MEMORANDUM

To:	Abraham Ejim	**Organisation:**	Environment Agency
cc:	Ralph Keeble	**Organisation:**	Gent Fairhead
From:	James Sturman	**Our Ref:**	S1552-0710-0116JRS
Date:	13 April 2017	**No. of Pages:**	7
Subject:	Clarifications		

Abraham,

In response to your recent request, dated 4 April 2017, find presented in Annex 1, a revised Fire Prevention Plan which addresses items 1-8. In addition, find below the response to items 10-12. In addition, we have separately submitted a revised Stack Height Justification, for completeness this is included in Annex 2.

Finally, it is understood that there was no item 9 in the request, therefore this memo (and its Annexes), addresses all of the items raised.

(10) Air quality impact assessment – stack data Rosie/James

We noticed that the temperature of the stack releases from the CHP plant and pulp plant flues have been changed from the previous application (see below):

- **The temperature of the CHP plant flues have reduced from 182.29 ºC to 138.65 ºC.**
- **The temperature of the pulp plant flue has increased from 30.54 ºC to 119.98 ºC (an increase of nearly 4 times)**

a) Please explain the reason(s) for the above changes.

In the previous EP application the FGT reagent used to abate acid gases from the flue gases from CHP Plant was sodium bicarbonate. The EP application being determined is for a system using dry hydrated lime. Hydrated lime has a optimum reaction temperature of around 135°C at the outlet of the boiler. For bicarbonate this temperature is approximately 180°C, hence the difference stated above, taking into account a net increase in temperature of the flue gases when they pass through the induced draft fan upstream of the stack.

The exhaust gases in the pulp plant flue are combined with the CHP flue gases prior to release at the stack. To prevent sub-dewpoint corrosion in the steel flues, the combined exit temperature must be at least 130°C. To achieve this, the temperature of the pulp plant exhaust air is heated to approximately 120°C.

b) How do the above changes affect the overall energy efficiency of the installation as a whole and the plume management?

The overall energy efficiency, as calculated against CHPQA guidance, is higher for the lime-based FGT system than the system with sodium bicarbonate. With the lime-based system, more energy can be recovered in the boiler before the combustion gases enter the FGT system. This results in higher steam flow to the steam turbine. Although some of this steam is extracted at low pressure to heat the pulp extraction air to 120°C, there is an overall improvement in energy efficiency for the lime-based system.

(11) Monitoring of stack emissions

It is stated in the application that the stack flues from the CHP plant, pulp plant, gas engines and biofilters will share a common windshield.

a) Please state the width of the common windshield (in metres).

The width of the common windshield is 7 metres.

b) Provide a proposed procedure for the monitoring of pollutants from the windshield in accordance with the Industrial Emissions Directive (IED) and the Environment Agency monitoring guidance M1. Your response should include the provision of monitoring platforms.

A procedure for the monitoring of pollutants from the windshield will be developed following detailed design of the IWMF. As stated in section 2.5.1.1 of the Supporting Information:

> *The flue gas sampling techniques and the sampling platform will comply with Environment Agency Technical Guidance Notes M1 and M2.*

For information, the supplier of the stack has undertaken some initial designs of the windshield including the location of the flues within the windshield and how the flues will be combined within the windshield. Presented in Annex 3 are the initial designs of the flues located within the windshield. Note this drawing also shows the location of the platforms which will be provided for emissions monitoring purposes.

(12) Incinerator bottom ash – destination and sampling protocol

The Applicant intends to transfer incinerator bottom ash (IBA) from the CHP plant to an off-site IBA reprocessing facility. The Applicant reports that if a suitable recovery facility will not accept the residue, it may be transferred for disposal in an off-site non-hazardous landfill.

a) Please explain why the disposal of IBA in an off-site non-hazardous off-site landfill is considered to be best available techniques (BAT) for the IBA produced by the CHP plant. What other options has the Applicant considered for the recovery of IBA apart from disposal in a landfill?

As stated in section 2.9.2 of the Supporting Information:

> *Gent Fairhead intends to transfer bottom ash from the CHP plant to an off-site bottom ash reprocessing facility. If a suitable recovery facility will not accept the residue, it may be transferred for disposal in an off-site non-hazardous landfill.*

Therefore, Gent Fairhead will investigate alternative recovery options for the IBA, including bottom ash reprocessing, which typically processes IBA to produce a bottom ash aggregate, which is a secondary aggregate. However, if there are no available waste management options which allow the IBA to be recovered, it may be transferred to a non-hazardous landfill.

Long-term recovery contracts will be made with specialist UK IBA processors for the continuous receipt, processing and recovery of IBA from the Rivenhall IWMF. Due to the quantity involved (new to the UK market), one of these specialists is establishing one or two new locations for IBA processing and aggregate recovery in the south-east of England. It is anticipated that these will be operational before the commissioning of the IWMF. These will be established to receive IBA from the IWMF and from other waste incineration facilities. In addition, back-up arrangements will be made with other IBA processors throughout the UK that can be used occasionally if and when the contracted facility may have short-term difficulties to receive the IBA. Hence, there will be back-up alternative licensed recovery sites available across the UK.

The option of off-site disposal at a non-hazardous landfill is intended only as an operational "last resort" to be used in the unlikely event that all other operational recovery sites are unable to receive the IBA. It would be part of an operational contingency plan to be utilised on a short-term emergency basis; not as a regular means of disposal.

b) Provide a protocol for the sampling and testing of incinerator bottom ash for the purposes of assessing its hazard status.

Bottom ash sampling and testing will be undertaken in accordance with the Environmental Services Association (ESA) ash sampling protocol and the Environment Agency guidance M4: Guidelines for Ash Sampling and Analysis. The sampling and analysis methodology will aim to provide a reliable and accurate classification of IBA in conjunction with the Environment Agency's Technical Guidance WM3 (2015): Guidance on the classification and assessment of waste (1st edition 2015) Technical Guidance WM3.

The protocol for the sampling and testing of the IBA will be developed following completion of detailed design and prior to the commencement of commissioning of the CHP Plant.

Tests will include all relevant parameters to allow assessment of relevant hazardous properties as listed in WM3. The analytical suite will include as a minimum, pH, alkali reserve and key metals (Cu, Ni, Pb and Zn). A full hazardous property assessment will be determined including, but not limited to, assessment of the following parameters.

- pH, alkali reserve which are used as a surrogate chemical test for irritancy where an in vitro test has been used to set an envelope for non-irritancy
- Composition: As, Al, Ba, Cd, Co, Cr, Cr(VI), Cu, Fe, Hg, Mn, Mo, Ni, Pb, V, Zn, Mg, Na, K, Li, total CN, TPH, dioxins and furans.
- Leachable metals and ions: such as alkalinity, Cl, Br, F, SO_4, NO_3, and free CN.
- Leachable metals and ions are required to support the technical justification for the inclusion or exclusion of specific compounds in the hazard assessment.

c) Given that there is likely to be a period of time between sampling and confirmation of the hazard status of the IBA, please explain where the IBA will be stored temporarily, the available capacity, the storage duration and contingency plans in the event the amount of IBA in storage exceeds the site's available capacity.

During the commissioning phase of the CHP Plant, the hazardous status of the IBA will be determined. As explained in response to item 12(b) above, a protocol for the sampling and analysis of ash will be developed prior to commencement of commissioning of the CHP Plant.

The initial IBA generated during commissioning, will be sampled to establish its hazardous status. It is understood that this will take approximately two weeks. During this time, if required, the IBA will be transferred to a suitably licensed waste management facility capable of receiving and storing, and if necessary processing or disposing, of hazardous waste. Assuming the IBA is subsequently confirmed that it is non-hazardous – which would be in accordance with all IBA from waste incineration plants in the UK - it will be transferred to a non-hazardous waste treatment facility for storage until the full suite of analysis can be confirmed that it is suitable for re-processing into a secondary aggregate. It is estimated that it will take an additional 6 weeks for the full suite of analysis to be undertaken. When the results of the analysis are available, and they confirm that the IBA is suitable for re-processing, the IBA will be processed at a suitably licensed waste management facility.

Following commissioning, and confirmation that the IBA is suitable for reprocessing into a secondary aggregate, the IBA will be sampled on a monthly basis, in accordance with EA guidance M4. If for during the periodic sampling it is identified that the ash is hazardous, and therefore is not suitable to be transferred as non-hazardous waste, it will be transferred to a suitably licenced waste management facility whilst investigations are undertaken to establish what has been the cause of the ash being hazardous and the non-hazardous status of the ash being re-established.

Yours sincerely
FICHTNER Consulting Engineers Limited

James Sturman
Associate Senior Consultant

Nick Claridge
Principal Consultant

Annex 1 - Revised Fire Prevention Plan

Annex 2 – Stack Height Justification

Annex 3 - Initial Stack Designs