
From: AQMAU, Air Quality Unit
Sent: 15 February 2022 13:30
To: [REDACTED]
Subject: [AQMAU] Portland EDG ENVHPI/AP3304SZ/A001 (audit email response)

AQMAU has audited the air quality assessment of the emergency diesel generator (EDG) and carried out check modelling with sensitivity analysis to our observations.

Please find a summary of our audit results as follows.

Recommendations

- Based on the modelled conditions below, the site is not likely to cause exceedances of any environmental standard (ES) at human health and habitats located **beyond the cavity region of buildings**. This extends to approximately 3 building heights distance where there are high uncertainties in the amount of pollutant recirculation due to high turbulence caused by building downwash.
- Due to these high uncertainties, we have little confidence in the daily NO_x critical level predictions at the area of Portland SSSI/SAC located due south of the installation within the cavity region. The building downwash effect is particularly pronounced here due to the proposed proximity of the stack to site buildings. Uncertainty may decrease if the applicant proposed an alternative configuration. The applicant might also wish to consider assessing against the alternative daily NO_x critical level that can be applicable under certain circumstances.
- If operational conditions and configuration change, remodelling should be sought from the applicant.

Conditions

- One diesel generator with a thermal input capacity of 7.6 MWth
- Emission concentration profile (at 273K, 101kPa, 15% oxygen, dry):
 - 894 mg/Nm³ unabated for up to 10 minutes
 - 200 mg/Nm³ abated for up to 20 minutes
- Testing up to 26 hours per year, up to 30 minutes every time, from 8 am to 5 pm
- Emergency operation remains infrequent

Observations

1. The applicant assumed abatement of emissions. We have assumed an ammonia emission concentration of 15 mg/Nm³ (at 272K, 101kPa, 15% oxygen, dry) to consider the ammonia slip from the potential operation of abatement with Selective Catalytic Reduction (SCR).
2. The applicant has only assessed against short-term (ST) environmental standards. We have included long-term (LT) assessment of annual NO₂ at human health receptors and annual NO_x, ammonia and nutrient nitrogen and acid depositions at ecological receptors.
3. The generator stack of 8 m height is located northeast and northwest of buildings façades with heights of 41 and 36.5 m, respectively. As a result, there is poor dispersion and an area of Portland SSSI/SAC close to the site is located within the cavity of buildings, where there is high uncertainty due to the level of turbulence in this region. Noting downwash and plume rise are estimated differently in each modelling software, we have included sensitivity to AERMOD and evaluated the regions where uncertainty is the highest to incorporate into our decision-making.
4. The applicant's predicted maximum daily NO_x PC is above the 10% short-term insignificance criteria (i.e. PC of 51%) and PEC is 96.5% of the 75 µg/m³ daily NO_x critical level at Portland SSSI. This PC is likely to be at the cavity of buildings, therefore, highly uncertain.
5. The background tile where the site is located already exceeds the NO_x annual critical level and the applicant notes a value of 34 µg/m³ based on Defra average background maps. They claim that this background concentration is 'higher than many other ports in the UK' and 'seems unusual' based on the low number of vessels. They have calculated daily NO_x PECs assuming backgrounds of 34 and 23 µg/m³. We cannot verify whether a lower background NO_x concentration would be appropriate in this case.

6. They have assumed that daily NO_x background is the same as the annual NO_x background. They refer to the approach presented in the LAQM but this is specific to daily PM₁₀ not NO_x. We cannot verify whether this is an appropriate approach to represent the daily NO_x variability in the port area and have considered the applicant's and our reasonably conservative approach in our decision-making.

Results

- Based on the proposed operation, we agree that the probability of exceeding the ST ES at locations relevant for human health is unlikely (less than 1%). We also agree that annual impacts are not likely to be significant based on the proposed operation. Despite the uncertainties due to the stack/building configuration and the elevated NO_x background, exceedances of the daily NO_x at the Portland SSSI/SAC are unlikely at locations **beyond the cavity region.**
- Assuming the elevated NO_x background and a daily NO_x which is more variable than the annual average (points 5 and 6), we cannot rule out exceedances of the daily NO_x critical level of 75 µg/m³ at areas of the Portland SSSI/SAC located within the cavity region of buildings (extending approximately 125 m from building 4). In addition, there is limited evidence to quantify uncertainties in modelling predictions in regions of such turbulent flow regimes and, therefore, predictions are highly uncertain.
- Outside the cavity region, exceedances of the 75µg/m³ critical level are not likely based on the proposed conditions.

Air Quality Modelling and Assessment Unit (AQMAU)

Environment Agency | Horizon House, Deanery Road, Bristol, BS1 5AH

From: [REDACTED]
Sent: 07 April 2022 17:34
To: [REDACTED]
Subject: [AQMAU] Portland EDG ENVHPI/AP3304SZ/A001
Attachments: [AQMAU] Portland EDG ENVHPI/AP3304SZ/A001 (audit email response)

Having evaluated the additional submission from the air quality consultant in relation to daily NOx predictions at ecological receptors in the cavity of buildings due to the operation of the EDG, we consider our conclusions and observations in the attached email do not change.

AQMAU
Air Quality Modelling and Assessment Unit (AQMAU)
Environment Agency | Horizon House, Deanery Road, Bristol, BS1 5AH

From: AQMAU, Air Quality Unit
Sent: 10 June 2022 12:16
Subject: [AQMAU] Portland ERF HHRA complementary submission ENVHPI/AP3304SZ/A001 - OFFICIAL

AQMAU response

As part of the consultation process on the planning application for the Portland Energy Recovery Facility, the former Public Health England (PHE) requested the assessment of impacts of dioxins, furans and dioxin-like-PCBs against the tolerable daily intake (TDI) [1]. As a result, the consultant undertook the forementioned assessment [2] to supplement the original Human Health Risk Assessment (HHRA) [3] audited by AQMAU [4]. We have evaluated whether the complementary submission would affect our audit conclusions.

AQMAU recommendation

- Applicant's conclusions can be used for permit determination.
- Our checks indicate that the new submission does not change our previous conclusion regarding impacts from dioxins, furans and dioxin-like PCBs. Process Contributions (PCs) are below 10% of the TDI, therefore, predicted impacts from dioxins and furan and dioxin-like PCB emissions are below the insignificance criterion suggested by PHE for the protection of human health.

Evidence for recommendation

- Applicant's emission rates presented in table 3 were based on the HMIP98 [5] congener profiles and the total emissions are consistent with the BAT-AEL of 0.06 ng I-TEQ/Nm³. Dioxin-like PCBs were based on maximum emission concentrations from historical measurements [3]. We were able to replicate applicant's emission values and considered alternative congeners within our original audit.
- The applicant claims to report PCs at the most impacted sensitive receptor. During our audit, we considered intake from all pathways at the maximum at the grid, assuming that food is grown and sourced locally at the maximum predicted point of impact within the modelling domain. This is conservative.
- The applicant compares intakes against the UK Committee on Toxicity (COT) TDI of 2 pg WHO-TEQ/kg(BW)/day [1]. Applicant's values presented at the most impacted sensitive receptor are below the 10% Public Health England threshold criteria (i.e., a maximum of 0.18% of the TDI). In the previous applicant's HHRA, intake values presented as a ratio were below the 10% PHE threshold criteria when compared against the UK COT TDI.
- The applicant concludes that "predicted impact of emissions of dioxins and dioxin-like PCBs from the Portland ERF at sensitive receptors are well below the TDI". As a result of our checks, although we do not necessarily agree with their exact numerical predictions, we agree with consultant's conclusion.

[1] Committee on toxicity of Chemicals in Food, Consumer Products and the Environment. Tolerable Daily Intake (TDI) of 2 picogrammes toxic equivalent (TEQ) per kilogramme human body weight per year.

[2] Planning document: Portland Energy Recovery Facility. Impact of dioxins using the TDI approach. S2953-0030-0012RST September 2021

[3] Human Health Risk Assessment. Portland Energy Recovery Facility. Project No.: 0552187. August 2020.

[4] Portland Energy Recovery Facility (ERF). EPR/AP3304SZ/A001. Audit of air quality impact assessment. AQMAU-C2179-RP01, October 2021.

[5] Risk Assessment of Dioxin releases from Municipal Waste Incinerators, Her Majesty's Inspectorate of Pollution. March 1996.

Many thanks,

Air Quality Modelling and Assessment Unit (AQMAU)

Environment Agency | Horizon House, Deanery Road, Bristol, BS1 5AH

To: [REDACTED]
Subject: Portland ERF ENVHPI/AP3304SZ/A001

Hi [REDACTED]

Hope you're well.

AQMAU were requested to confirm if the applicant's conclusions will apply for a new receptor – Barge 369259, 74371 (approximate grid reference).

We have reviewed applicant's Air Quality Assessment (AQA) (Reference: Powerfuel Portland Limited Appendix D.2: Process Emissions Modelling (S2953-0030-0005RSF), Fichtner Consulting Engineers Ltd, August 2020), AQMAU-C2179-RP01, AQMAU-C2261-RP01, AQMAU's email response dated 15/02/2022 and 07/04/2022.

Based on this we can conclude that exceedances are unlikely for all pollutants against the environmental standards.

Hope this helps with the decision document.

Many thanks,
Air Quality Modelling and Assessment Unit (AQMAU)
Environment Agency | Horizon House, Deanery Road, Bristol, BS1 5AH

From: [REDACTED]
Sent: 14 December 2023 12:57
To: [REDACTED]
Subject: RE: Helpdesk query: Assessment against new EALs required for EPR/AP3304SZ/A001

Hi [REDACTED],

Apologies for the delay. We received too many of these work requests but are getting them done as soon as we can.

Following the changes to the environmental assessment levels (EALs) published in our guidance in November 2023 ([Air emissions risk assessment for your environmental permit - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit)) for 1,3-butadiene, cadmium (Cd), chromium III (CrIII), copper (Cu), mercury (Hg) and nickel (Ni), we have re-assessed the process contributions (PCs) from Portland Energy from Waste (EFW) Facility (EPR/AP3304SZ/A001) against the updated EALs.

We have assessed the normal operations of the facility at the BAT-AELs, the same as those used by the consultant in their original Air Quality Assessment (AQA). We have used our own reasonable worst-case emissions scenarios for abnormal operations to conduct these additional checks.

Conclusions:

- Normal operation long-term (LT) PCs for 1,3-butadiene, cadmium and nickel are likely to be not insignificant against the revised EALs. However, the predicted environmental concentrations (PECs) are well below the updated EALs.
- Normal operation short-term (ST) PCs for 1,3-butadiene, cadmium and nickel are likely to be not insignificant against the revised EALs. However, the PECs are well below the updated EALs.
- Under abnormal operating conditions, the 1,3-butadiene, mercury, cadmium and nickel PCs are likely to be not insignificant. However, the PECs are well below the updated EALs.

If you have any questions or would like to discuss this further, please do not hesitate to contact me.

Many thanks,
Air Quality Modelling and Assessment Unit (AQMAU)
Environment Agency | Horizon House, Deanery Road, Bristol, BS1 5AH