chloride (HCl)	15	10
Hydrogen fluoride (HF)	1.5	1
Sulphur dioxide (SO ₂)	75	50
Nitrogen Oxides (NO _x)	300	200
Carbon monoxide (CO)	75	50
Ammonia (NH ₃)	5	5
Group 1 metals ^c	0.05	0.05
Group 2 metals ^d	0.05	0.05
Group 3 metals ^e	0.5	0.5
Dioxins and furans ^f	1 x 10 ⁻⁷	1 x 10 ⁻⁷

^a As presented in Table 3 of the Air Quality Assessment submitted with the application (report ref: J1925/C/F3).

^b Emission limits are defined in the IED Annex VI Part 3.

^c Cadmium (Cd) and Thallium (Tl)

^d Mercury (Hg)

^e Antimony (Sb), Arsenic (As), Lead (Pb), chromium (Cr), Cobalt (Co), Copper (Cu), Manganese (Mn), Nickel (Ni) and Vanadium (V)

^f I-TEQ (Toxic Equivalent)

- 2.4 In December 2018, the European Commission published a new draft Best Available Techniques Reference Document (BREF) for consultation¹. Once adopted, the BREF will require even more stringent regulated emission limits for air pollutants than those presented in Table 1. The proposed installation will be required to meet these limits, which will further reduce the air quality impacts of the energy centre.

¹ European Commission (2018) Draft Best Available Techniques (BAT) Document for Waste Incineration. Available: http://eippcb.jrc.ec.europa.eu/reference/BREF/WI/WI_BREF_FD_Black_Watermark.pdf

Description of Emissions Abatement

- 2.5 The energy centre will include an emissions abatement system that will be designed to ensure that all emissions to air are maintained below the regulated emission limits. The abatement system is likely to include the following elements:
- a Flue Gas Treatment (FGT) system based on using lime or sodium bicarbonate, activated carbon and filtration;
 - a two-stage filtration system with either Electrostatic Precipitation (ESP) or cyclones, used prior to fabric filters; and
 - a Selective Non-Catalytic Reduction (SNCR) system using proven technology.
- 2.6 The abatement system will be located within the main Process Building shown on the approved plans. It is also likely that the energy centre will need to operate with a Continuous Emissions Monitoring System (CEMS), which will ensure the emissions from the stack are continually measured and reported.

Consultation with EHO

- 2.7 On the 17th December 2018, a consultation was held between Laurence Caird (Air Quality Consultants Ltd) and Chris Shields (Barnsley Council) to discuss the differences between the emissions limits used in the air quality assessment and the emissions limits that the energy centre will be required to meet, as set out in Table 1, and the implications for the air quality assessment.
- 2.8 Mr Caird explained that the emissions used in the modelling had been provided by a technology supplier based on a similar system elsewhere. The emission limits for that system were used in the air dispersion modelling (as explained in paragraph 2.1 of this note), but the proposed Houghton Main energy centre will need to meet tighter emission limits for some pollutants.
- 2.9 It was discussed and agreed that the lower emission limits required by a future Environmental Permit would be mean lower volumes of pollutants being emitted from the energy centre's main stack than have been assumed in the air quality assessment, and therefore the air quality impacts will be lower than those predicted in the air quality assessment.
- 2.10 Mr Shields agreed that on the basis that the air quality assessment uses higher emissions limits for a number of pollutants than the regulated energy centre will be allowed, that the assessment is conservative and there is no need to provide any updated modelling based on the proposed emissions limits.

Stack Height Assessment

- 2.11 Stack height assessment often involves predicting the air quality impacts of an energy centre using dispersion modelling, with a range of different stack heights being assessed in order to determine an appropriate stack height for a new energy centre. In the case of the Houghton Main energy centre, because the development site has existing planning permission for an energy centre with a 45 m stack, the approach in this case was simply to assess the acceptability of the consented 45 m stack for the currently proposed system. As this stack height was demonstrated to be acceptable (the results of the modelling are presented in the air quality assessment), it was not necessary to assess alternative stack heights for the energy centre.

Hickleton AQMA

- 2.12 Doncaster Council has requested that the air quality assessment considers the potential for emissions from HGV traffic generated by the energy centre to have air quality impacts on the Hickleton Air Quality Management Area (AQMA), and the proposed Marr AQMA, both of which lie adjacent to the A635 to the east of the site.
- 2.13 SK Transport Planning Ltd has confirmed that the energy centre will increase traffic along the A635 by around 12 vehicle movements a day, 9 of which will be HGVs. This means up to 9 additional HGVs per day travelling through the Hickleton AQMA and the proposed Marr AQMA. Air quality guidance published by the Institute of Air Quality Management (IAQM)² provides a series of screening criteria for determining when an air quality assessment may be required for a proposed development. These screening criteria include increases in traffic movements. For roads within AQMAs, the guidance advises that an increase in HGV traffic of more than 25 per day (as an Annual Average Daily Traffic (AADT) flow) determines the need for an air quality assessment. The guidance then explains that *"if none of the criteria are met, then there should be no requirement to carry out an air quality assessment for the impact of the development on the local area, and the impacts can be considered as having an insignificant effect"*. As the proposals are predicted to increase HGV movements on the A635 by less than 25 per day, there is no need to assess the air quality impacts in the AQMAs, and the effects can be considered to be insignificant.

² Moorcroft and Barrowcliffe. et al. (2017) Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management, London. Online: <http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>

3 Glossary

AADT	Annual Average Daily Traffic
AQMA	Air Quality Management Area
BAT	Best Available Techniques
BREF	Best Available Techniques Reference Document
CEMS	Continuous Emissions Monitoring System
ESP	Electrostatic Precipitation
FGT	Flue Gas Treatment
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
IED	Industrial Emissions Directive
µg/m³	Microgrammes per cubic metre
SNCR	Selective Non-Catalytic Reduction