Thurrock Flexible Generation Plant

Environmental Statement Volume 6
Appendix 12.7: Assessment of Plume Visibility

Date: February 2020

Environmental Impact Assessment

Environmental Statement

Volume 6

Appendix 12.7

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Summary

This appendix outlines the assessment of plume visibility.

Qualifications

This appendix has been prepared by Kathryn Barker, a Member of the Institute of Air Quality Management (IAQM) and an Associate Member of the Institution of Environmental Sciences.

It has been checked by Fiona Prismall, a Chartered Environmentalist, Member of the Institution of Environmental Sciences and Fellow of the IAQM. Fiona is the IAQM committee secretary. Fiona was a member of the working groups that produced the IAQM 2014 'Guidance on the assessment of dust from demolition and construction', the EPUK & IAQM 2017 'Land-use Planning & Development Control: Planning for Air Quality' guidance and the IAQM 2019 'A guide to the assessment of air quality impacts on designated nature conservation sites'.

It has been reviewed by Jon Pullen, a Chartered Scientist, Chartered Chemist, Member of the Royal Society of Chemistry, Member of the Institution of Environmental Sciences and Fellow of the IAQM. Jon sits on the committee of the IAQM and is co-author of the IAQM best practice guidance publications on: odour impact assessments for planning; construction dust assessments; minerals dust impact assessment; and the air quality mitigation. Jon is author of the IEMA Handbook chapter on environmental monitoring and measurement and wrote many of the Environment Agency`s Technical Guidance Notes on source and ambient air quality monitoring.

1. Assessment of Plume Visibility

1.1.1 Visible plumes can arise when hot, wet exhaust gases are cooled to ambient temperature, resulting in the condensation of water vapour and a white plume. The extent of the plume is dependent on the volumetric flow rate of gases from the source, the amount of water vapour in the cooled gases, the relative humidity of the atmosphere and the extent of plume dispersion in the atmosphere.

1.1.2 The likely incidence and dimensions of a visible plume emitted from the proposed stacks has been predicted using the ADMS 5 plume visibility module, based on an initial mixing ratio of the plume of 0.142 $kg.kg^{-1}$ (mass of H_2O). Modelling has been undertaken using five years of hourly sequential meteorological data. As explained in Volume 3, Chapter 12: Air Quality, four scenarios have been considered. For the purposes of the plume visibility modelling, *Scenario 1: 48 x 12.4MW engines, each with their own stack (48 stacks),* has been modelled.

1.1.3 Resultant data have been used to determine:

- The amount of time that the length of the plume may exceed the minimum distance to the site boundary; and

1.1.4 The number of plumes that exceed the minimum distance to the site boundary during daylight hours.

1.1.5 Table 1.1 provides a summary of the results of plume visibility modelling per stack.

Table 1.1: Summary of Plume Visibility Results (per stack)

Year of Met Data	Number of visible plumes	Percentage of year that a visible plume is predicted	Maximum plume length (m)	Average plume length (m)	Number of hours plume visible outside site boundary during daylight hours	Percentage of year visible plumes are outside site boundary during daylight hours
2012	494	5.6	138	2	5	0.1
2013	833	9.5	172	4	21	0.5
2014	289	3.3	104	1	3	0.1
2015	400	4.6	155	1	3	0.1
2016	459	5.2	106	1	4	0.1

1.1.6 These results are considered further in Volume 3, Chapter 6: Landscape and Visual Resources.