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Our Ref: 3016/L/002
29th January 2021

John McClean
Environment Agency Permitting and Support Centre
Environmental Permitting Team
Quadrant 2
99 Parkway Avenue
Parkway Business Park
Sheffield
S9 4WF

Dear John,

Wood Lane Biomass Plant – EPR/CP3698VW/V004

Please see below a response to the Schedule 5 questions received on 9th December 2020. The questions provided in the Schedule 5 notice, excluding Questions 1 to 18, are reproduced below and our responses are given in blue.

Fire Prevention Plan (FPP) Questions 1 to 18

Response
The response to questions 1 to 18 are provided in an updated Fire Prevention Plan which addresses all requirements of the questions contained within the Schedule 5 notice.

Best Available Techniques (BAT)

General comments
The activity falls to be regulated under Schedule 1 Section 5.1 Part B (a)(v) as a Part B installation under Local Air Pollution Prevention and Control (LAPPC) regime. Its regulation as a Part B installation reflects the lower environmental risk and lower complexity of the activity. The Application for a Direction was submitted with agreement of all parties with the objective of reducing the legislative burden on the Operator and Regulator. Your questions regarding to Best Available Techniques (BAT) have been addressed and the full technical specifications for the Linka biomass boilers and associated infrastructure is provided. Linka boilers are Renewable Heat Incentive (RHI) approved and the emissions certificate for the Linka boiler is provided with this response. The emission certificate provides evidence that the specific model has demonstrated that the plant meets air quality requirements of the non-domestic RHI scheme.

19. Demonstrate that wood fuel (Grade A wood and virgin wood) are stored under cover to keep them dry and maximise the efficiency of the boiler process.

Section 4.2.1 of Guidance document, "Environmental Permitting Technical Note 5/1(18), Reference document for the incineration/combustion of waste wood" [5/1(18)] states that "uncovered storage of fuels should be avoided to keep fuel dry". Site drawing, TGE/09/A, Schematic Site Layout – Biomass, does not indicate that the stockpiles of wood are covered.

Response
Grade A wood and virgin wood are stored under cover to keep dry as shown below in the photograph. This is to ensure that the moisture content of the wood can be kept low. However, the biomass plant building provides drying floors for drying the virgin wood chip and shredded Grade A waste wood.

20. (a) Describe how the combustion zone temperatures of the boilers are raised at start-up from cold.
(b) Confirm that waste wood is not burned during start-up from cold.
(c) Demonstrate how the boiler is operated to prevent idling.

Response

The initial temperature increase comes from the ignitor and then from there the boiler warms up gradually by the heat from the fire and then circulation of the water begins when it's at a certain temperature. On start-up from cold, prior to the introduction of waste wood into the furnace, the combustion temperature is raised using virgin wood.

The biomass boilers are capable of stable operation at a minimum turndown of 30% of their maximum continuous rate and it is confirmed by the Operator that the boilers will not be operated below this load (idling condition) to prevent higher emissions, specifically of carbon monoxide associated with non-optimised combustion at low load. The parameters are changed so that it either decreases the amount of fuel or increase depending on the running temperature, so it doesn't reach the stop temperature.

21. (a) Describe how air flow in the boilers is controlled to maximise thermal efficiency.
(b) Confirm if more air than the theoretical minimum for complete combustion is supplied.

Response

A computer based control system, fully automated programmable logic controller (PLC), enables oxygen levels to be monitored within each of the combustion chambers and can adjusts the speed / movement of the grate to maintain oxygen levels within set parameters specified to result in highly efficient combustion. In order for the grate to feed evenly, waste wood fuel is supplied into the boilers with a waste feeder, automatically controlled by the PLC. Fuel is fed in by augers through top loader bays, which are speed controlled.

As oxygen levels increase, fuel delivery is also increased to provide more fuel for combustion and therefore increase the demand for oxygen. If oxygen levels drop, then the feed auger slows, reducing fuel input and reducing the demand for oxygen, allowing oxygen levels within the combustion chamber to increase. Oxygen levels within the combustion chamber are also controlled by the PLC through the use of primary and secondary air fans. The system automatically regulates the primary blowers according to the oxygen percentage (pre-gassing) and secondary blowers (incineration gases), ensuring a degree of efficiency of up to 93%. The primary

blower is used to provide the bulk of O_2 demand, with the secondary blower operating when oxygen levels are dropping towards the lower limits, pre-set during the commissioning of the boilers. Combustion temperature, residence time and oxygen content are therefore all continuously controlled by the PLC system and can be checked by the Operator.

22. Demonstrate how the "turndown ratio" (the ratio between the maximum and minimum firing rates over which emission parameters can be satisfied) has been optimised to enable greater thermal efficiency.

Section 4.2.6 of 5/1(18) notes that "A good turndown ratio will enable greater thermal efficiency by better matching the heat requirement with the waste wood feed rate." There is no evidence in the application that this has been considered for the biomass plant.

Response
The PLC control system ensures stable combustion at low and high output levels. The boilers can operate down to approximately 30% of maximum design capacity. As stated previously the biomass boilers are fully automated to manage the combustion process and ensure thermal efficiency.

23. (a) Demonstrate that the use of a multi-cyclone abatement system is BAT for the removal of particulate matter (PM10, PM5 and PM2.5) from the discharges from the biomass plant stack.

Response
The Linka Biomass boilers are equipped to minimise the formation of carbon dioxide, oxides of nitrogen and particulates. As listed in Table 4.3 of PGN 1/1/(18) there are numerous techniques for reducing dust from combustion comprises:

1. Optimising combustion - maintaining good combustion techniques ensures that the amount of particulates produced can be minimised;
2. The fuel used – grade A waste wood shred / virgin timber wood chip only. The quality of the fuel is maintained to ensure compliance with the Renewable Heat Incentive (RHI) scheme administered by Ofgem who periodically audit RHI participants;
3. Abatement – multicyclone which centres on the use of centrifugal force to sperate the particulates from the carrier gas. The particulate emissions are minimised by the multi-cyclone on the exhaust from the boiler. The technical brochure for the Linka multi-cyclone is attached with this response.

The multi-cyclone can reduce particulate emissions by 90%. The particles are transported away through an airtight cell lock and ash screw drive to the ash container. The flue gas when exiting the multi-cyclone passes through the draft exhaust fan and into the stack. The fan enables a control on the efflux velocity and the stack height has been designed to provide effective dispersion. Multi-cyclone systems are efficient abatement however there are options to improve the abatement systems such as fitting bag filters if required.

(b) Explain how a visual and audible alarm triggered where failure of abatement equipment is detected is adequate to ensure prompt action can be taken to prevent the biomass plant operating without adequate abatement.

(i) Confirm the location of the visual and audible alarms.
(ii) Specify the actions to be taken and by whom on discovery of the alarm including the timescale expected to bring the plant back into control.
(iii) Demonstrate that these actions and that timescale deliver an equivalent level of environmental control to automatic shutdown of biomass boilers on detection of abatement failure.
Section 3.2.3 of application document, 3016/R/002/05 states "The plant is fitted with a filter leak monitor to assess the performance of abatement equipment…Where a failure of abatement equipment is detected, a visual and audible alarm will be triggered." Further details on this system are required to demonstrate that it is robust enough to ensure the biomass plant cannot continue to operate with failed abatement equipment.

Response
The Linka Biomass Boilers are controlled by fully automated programmable logic controller (PLC) control system.

The PLC system detects deviations from standard operating conditions and triggers a visible and audible alarm on the control panel. The boiler control system is able to indicate a low alarm condition, for small deviations

which would not have a significant impact on emissions, and a high alarm condition for large deviations which could impact significantly on emissions. Under the low alarm condition, the PLC controller will alert the Operator via telephone and on the panel but will continue operating. In the event that the low alarm persists without an Operator responding within a defined period (typically between 4 to 24 hours depending upon severity of the alarm), then the PLC controller will automatically shut down the boiler and lock-out to prevent automated restart until the error is cleared on the control panel. Under high alarm condition, the boiler will immediately shut down in a controlled manner as quickly as possible and will then lock-out to prevent automated restart. Any faults are texted to nominated site personnel which sends the specific error codes through to enable investigation. Errors are retained on the control panel until cleared. The various safety circuits and fail-safe devices continuously monitor the boiler state and provide control and safety response to any developing issues.

Training in the use of the PLC control system was conducted by the commissioning engineers from IEC Heat Solutions. Any detailed interventions required as a result of a fault will either be conducted by IEC Heat Solutions. The boilers' PLCs are password-protected with different access according to the user level, such that untrained personnel are unable to clear errors from the control panel or operate the boilers.

24. (a) Confirm that sampling points to be used for manual extractive testing are constructed and located in accordance with the Environment Agency's Technical Guidance Note (Monitoring) M1: Sampling requirements for stack monitoring or appropriate regulator's guidance (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/635269/LIT_4736.pdf).

Response
Prior to sampling, sampling ports will be constructed and located in accordance with the requirements of Environment Agency Technical Guidance Note M1 and British Standard BS-EN15259. Temporary sampling platforms will be erected to enable full and unfettered access to the sample ports by the specialist contractors appointed to undertake the compliance monitoring programme. Sampling platforms are subject to confirmatory checks by the third-party monitoring technicians to ensure they comply with the requirements specified in TGN M1.

(b) Specify the method to be used for monitoring of Volatile Organic Compounds (VOCs) from the biomass plant stacks.

Response
The method to be used for monitoring of Total VOCs from the biomass stacks is BS EN 12619, in accordance with Environment Agency web-based guidance: Monitoring stack emissions: techniques and standards for periodic monitoring, Published 18 December 2019 (formerly Technical Guidance Note (TCN) M2).

(c) Confirm that the methods, equipment and personnel used for sampling and testing emissions will be accredited to the Environment Agency's MCERTS scheme.

Response
As the stack emissions testing will be undertaken by an external third party consultant all methods, equipment and personnel used for sampling and testing emissions will be accredited to the Environment Agency's MCERTS scheme. Evidence of accreditations and sampling techniques and standards will be provided to the Operator prior to monitoring for confirmation.

25.
(a) Confirm that the biomass plant and its operations are subject to a preventative maintenance and cleaning process.
(b) Describe the procedures you will employ as part of your preventative maintenance and cleaning process.
(c) Confirm if the Environmental Risk Assessment/Accident Management Plan (provided as Appendix 10 to the Tudor Griffiths Environmental Management System) applies in full to the biomass plant. If not, submit a similar document specific to the biomass plant.

The Tudor Griffiths Environmental Management System Risk Assessment (Appendix 10 to the Environmental Management System) notes that "routine preventative maintenance and cleaning is carried out. However, this document is titled "MRF" [Material Recovery Facility]. It is not apparent that the content of that document and the comments on cleaning and maintenance pertain also to the biomass plant. You must confirm that all the

content of that Risk Assessment is applicable to the biomass plant or submit a separate Environmental Risk assessment for the biomass plant.

Response
A preventative maintenance and cleaning programme is in place in accordance with the manufacturers recommendations as required by Section 4.7 of PGN 5/1(18). The preventative maintenance and cleaning programme is undertaken to ensure that the biomass boilers run efficiently and are well maintained but also avoid damage to any parts that or more significant boiler maintenance which would incur significant costs to the Operator.

IEC heat solutions provided training on daily and preventative maintenance and cleaning at commissioning and this is also clearly noted in the Operator instructions. The Operator has a standing Maintenance and Service agreement in place with IEC and have been provided the check sheets for their staff to undertake intermediate services and cleaning.

Checklists are also provided by the manufacturer to enable all components and systems of the biomass plant to be checked and maintained. Copies of the checklists are provided with this response. A number of the components are automatically cleaned removing the requirement for manual cleaning. The automatic cleaning systems result in less boiler down time and increased time between manual cleaning programmes.

The Operator has confirmed that the boiler pipes are cleaned every 6 months, this involves letting the boiler cool down and then brushing out the soot and foreign material that has built up over time. All bearings are greased every 2-3 weeks including a visual inspection and any repairs or replacement where necessary. The boiler is accessed every 12 months to remove any ash built up and any foreign material underneath the step grates. If the step grate gets a build-up of ash underneath them unexpectedly, then the Operator may need to go inside to clean but everything is done outside the boiler first to minimise time spent inside the boiler.

An Environmental Risk Assessment for the Biomass Building is provided at Section 4 of the Permit Application Report: 3016/R/002/04. The EMS is a working document and as such will be updated to include the environmental risk assessments.

Location of Biomass Building - Methane Mitigation.
26. (a) Describe what mitigation measures have been taken to ensure there is no risk of explosion in the biomass plant building from methane build-up from the landfill cell most adjacent to the new biomass plant building.

(b) Confirm and submit evidence that the biomass plant building has been constructed in a way that prevents methane build up underneath its foundations or migration into the building.

(c) Confirm if methane alarms are present in, or in the vicinity of, the biomass building and justify their absence if they are not present.

(d) Confirm if additional methane monitoring from the landfill cells closest to the biomass plant is proposed and justify the existing level of monitoring if no additional monitoring is proposed.

Response
We do not agree that this question should be asked as part of the environmental permitting process for determination of the biomass plant application. The building was designed with full gas prevention specification membrane with taped joints included and required any incoming ducts to be sealed. This was submitted as part of the building process in accordance with building regulations.

Proximity of Biomass Building to Flare.
27. Demonstrate that the location of the biomass building in relation to the flare was assessed before construction and that it will not change the air dispersion from the on-site flare.

The biomass building has been constructed in close proximity to the flare. The application does not satisfactorily indicate if the risk of changing the air dispersion from the flare due to the proximity of the building has been assessed. This may have been carried out and submitted as part of the process for obtaining

planning permission. As there may be potential environmental risks due to changes to air dispersion, you must address this matter also in the environmental permitting process.

Response
The design of the biomass plant and the height of the stacks were determined to optimise dispersion. The landfill gas flare was installed as a stand-by flare it is only run when the generators are off. The landfill gas flare was operational for a total of 357 hours in total in 2020. In accordance with Landfill Technical Guidance Note (LFTGN 05) Monitoring of enclosed flares, monitoring is not required as the guidance states "Where an enclosed flare is used as standby equipment to back up landfill gas engines then you do not need to carry out emissions testing." Therefore, the air dispersion did not consider the impact of the flare.

Waste Generation.
28. (a) Define the expected quantity of ash waste to arise during the burning of wood;

(b) Outline how the burning of wood will be optimised to minimise the generation of waste ash.
Section 2.3.1 of application document, 3016/R/002/05, states "A small volume of wood ash is also produced as a by-product of the burning process". Although the storage, handling and disposal of this waste is discussed to minimise dust, there is no evidence that the operation will actively seek to reduce this new waste stream.

Response
Each individual boiler has its own contained ash bin, these are sealed containers and the ash in the sealed container is removed from the site. The bins have the capacity to collect 5m^3. The bins are emptied approximately every 3 weeks even if half full. The frequency is entirely dependent on when the boilers are in operation based on the drying requirements which is highly variable, and lower in summer months therefore the ash bins are emptied less frequently.

The quantity of ash produced is minimised by maintaining good combustion techniques, ensuring good quality fuel and ensuring the biomass plant is inspected and maintained regularly. The production of ash is associated with costs incurred by the Operator in the storage, handling and disposal of this waste stream therefore the Operator will ensure that the quantity of ash generated is minimised.

Dust and Emissions Management.
29. Describe the measures you will use to minimise dust generation during the process of supplying shredded wood feedstock to the biomass building walking floors by loading shovel from the feedstock preparation area.

Section 1.3.2 of application document, 3016/R/002/05, notes how feedstock shredded wood is fed to the biomass building. The shredding of wood is already permitted at Tudor Griffiths Limited, Wood Lane, but the movement of shredded wood to the biomass plant is a new operation with a potential to generate dust. Further information is required to demonstrate how dust is controlled and minimised.

Response
Feedstock is fed into the biomass building by loading shovel where the Grade A waste wood also undergoes drying on the drying floors to reduce the moisture content. The grade A waste wood is shredded every 2 to 3 weeks and then screened every week prior to transfer into the biomass building therefore transfer into the building is limited to once a week, less in summer months. Once dried the Grade A shredded wood is transferred internally to the boilers.

There is a dust suppression system fitted to the external yard with 3 wetting points. 2 wetting points produce a fine mist and one has a water cannon. These are utilised during any transfer however despite the shredded wood being covered the moisture content will ensure limited amount of dust is created from the handling of the shredded wood. The locations of these points are shown in Drawing No. TGE/09/A provided in the Management System. However as stated above all grade A shredded wood and virgin timber is dried prior to combustion.

Noise:
30.
(a) Define all expected new noise sources and their levels in dB from the biomass plant.
(b) Outline how noise from the operation of the biomass plant will be mitigated.

Section 3.3.3 of application document, 3016/R/005/02, notes that "The proposed activity may generate some noise and vibrations. This is expected to result primarily from the loading of feedstock into storage trays." Figure 1 (Process Flow Chart) notes that noise from biomass plant operations is controlled by use of Best Available Techniques (Table 2) and restriction on plant operation to working hours specified. Further information is required to demonstrate how these controls actively reduce the potential for noise impact at sensitive local receptors.
There is no reference to mitigation of noise in Table 2 (Point Source Emission Mitigation Best Available Techniques (BAT).

Response
A Noise Impact Assessment was undertaken by Vibrock Limited in November 2016 (Report Ref: R16.9144/5/JS) for the proposed biomass plant in support of planning application. A copy is provided with this response. The noise impact assessment was undertaken in accordance with British Standard BS 4142: 2014 Methods for rating and assessing industrial and commercial sound. The sound level data used to represent each proposed new noise source is presented in Table 1 of the NIA. Section 6 of the NIA provides noise control measures employed to mitigate the noises associated with the biomass plant. The Site is located in a rural area and the Operator has received no noise complaints.

Containment of fuel tank.
31. (a) Confirm if the fuel tank located outside the biomass plant is a new addition to the installation as a result of the operation of the biomass plant.
(b) Confirm if the fuel tank is located within a purpose-build concrete bund capable of containing 110% of the contents of that tank or demonstrate how this fuel is contained to prevent loss of fuel from the tank in compliance with the guidelines in CIRIA (Construction Industry Research and Information Association) C736 (*Containment systems for the prevention of pollution. Secondary, tertiary and other measures for industrial and commercial premises*)

Response
All oils and fuels are stored in accordance with the Oil Storage Regulations requiring all fuel is stored in double skinned containers, stored within a bunded area. The fuel tank comprises a double skinned container enable to contain 110% of the contents of the tank. The fuel tank was installed in 2017 and is used to fuel the generator to the biomass building.

We consider the above information sufficient to address the questions identified in the Schedule 5 notice.

Kind regards,
for and on behalf of TerraConsult Ltd

Claire Finney
Senior Consultant