

**AQMAU Reference:** AQMAU-C2655-RP01

**Project Title:** Lostock Sustainable Energy Plant Ltd – Process Emissions Modelling

**Impact Assessment:** Air Quality and Ecological

**Date Requested:** 16<sup>th</sup> November 2023

**AQMAU Response Date:** 22<sup>nd</sup> December 2023

<b>AQMAU Recommendation</b>	<b>Conditions/Noted</b>
<ul style="list-style-type: none"><li>The consultant's numerical predictions and conclusions regarding human health can be used for permit determination.</li></ul>	<ul style="list-style-type: none"><li>Contributions from the proposed variation are unlikely to exceed any Environmental Standard (ES) set for the protection of human health given that the:<ul style="list-style-type: none"><li>annual throughput does not exceed 685,000 tpa.</li><li>Daily average BAT-AEL for NO<sub>x</sub> is set at 150 mg/Nm<sup>3</sup>.</li></ul></li></ul>
<ul style="list-style-type: none"><li>The consultant's numerical predictions and conclusions regarding ecological impact can be used for permit determination.</li></ul>	<ul style="list-style-type: none"><li>There are no exceedances of critical levels and loads at ecological receptors within the relevant screening distances.</li></ul>

**Detailed response and evidence starts on Page 2.**

## 1. Summary of Work Request

- 1.1 The Environment Agency's Installations Regime of the National Permitting Services (NPS) asked the Acoustics and Air Quality Modelling and Assessment Unit (AQMAU) to audit an air quality addendum<sup>1</sup> (AQA) for a permit variation application for the Lostock Sustainable Energy Plant, LSEP (the facility). The air quality assessment within the addendum was completed by Fichtner Consulting Engineers (the consultant).
- 1.2 As a result of our previous audit of their Air Quality Assessment<sup>2</sup> the consultant was issued a Schedule 5 Request<sup>3</sup> In response, the consultant remodelled the emissions from the facility and have submitted an air quality addendum report. This report should be read in conjunction with our previous report 'AQMAU-C2483 -RP01'<sup>4</sup>.
- 1.3 The consultant has reduced their throughput from 728,000 tonnes/year to 685,000 tonnes per year. They have also requested a reduction in the Oxides of Nitrogen (NO<sub>x</sub>) emission limit value (ELV) from 180mg/Nm<sup>3</sup> to 150mg/Nm<sup>3</sup>. Our audit is based on a throughput of 685,000 tonnes per year at NO<sub>x</sub> ELV of 150 mg/Nm<sup>3</sup>.

## 2. Conclusions that Lead to AQMAU Recommendations

- 2.1 In their report, the consultant concludes:
  - Emissions to air from the proposed facility are not expected to have a significant impact on human health or ecology.
- 2.2 We have audited the applicant's submission and have made observations relating to any assumptions made in their updated report. We have conducted modelling to check the applicant's updated conclusions, including sensitivity to observations we have made during our audit. Although we do not agree with the applicant's absolute numerical predictions, we agree that they can be used as a basis for permit determination.

## 3. Evidence for Recommendations

- 3.1 The consultant used air dispersion modelling software ADMS 5.2. We have tested sensitivity to the more recent version ADMS 6.0.0.1.
- 3.2 Based on our previous assessment, we have used meteorological data observed at Woodford meteorological site for the year 2006 to represent a reasonable worst-case scenario.
- 3.3 The consultant's model set up has included the updated emission rates that have changed since the last air quality assessment They have included details for the calculation of two volumetric flow rates. They have proposed to implement a restriction that prevents more than 685,000 tonnes of throughput per year. Therefore, they have calculated an annual/long-term (LT) volumetric

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<sup>1</sup> Lostock Sustainable Energy Plant Ltd, Air Quality Addendum, dated 17<sup>th</sup> November 2023, document reference: S3291-0330-0003RSF.

<sup>2</sup> Lostock Sustainable Energy Plant, Appendix E2 – Process Emissions Modelling, dated 14<sup>th</sup> February 2022, document reference: S3291-0200-0004HKL

<sup>3</sup> Schedule 5 Request. Notice of request for more information. Dated 20<sup>th</sup> September 2023.

<sup>4</sup> AQMAU-C2483-RP01

flowrate and a short-term (ST) volumetric flowrate. These flowrates are within expected ranges when compared against similar energy from waste plants.

- LT flowrate – 63.2 Nm<sup>3</sup>/s with a velocity of 17.1 m/s. (685,000 tonnes/year)
- ST flowrate – 73.6 Nm<sup>3</sup>/s with a velocity of 19.9 m/s. (45.5 tonnes/hour)

- 3.4 The consultant has modelled a scenario in which the facility operates at maximum capacity for 8,760 hours per year.
- 3.5 The consultant's modelled emissions presented in table 8 of the AQA correspond to the values in the current BAT conclusions for existing plant. We can replicate their emission rates for all pollutants. We have noted that their NO<sub>x</sub> emission rates are based on the reduced concentration of 150 mg/Nm<sup>3</sup>. For all other pollutants, the emission concentrations used are the same as their previous report.
- 3.6 We observe that modelling parameters such as buildings, surface roughness, terrain, grid are all consistent with their previous report.
- 3.7 The background data used by the consultant is consistent with their previous report. Where some differences were identified, the most conservative background concentrations were used in our checks.
- 3.8 The consultant predicts PCs for the proposed facility to be 'insignificant' for all pollutants and averaging periods except for annual mean NO<sub>2</sub>, annual mean volatile organic compounds (VOCs) as benzene and 1,3-butadiene, annual mean cadmium, arsenic and nickel. However, their predicted PECs do not exceed the ES. This information can be found in tables 19 and 22 of their AQA.
- 3.9 Since the consultant's addendum report, several environment assessment levels (EALs) have been updated or introduced and published in the Air emissions risk assessment guidance<sup>5</sup>. We have assessed impacts against these new EALs in our checks.

### **Ecological Assessment**

- 3.10 The consultant has used a screening distance of 10km for special protection areas (SPAs), special areas of conservation (SACs) and Ramsar sites (protected wetlands) and 2km for SSSI's and local nature sites based on the Air emissions risk assessment guidance. We note that some ecological receptor locations within Midland Meres and Mosses (Phase 2) Ramsar site, Plumley Lime Beds (SSSI) and Witton lime beds (SSSI) are located outside of the relevant screening distances. These locations need not necessarily be considered. However, they were still included in the consultant's assessment.

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<sup>5</sup> <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>,

- 3.11 The consultant has used APIS<sup>6</sup> to identify the habitat features, background concentrations and critical levels and loads. The consultant has compared their daily NO<sub>x</sub> emissions against the lower daily critical level of 75µg/m<sup>3</sup>.
- 3.12 The results for the PCs for ecological receptors are presented in tables 28,30,31 and 39 of their AQA<sup>2</sup>.
- 3.13 The PCs for annual and daily NO<sub>x</sub>, weekly and daily HF and annual NH<sub>3</sub> are all below the insignificance threshold of the critical levels for all ecological sites.
- 3.14 The PCs for nutrient nitrogen and acid deposition all below the insignificance threshold of the critical loads for all ecological sites.
- 3.15 The consultant predicts PCs for annual mean NH<sub>3</sub>, nutrient nitrogen and acid deposition at Plumley Lime Beds (SSSI) to be over the insignificance threshold. We note that this ecological receptor is outside the screening distance of 2km. We also note that the PCs are against the lower critical load functions and the background concentration already exceeds the critical loads at this site.
- 3.16 In their previous air quality assessment, the consultant had predicted potential adverse impacts on the Midland Meres and Mosses – Phase 2 Ramsar overlain by West Midlands Mosses SAC. Table 43 in their addendum report presents PCs for acid deposition against the minimum critical load function as below 1%.

### **Abnormal Emissions Assessment**

- 3.17 The consultant had assessed impacts during abnormal emissions in their previous air quality assessment and had predicted no exceedances of the ES. The same conclusions would still be applicable.

### **AQMAU Check Modelling and Assessment**

- 3.18 To check the validity of the consultant's updated predictions, we have undertaken modelling using ADMS 6.0.0.1, based on the consultant's modelling files, and included sensitivity analysis of the following:
- NO<sub>x</sub> emission rate based on NO<sub>x</sub> BAT-AEL of 150 mg/Nm<sup>3</sup>.
  - Assessing against the updated EALs for 1,3-butadiene, cadmium (Cd), chromium III (CrIII), copper (Cu), mercury (Hg) and nickel (Ni).
  - Assessing specific ecological sites using grassland deposition rates for NO<sub>2</sub>, SO<sub>2</sub>, NH<sub>3</sub> and HCL in the assessment of nutrient nitrogen and acid deposition, this is further explained in section 3.21.
- 3.19 We do not entirely agree with the consultant's absolute numerical values and predictions, we do, however, agree with the consultant's conclusions that the proposed variation to the facility will not cause any breaches of the environmental standards for the protection of human health. This applies to both normal operation and abnormal operation.

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<sup>6</sup> Air Pollution Information System [Air Pollution Information System | Air Pollution Information System \(apis.ac.uk\)](http://apis.ac.uk).

- 3.20 At ecological receptors, we agree with the following potentially significant contributions to background exceedances:
- Receptor E8 Plumley Lime Beds, SSSI NH<sub>3</sub>, nutrient nitrogen and acid deposition PCs greater than 1% where the background pollution is already exceeded.
- 3.21 We find no exceedances of the nutrient nitrogen or acid deposition minimum critical loads for Midland Meres and Mosses – Phase 2 (Oak Mere and West Midlands Mosses SAC). Our previous audit identified exceedances using the woodland deposition rate as worst-case. APIS does not include woodland deposition rates for any featured habitat for these two SACs. Using grassland deposition rates for these ecological sites produces PCs that are below 1% of the minimum critical loads.
- 3.22 We are also satisfied that based on the emission parameters used by the applicant, impacts at human and ecological receptors are likely to be reduced relative to the original application in 2011.
- 3.23 We must also note that our conclusions regarding ecological sites are dependent on the site operating at the reduced NO<sub>x</sub> ELV of 150mg/Nm<sup>3</sup>.