

**Air Quality Assessment**  
**Colwick Industrial Estate, Nottingham**

**Client: H&C Consultancy Ltd**

**Reference: 4142r1**

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## Report Issue

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## **Executive Summary**

Redmore Environmental Ltd was commissioned by H&C Consultancy Ltd to undertake an Air Quality Assessment in support of the installation of a new gas upgrading unit and grid entry facility on land off Road 4, Colwick Industrial Estate, Nottingham.

The proposed plant has the potential to cause air quality impacts as a result of atmospheric emissions during normal operation. An Air Quality Assessment was therefore required in order to assess potential effects in the vicinity of the site.

An assessment using a standard screening tool was undertaken in order to predict pollution levels as a result of emissions from the upgrading unit and grid entry facility. The findings indicated that the operation of the plant is not predicted to result in significant impacts at any sensitive location within the vicinity of the site. As such, air quality issues are not considered a constraint to the development.

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## **1.0 INTRODUCTION**

### **1.1 Background**

1.1.1 Redmore Environmental Ltd was commissioned by H&C Consultancy Ltd to undertake an Air Quality Assessment in support of the installation of a new gas upgrading unit and grid entry facility on land off Road 4, Colwick Industrial Estate, Nottingham.

1.1.2 The proposed plant has the potential to cause air quality impacts as a result of atmospheric emissions during normal operation. An Air Quality Assessment was therefore required in order to assess potential effects in the vicinity of the site.

### **1.2 Site Location and Context**

1.2.1 The site is located on land off Road 4, Colwick Industrial Estate, Nottingham, at National Grid Reference (NGR): 463465, 339855. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 It is proposed to install a new gas upgrading unit and grid entry facility at the site. This will be used to produce biomethane from biogas generated by the adjacent Biodynamic UK Limited anaerobic digestion (AD) plant for injection into the national transmission network.

1.2.3 The proposed plant has the potential to cause air quality impacts as a result of atmospheric emissions during normal operation. An Air Quality Assessment was therefore undertaken in order to evaluate the potential for significant effects in the vicinity of the site. This is detailed within the following report.

## 2.0 **METHODOLOGY**

### 2.1 **Introduction**

2.1.1 The proposed development has the potential to cause increases in pollution levels as a result of atmospheric emissions from the gas upgrade and grid entry plant. Impacts have therefore been assessed in accordance with the guidance provided on the Environment Agency (EA) web page 'Air emissions risk assessment for your environmental permit'<sup>1</sup> and associated H1 Assessment Tool. The process and relevant inputs are summarised in the following Sections.

### 2.2 **H1 Assessment Tool**

2.2.1 The H1 Assessment Tool is a Microsoft Access based methodology produced to support the EA risk assessment process. The database allows the user to calculate the contribution of defined emission sources to ground level pollution concentrations based on various input values. These can then be compared with the relevant Environmental Assessment Levels (EALs) to determine the acceptability of the facility in terms of air quality.

### 2.3 **Emission Sources**

2.3.1 Potential emissions sources were identified based on information provided by the applicant. These are summarised in Table 1.

**Table 1 Emission Sources**

Source		Description of Operation
A1	Upgrade unit carbon dioxide (CO <sub>2</sub> ) vent	Continuous operation
A2	Grid entry unit analyser vent	Continuous operation
A3	Grid entry unit analysis system pressure relief vent	Only used in event of equipment failure
A4	Grid entry unit thermal relief vent	Only for a short duration when the system is isolated

<sup>1</sup> <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>.

Source		Description of Operation
A5	Grid entry unit LGT PRU relief valve	Only used in event of equipment failure
A6	Grid entry unit expansion tank creep relief vent	Frequent operation
A7	Grid entry unit creep relief vent	Only used in event of equipment failure

2.3.2 As shown in Table 1, emissions from sources A3 to A5 and A7 are expected to be extremely infrequent and short-term as they would only occur in the event of equipment isolation or failure. As such, potential emissions from these sources are not considered to be significant and have not been considered further in the context of this assessment. Potential impacts as a result of emissions from A1, A2 and A6 have been considered further in the following Sections.

## 2.4 Assessment Inputs

2.4.1 A summary of the inputs used in the assessment is provided in Table 2. These were obtained from H&C Consultancy Ltd.

**Table 2 H1 Assessment Inputs**

Parameter	Unit	A1 - Vent Stack Interface	A2 - Analyser Vent	A6 - Expansion Tank Creep Vent
Stack height	m	10.0	3.1	3.1
Exhaust gas temperature	°C	20	20	20
Exhaust gas flow rate	Nm <sup>3</sup> /hr	536	0.102	0.032
Exhaust gas efflux velocity	m/s	1.0	0.34	0.11
Hydrogen Sulphide (H <sub>2</sub> S) emission concentration	mg/m <sup>3</sup>	4.18	-	-
H <sub>2</sub> S emission rate	g/s	0.0006	-	-
Methane (CH <sub>4</sub> ) emission concentration	mg/m <sup>3</sup>	4,592	636,352	636,352
CH <sub>4</sub> emission rate	g/s	0.684	0.018	0.006

2.4.2 There are a number of buildings in the vicinity of the sources that may affect emission dispersion. The effective stack height for all points was therefore entered into the H1

Assessment Tool as 0m in accordance with EA guidance 'Air emissions risk assessment for your environmental permit'<sup>2</sup>.

## **2.5 Background Concentrations**

2.5.1 There is currently no UK baseline monitoring data available for H<sub>2</sub>S nor CH<sub>4</sub>. As such, in the absence of such information, background levels have not been considered as part of the assessment.

## **2.6 Environmental Assessment Levels**

2.6.1 An EAL is the concentration of a substance, which, in a particular environmental medium, the regulators regard as an appropriate comparator value. This enables comparison between the environmental effects of different substances in that medium and between environmental effects in different media, enabling the summation of those effects.

2.6.2 Ideally EALs to fulfil this objective would be defined for each pollutant:

- Based on the particular habitats or receptors (in particular three main types of receptor should be considered, protection of human health, protection of natural ecosystems and protection of specific sensitive receptors, e.g. materials, commercial activities requiring a particular environmental quality);
- Be produced according to a standardised protocol to ensure that they are consistent, reproducible and readily understood;
- Provide similar measure of protection for different receptors both within and between media; and,
- Take account of habitat specific environmental factors such as pH, nutrient status, bioaccumulation, transfer and transformation processes where necessary.

2.6.3 EALs used in this assessment were obtained from EA guidance 'Air emissions risk assessment for your environmental permit'<sup>3</sup> and are summarised in Table 3.

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<sup>2</sup> <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>.

<sup>3</sup> <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>.

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**Table 3 Environmental Assessment Levels**

Pollutant	Environmental Assessment Level ( $\mu\text{g}/\text{m}^3$ )	
	Concentration	Averaging Period
H <sub>2</sub> S	140	Annual mean
	150	1-hour mean

2.6.4 It should be noted that EALs have not been defined by the EA for CH<sub>4</sub>. As such, potential impacts as a result of emissions of the pollutant have not been considered further as part of the assessment.

## 2.7 Assessment Criteria

2.7.1 Predicted pollutant concentrations as a result of emissions from the identified sources were summarised as Process Contributions (PCs).

2.7.2 EA guidance 'Air emissions risk assessment for your environmental permit'<sup>4</sup> states that PCs can be screened as insignificant if they meet the following criteria:

- The short-term PC is less than 10% of the short-term environmental standard; and,
- The long-term PC is less than 1% of the long-term environmental standard.

2.7.3 The PCs predicted from the H1 Assessment Tool were compared with the relevant EALs in order to determine potential for significant air quality effects.

<sup>4</sup> <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>.

### 3.0 **ASSESSMENT**

3.1.1 The contribution of emissions from the relevant emission sources to ground level pollutant concentrations was calculated using the H1 Assessment Tool, as described previously. The results are summarised in Table 4.

**Table 4 H1 Assessment Results**

Pollutant	Averaging Period	PC ( $\mu\text{g}/\text{m}^3$ )	PC Proportion of EAL (%)
H <sub>2</sub> S	Annual mean	0.092	0.07
	1-hour mean	2.43	1.62

3.1.2 As shown in Table 4, there are no predicted exceedences of the relevant EALs as a result of emissions from the plant. Predicted PCs were below the relevant criteria for both the long-term and short-term averaging periods. As such, predicted effects on H<sub>2</sub>S concentrations as a result of the proposals are not considered to be significant in accordance with the stated criteria.

3.1.3 It should be noted that the assessment results represent the point of maximum impact, which is likely to be within the development boundary. As such, levels at sensitive locations would be significantly lower than those presented above.

## **4.0 CONCLUSION**

- 4.1.1 Redmore Environmental Ltd was commissioned by H&C Consultancy Ltd to undertake an Air Quality Assessment in support of the installation of a new gas upgrading unit and grid entry facility on land off Road 4, Colwick Industrial Estate, Nottingham.
- 4.1.2 The plant has the potential to cause air quality impacts as a result of atmospheric emissions during normal operation. An Air Quality Assessment was therefore required in order to assess potential effects in the vicinity of the site.
- 4.1.3 An assessment using the EA H1 Assessment Tool was undertaken in order to predict pollution levels as a result of emissions from the proposed plant. The findings indicated that the operation of the upgrading unit and grid entry facility is not predicted to result in significant impacts at any location within the vicinity of the site. As such, air quality issues are not considered a constraint to the development.

## 5.0 **ABBREVIATIONS**

AD	Anaerobic Digestion
CH <sub>4</sub>	Methane
CO <sub>2</sub>	Carbon Dioxide
EA	Environment Agency
EAL	Environmental Assessment Levels
H <sub>2</sub> S	Hydrogen Sulphide
NGR	National Grid Reference
PC	Process Contribution

**Figures**

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**Legend**



**Title**  
Figure 1 - Site Location Plan

**Project**  
Air Quality Assessment  
Colwick Industrial Estate,  
Nottingham

**Project Reference**  
4142

**Client**  
H&C Consultancy Ltd

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