Barry Biomass UK No.2 Ltd

Boiler Ash and APCR

Sampling Protocol

Contents

1. Introduction and Purpose

1.1. The Biomass UK No.2 Ltd (BUK) operates a permitted Co-incineration Activity regulated under the Environmental Permitting Regulations (EPR) 2016 (as amended) to control and minimise emissions and impacts to the environment. This procedure details how BUK carries out the sampling process of:

1.1.1. Bottom Ash (BA) to conform with the Environmental Permit and IED.

1.1.2. Air Pollution Control Residue (APCR) to conform with the Environmental Permit and IED.

1.2. Relevant extracts from the Industrial Emission Directive which also need to be complied with:

1.2.1 IED Article 50(1): *"Waste incineration plants shall be operated in such a way as to achieve a level of incineration such that the total organic carbon content of slag and bottom ashes is less than 3% or their loss on ignition is less than 5% of the dry weight of the material"*

1.2.2 IED Article 53(3): *"Prior to determining the routes for the disposal or recycling of the residues, appropriate tests shall be carried out to establish the physical and chemical characteristics and the polluting potential of the residues."*

1.3. The Environment Agency's M4 – Guidance for Ash Sampling and Analysis' BS EN14899 have been used to produce this procedure. As such, the following key steps have been identified which are to be followed:

- Define the Sampling Plan;
- Take the sample in accordance with the Sampling Plan; and
- Transport the sample to the laboratory.

2. Scope

2.1. The BUK facility will produce two separate streams of residues. The first being collected as part of the deslagging and soot blowing stages of the boiler and economiser together with that collected from the mechanical separation process in the multiclone.

The total residue is all mechanically and/or pneumatically conveyed to an ash silo. The second being the APCR collected from the Flue Gas Treatment process and conveyed mechanically and/or pneumatically to a dedicated silo before removal off site.

Both of these ash residue streams have separate sampling plans which are detailed in this procedure.

2.2. This Procedure applies to BUK and details how the plant carries out the sampling process of BA and APC Residue

2.3. P&IDs showing the location of the sampling points is provided in Appendix 02 & 03.

2.4. Safe working / operational procedures relating to the exact ash sampling procedures are maintained as part of the site EHS management plan.

3. Roles and Responsibilities

Reference	Role	Notes
Responsible	O&M Environment, Health & Safety Manager	
Accountable	O&M Site Manager	
Consulted	Owners Site Manager	
Informed	All Operations Staff	

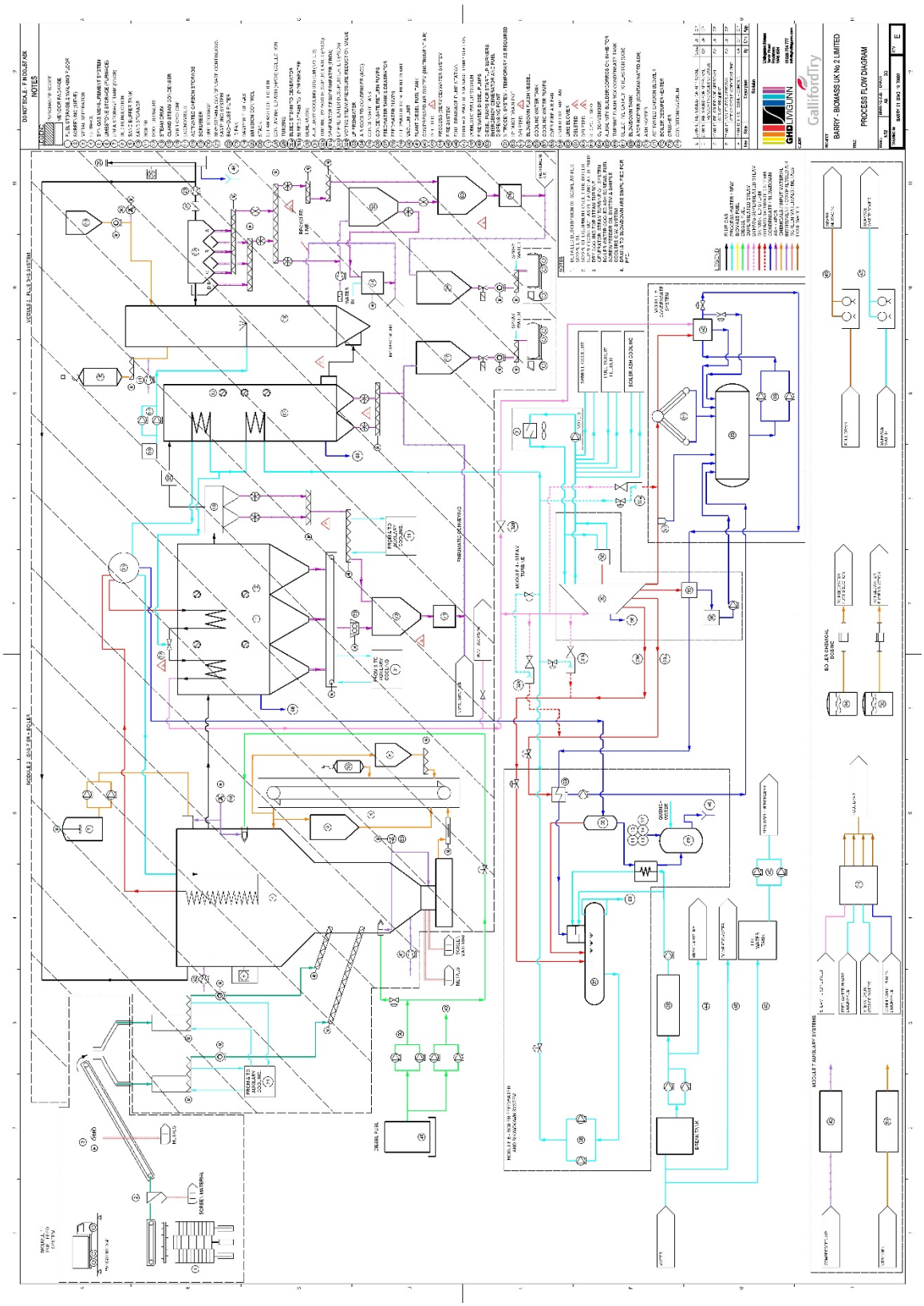
4. References

Reference	Title
Residue Sampling and Analysis	BUK Environmental Permit
Sampling and Testing protocol	Environmental Services Association
IED	Industrial Emissions Directive
Sampling of BA	Sampling of BA Method Statement
Sampling of APC	Sampling of APC Method Statement

5. Terms and Definitions

Term/Definition	Title
APCR	Air Pollution Control Residue
BA	Bottom Ash
CV	Calorific Value
EA	Environment Agency
ESA	Environmental Services Association
FGT	Flue Gas Treatment
IED	Industrial Emissions Directive
NRW	Natural Resources Wales
PAC	Powdered Activated Carbon
PPE	Personal protective equipment
TOC	Total organic carbon

6. Process Map



7. Procedure

7.1 Bottom Ash Sampling

Bottom Ash SAMPLING OBJECTIVES & TECHNICAL GOALS
OBJECTIVES: To demonstrate that the ash derived from thermal processes complies with all relevant determinants, as defined by permit. **TECHNICAL GOALS**: A representative sample of Bottom Ash to be taken twice a month. The date and time of sampling should be selected using a random approach. This will be achieved by randomly selecting 2 numbered tickets from a bag containing tickets numbered 1 to 31 representing days of the month, to identify sampling days for each month. All initial samples will be submitted to the laboratory for analysis against all 15 of the hazardous properties detailed within EA / NRW guidance WM3. Once steady operation of the plant is achieved and the Bottom Ash is demonstrated to be non-hazardous (as per WM3) all future samples will be analysed for the following analysis: H4/8 Irritancy/Corrosivity H7 Carcinogenicity H14 Ecotoxicity In addition to this, in order to comply with the NRW permit, one of the samples produced in each Calendar month will be subjected to the following analysis • TOC analysis • Soluble metal analysis • Dioxins/furans and dioxin-like PCBs • Total Soluble Fraction (before use of a new disposal or recycling route) Results to be reported at 95 % confidence interval and compared against environmental permit and IED requirements. Annually a full H1-H15 hazard assessment and full characterisation IBA, APC residues or boiler ash pH and alkali reserve will be completed.

BA SAMPLING LOCATION	
Sampling Location:	Ash Storage Silo. Barry Biomass UK No.2 Ltd Woodham Road, Barry, CF63 4JE
Source & origin of material:	Bottom Ash (BA) produced as by-product of thermal treatment of Waste Wood Biomass in a fluidised bed combustion plant.

BA GENERIC LEVEL OF TESTING REQUIRED (ref: BS EN 14899)	
Characterisation, Basic or LEVEL 1: **&** **Compliance, Periodic or LEVEL2:**	Characterisation of ash, involving extensive sampling and analysis. Sampling to show compliance of a particular determinant, involving robust sampling to give a composite sample with a lesser level of analysis.
BA SAMPLING APPROACH – PROBABILISTIC OR JUDGEMENTAL	
Sampling Approach: **Justification:**	Probabilistic Sampling Approach
Sampling Frequency:	Monthly incremental samples will be taken on two randomly selected days each month. This will provide two sub-populations (i.e two samples) which are both representative of the overall monthly population. Design of extraction equipment limits the increment sample extraction method. Bias or levels of uncertainties are unquantifiable. In the event where 6 exceedances in 24 samples, a 4-times exceedance, or 3 exceedances in a row (a '3 in a row' exceedance) of a hazard threshold is reached this would trigger a change in sampling frequency and the actions outlined in Appendix 4 of this procedure. In any such circumstances, the frequency of sampling will be increased to 'daily' until such a time that the ash is consistently within specification for 6 consecutive sampling events. The following additional concurrent measures will also be taken: • NRW will be notified as per Permit requirements • Daily Ash analysis of all incoming fuel feedstocks; • Review of Plant Operating parameters to ensure that no plant operating changes / breakdowns or maintenance have occurred which may have led to the change in ash composition.

BA MATERIAL	
Process/Activity producing material:	Bottom Ash (BA) produced as by-product of thermal treatment of Waste Wood Biomass in a fluidised bed combustion plant.
Causes of variability in the waste stream:	• Fuel content (ash and inert) • CV • Fuel Moisture level • Start-up & Shut-down conditions • Variability in thermal treatment conditions
BA ANALYTICAL LABORATORY	
Company Details:	Marchwood Scientific Services Unit 1A (2a) North Road Marchwood Industrial Park Marchwood, Southampton SO40 4BL
Contact:	Steve Cox

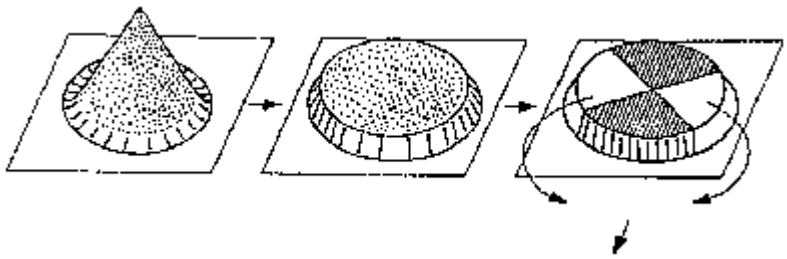
BA ANALYSIS REQUIRED (Identifying target constituents to be tested)			
DETERMINANT	**RELEVANT LEGISLATION**	**LOD (Units)**	**Monitoring Frequency**
TOC	Environmental Permit Compliance – Sampling and analysis as per NRW ash sampling protocol. IED – Article 50(1)	3%	Monthly in first year then quarterly thereafter IF cleared by EA.
Metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) and their compounds,	Environmental Permit Compliance - Sampling and Analysis as per NRW Ash Sampling Protocol.	No limit set	Monthly in first year then quarterly thereafter IF cleared by EA.
Dioxins/Furans and dioxin-like PCBs	Environmental Permit Compliance - Sampling and analysis as per NRW Ash Sampling protocol.	No limit set	Monthly in first year then quarterly thereafter IF cleared by EA.
Total soluble fraction and metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) soluble fractions	Environmental Permit Compliance - Sampling and analysis as per NRW Ash Sampling Protocol.	No limit set	BEFORE USE OF A NEW DISPOSAL OR RECYCLING ROUTE
Regular H4/H7/H14 BA hazard assessment pH and alkali reserve aqua regia digest: (eleven replicate digestions and determinations) aqua regia digest: As, Ag, Al, B, Ba, Be Ca, Cd, Co, Cr, Cr(VI), Cu, Fe, Hg, K, Li, Mn, Mg, Mo, Ni, Na, P, Pb, Sb, Si, Sn, Sr, Ti, Tl, V and Zn	ESA Protocol, Hazardous properties to be assessed as per WM3	No limit Set	24 samples per year

H1-H15 hazard assessment and full characterisation BA, APC residues or boiler ash pH and alkali reserve Aqua Regia digest: eleven replicate digestions and determinations on key metals Pb, Cu and Zn and As, Ag, Al, B, Ba, Be Ca, Cd, Co, Cr, Cr(VI), Fe, Hg, K, Li, Mn, Mg, Mo, Ni, Na, P, Sb, Si, Sn, Sr, Ti, Tl, V TOC total organic carbon), and TPH as a screen for organic compounds, PAH (17 congeners), PCB (7 congeners), phenols (speciated) and cyanide (total and free) Leachability (BS EN 12457-3) to provide information on soluble metals and anion concentrations for assessment of certain hazard properties. The water leachable component of a sample prepared to <4 mm	ESA Protocol, Hazardous properties to be assessed as per WM3	No limit Set	Annual

BA SPECIFIC MATERIAL	
Type of material:	BA (Bottom Ash)
Relevant characteristics:	Granulated Hydrogenous Free flowing Gritty-ash type product

STEPS TO BE TAKEN UNDER NORMAL RUNNING CONDITIONS:

- BA will be moved from its point of delivery to the BA storage area.
- Twice monthly a designated member of staff will sample the BA in accordance with the following method statement.
- Collect 20 x 10Kg samples of BA from the exit chute of the FBA silo, during ash collection and discharge.
- Samples of ACPR ash can be safely taken during the controlled discharge of ash into the ash tanker for disposal.
- Access to the ash silo chute can be safely achieved through the use of the access platforming provided by the silo.
- Empty the 20 samples onto a clean tarpaulin or plastic sheet.
- Transfer the BA three times making a new cone.
- Undertake sample size reduction by coning and quartering, discarding opposite quarters to produce a 10kg sample.



- Undertake sample size reduction by coning and quartering, discarding opposite quarters to produce a 50kg sample.
- Put opposite corners into a suitable container sample container, filling the container to the top and sealing the lid securely ready for labelling and sending to the laboratory for analysis.
- Transfer the remaining two quarters to a separate container and seal the lid securely and label with the same details as the laboratory sample for storage on site as a reserve sample.

Persons sampling:	All samples will be taken by a member of the OUTOTEC O&M staff, whom has been trained in ash collection procedures.
PACKAGING, PRESERVATION, STORAGE, TRANSPORTATION REQUIREMENTS	
Packaging:	Clean, unused, robust, airtight plastic containers.
Storage and Preservation:	Samples shall be packed and transported in such a way that their condition at the time of sampling is preserved. The samples will be sent to the laboratory for analysis on the same day as the samples are taken. The sample date and dispatch date must be clearly recorded on the sample transmittal and chain of custody form and the Ash Sample Register. The reserve sample should be transferred to safe storage on site where it cannot be contaminated.

Labelling:	A printed label will be stuck on to the side of the sample container clearly showing the following information: • Site Name • Purchase Order Number • Sample Reference Number • Date Taken • Label as Bottom Ash (BA) The same information should be printed on a paper label which is placed in a sealed polythene bag inside the drum with the sample. A record of the sample will be kept in the Ash Sample Register. The Ash sample register will generate the unique sample reference number detailed on the sample bottle label.
Transport:	All samples will be sent by recorded delivery to the analysing laboratory by a reputable logistics company to ensure full traceability and tracking of sample. Each sample will be sealed to ensure integrity of the container is maintained. Each sample will be sent with a complete transmittal form (see Appendix 1 for template)

7.2 APCR Sampling

APCR SAMPLING OBJECTIVES & TECHNICAL GOALS
OBJECTIVES: To demonstrate that the ash derived from incineration processes is in compliance for relevant determinants, as defined by the permit. **TECHNICAL GOALS**: A representative sample of APCR from the Silos to be taken on the first day of each month and submitted to the laboratory for the following analysis: • TOC analysis • Soluble metal analysis • Dioxins/furans and dioxin-like PCBs • Total Soluble Fraction Results to be reported at 95 % confidence interval and compared against environmental permit and IED requirements.

APCR LOCATION	
Sampling Location:	APCR Storage Silo. Barry Biomass UK No.2 Ltd Woodham Road, Barry, CF63 4JE
Source & origin of material:	FGT Residue ash produced as by-product of the thermal treatment of Waste Wood Biomass in a fluidised bed combustion plant. Material is post Acid Gas abatement, filter-bag filtration, heavy metals and DeNOx abatement technologies and is a powder-like product.

APCR GENERIC LEVEL OF TESTING REQUIRED (ref: BS EN 14899)	
Characterisation, Basic or LEVEL 1: **&** **Compliance, Periodic or LEVEL2:**	Characterisation of ash, involving extensive sampling and analysis. Sampling to show compliance of a particular determinant with a lesser level of analysis.

APCR SAMPLING APPROACH – PROBABILISTIC OR JUDGEMENTAL	
Sampling Approach: Justification:	Judgemental Sampling Approach Monthly samples can only be taken from what is in the APC Silo at a given point in time. Sub-population is as practicably representative as the monthly sub-population. Design of extraction equipment limits the increment sample extraction method. Bias or levels of uncertainties are unquantifiable. Ash samples will be removed directly from the base of the silo from the exit chute and stored.
APCR MATERIAL	
Process/Activity producing material:	APC Residue ash produced as by-product of the thermal treatment of waste wood biomass in a fluidised bed combustion plant. Material is post Acid Gas abatement, filter-bag filtration, heavy metals and DeNOx abatement technologies and is a powder-like product.
Causes of variability in the waste stream:	• Fuel content, CV & moisture levels • Lime consumption • PAC consumption • Urea consumption • Start-up & Shut-down conditions • Variability in thermal treatment conditions
APCR ANALYTICAL LABORATORY	
Company Details:	Marchwood Scientific Services Unit 1A (2a) North Road Marchwood Industrial Park Marchwood, Southampton SO40 4BL
Contact:	Steve Cox

APCR ANALYSIS REQUIRED (Identifying target constituents to be tested)			
DETERMINAND	**RELEVANT LEGISLATION**	**LOD (Units)**	**MONITORING FREQUENCY**
Metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) and their compounds,	Environmental Permit Compliance	No limit set	Monthly
Dioxins/furans and dioxin-like PCBs	Environmental Permit Compliance	No limit set	Monthly
Total soluble fraction and metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) soluble fractions	Environmental Permit Compliance	No limit set	Before use of a new disposal or recycling route
APCR SPECIFIC MATERIAL			
Type of material:	APC Residue		
Relevant characteristics:	Powder-like Free flowing		
APCR ACCESS, HEALTH & SAFETY			
Identify access problems or restrictions that may affect sampling programme:	APC residues are collected in bulk storage silos adjacent to the main APC baghouse plant. The silos are fed from enclosed conveyors and discharged via a chute at the base of the silo. Samples of ACPR ash can be safely taken during the controlled discharge of ash into the ash tanker for disposal. Access to the ash silo chute can be safely achieved through the use of the access platforming provided by the silo.		

Identify health and safety precautions:	In accordance with company Health and Safety requirements, a risk assessment and method statement must be written before any sampling of APC Residue takes place. This will include the identification of relevant PPE. Staff designated to take APCR samples must have received training in the relevant sampling procedures.
APCR SAMPLING METHODOLOGY	
Sampling Frequency:	1 off 2500ml sample to be taken once per month where an APC residue collection is made.
Place & Point of Sampling:	**Sub-Population** = APC Silo
Sub-Population, Increment & Composite sample details	**Sub-Population**
STEPS TO BE TAKEN Samples will be collected from the Ash Sampling point above the discharge to the disposal vehicle, prior to conditioning. Following safety protocol including wearing the right PPE the operator will gather a full buckets worth of APC residue from the bags. The bucket will be filled and sealed, labelled and sent to laboratory for analysis. Any spilt residue product will be cleaned up and disposed of back into the bags.	
Authorised Person Carrying Out Sampling:	Outotec O&M Plant Operator.
Replicate Sample / Sub-Sample Provision:	Method for extracting replicate samples to follow Sampling plan. It is not deemed necessary to create sub-samples for this application.

PACKAGING, PRESERVATION, STORAGE, TRANSPORTATION REQUIREMENTS	
Packaging:	Clean unused 2500ml plastic sampling container with sealable lid.
Storage & Preservation:	Samples shall be packed and transported in such a way that their condition at the time of sampling is preserved. The samples will be sent to the laboratory for analysis on the same day as the samples are taken. Where this is not possible for whatever reason, the sample date and dispatch date must be clearly recorded.
Labelling:	A printed label will be stuck on to the side of the sample container clearly showing the following information: • Site Name • Purchase Order Number • Sample Reference Number • Date Taken • Label as APC Residue A record of the sample will be kept in the Ash Sample Register. The Ash sample register will generate the unique sample reference number detailed on the sample bottle label.
Transport:	All samples will be sent by recorded delivery to the analysing laboratory by a reputable logistics company to ensure full traceability and tracking of sample. Each sample will be sealed to ensure integrity of the container is maintained. Each sample will be sent with a complete transmittal form (see Appendix 1 for template)

8. Reporting

When the samples have been processed the test report will be sent back to BUK Site management.

Both electronic and hard copies for the attention of the site EHS Manager.

The report must be scrutinised and checked for accuracy / errors and amendments made by the laboratory if required.

All relevant data can then be transferred to the applicable Natural Resources Wales format and via email sent to Natural Resources Wales in line with the specified frequency.

The reports are then filed in the appropriate register and held on file for a minimum of 5 years.

9. Records

Record	Responsibility	Location	Retention Time	Authority for Disposal

END

Chain of Custody Form

FROM: Barry Biomass UK No.2 Ltd Woodham Road, Barry, CF63 4JE	**TO:**
Order number:	**Your ref:**

THE SAMPLE IS: BOTTOM ASH ☐

APC RESIDUE ☐

1. OTHER (*as specified*):_____

ANALYSIS REQUIRED (*boxes ticked as appropriate*)

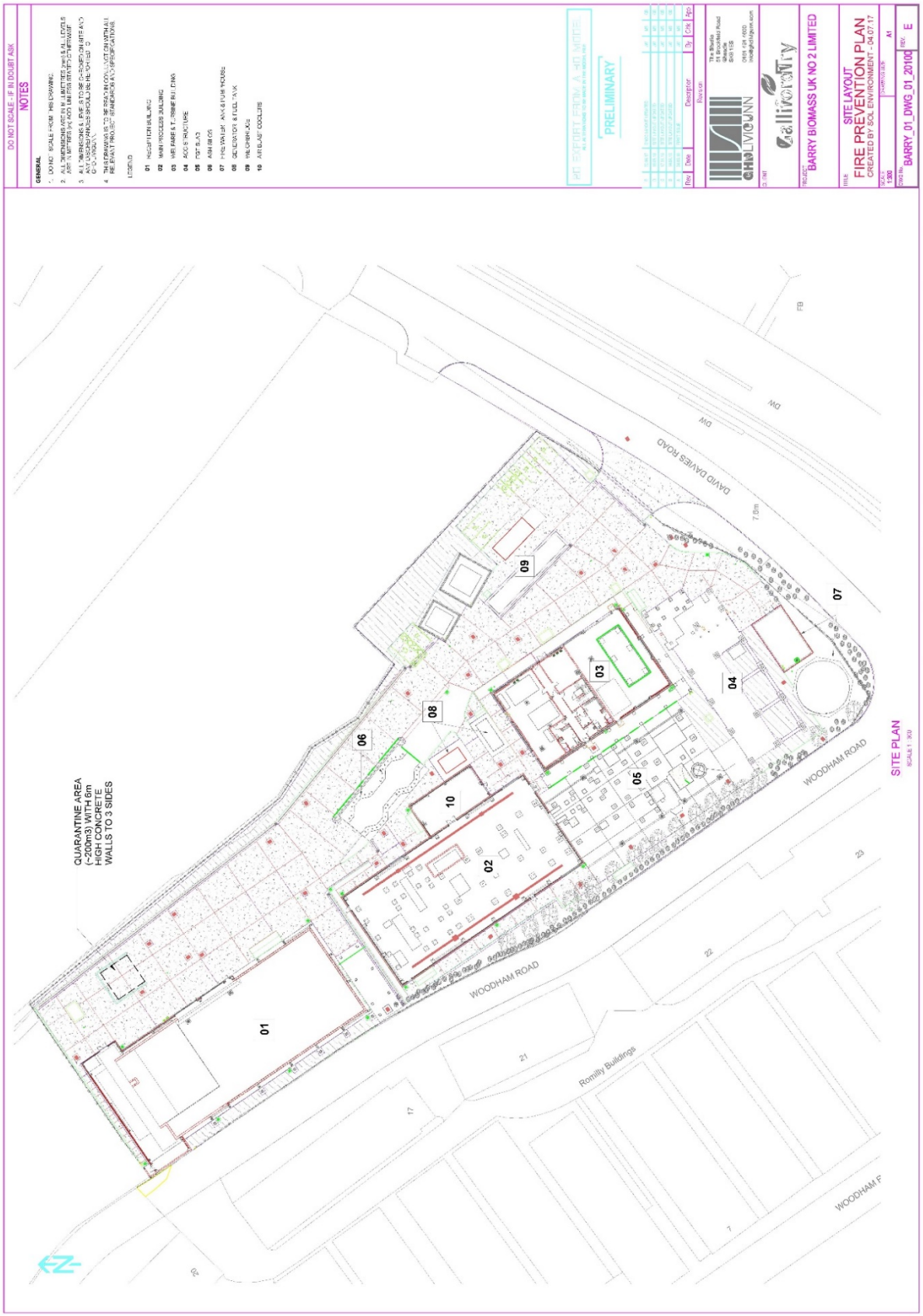
☐ Full analysis for the following: Dioxin/furan analysis of Ash by HR-GC-MS following EPA method Dioxin like PCB's by GC-MS Cd, Tl, Hg, Pb, Cr, Cu, Mn, Ni, As, Co, V, Zn analysis by ICP-MS/Cp – AES Carbon content by LOI (for Bottom Ash) or TOC (for APC Residue)

☐ Carbon content only by TOC (*for Bottom Ash only*)

☐ Other (*as specified below)*

DETAILS OF 'OTHER' TESTING REQUIREMENTS:

DATE OF SAMPLE:		SAMPLE REF No:	
DATE OF DESPATCH:		DESPATCHED BY:	
DATE RECEIVED:		RECORDED DEL No:	
RECEIVED BY:		PACKAGING DAMAGED? YES ☐ NO ☐	



Appendix 1 Barry Site Plan

Appendix 3 APCR Storage

Appendix 4: Actions to be taken in the event of an exceedance

As specified in Section 7.1 of this procedure, when any exceedance in the ash sampling parameters occurs the Operator;

(i) must inform the reprocessor and if requested NRW

(ii) undertake and document an investigation that should be made available to NRW.

Additional actions are necessary if that exceedance

- Is the 3rd exceedance in a row
- Is the 6th exceedance in the last 24 samples, or
- Is 4 x any hazardous waste threshold

Hazardous Waste Classification and the 24 hour rolling assessment period

IBA compliance is determined over a 24 sample rolling assessment period and considers the most recent sample result and the 23 previous results (and includes any samples collected during an authorised accelerated sampling programme).

Under the accepted NRW testing protocols it is permissible for five single exceedances of a relevant hazardous property concentration limit are allowed in any 24 samples. (i.e. 5 or less exceedances are permitted).

The IBA will need to be classified as hazardous waste if:

(i) Any parameter exceeds a hazardous property concentration limit by a factor of 4 (a 4 x exceedance).

(ii) 6 or more exceedances have occurred in 24 samples.

This classification will therefore apply to all ash on site and being held under control awaiting the test result and ash subsequently produced from the EfW facility until a non-hazardous waste classification can be demonstrated.

If 3 exceedances of any hazardous property concentration limit are experienced in a row, whilst this may not immediately designate a hazardous waste classification further actions are required to establish whether the problem is on-going and a change in waste classification is required.

All exceedances must be assessed in the context of the 24 sample rolling assessment regime.

Actions to be taken in the event of bottom ash being classified as hazardous

If the ash sampling indicates that the material needs to be classified as hazardous then this means that the whole batch including all materials in storage silos and awaiting testing is designated and handled as being Hazardous.

The site is required to conduct an investigation into the cause of the hazardous waste classification, identify the cause, remove it, and report to the regulator as required.

If the regulator accepts that the root cause is understood then the rapid reassessment of the IBA can be commenced.

The objective of the rapid re-assessment is to demonstrate that:

- the cause has actually been removed, and
- the IBA is now consistent and non-hazardous

The re-assessment should consist of a minimum of 2 samples per week for a minimum of 6 weeks (i.e. a minimum of 12 samples).

The hazard status of the waste should be assessed on the basis of the last 24 results (including these 12) in line with the rolling assessment programme.

Where a cause cannot be found despite an intensive investigation it is important that the accelerated testing and on-going monitoring is used to demonstrate that levels of the pollutant(s) of concern have returned to 'normal' levels, and that there are no exceedances that could indicate that the underlying cause remains.

The ash produced during this period of additional testing can either be:

- classified as hazardous waste, or
- classified as 'unknown status' whilst awaiting the results of the reassessment. In which case it would need to remain under control and not reprocessed.

It is important to note that there are three potential outputs from reassessment:

- the ash is consistently non-hazardous
- the ash is consistently hazardous, or
- the ash is inconsistent, and is not a single population under the protocol. The waste inputs contributing to this inconsistency should be removed or considered separately.

The latter is more likely where the results suggest the initial cause has not been remedied and may remain or reoccur.

Investigation when testing shows IBA to be hazardous

In the event that the sampling shows the IBA to be hazardous an investigation must be completed to identify the cause(s) behind the hazardous status.

It will be important to review historical data and statistical trend analyses to help identify the cause of the change in IBA quality.

- An investigation will be completed to find the cause of exceedances within the 24 sample programme and prevent re-occurrence.
- Establish whether the exceedance is an indicator of a wider problem. Assistance from the plant manufacturers or outside consultants should be sought to design a suitable investigation and provide independence.

The following actions should be carried out and agreed with the regulator in order to expedite the investigation and reclassification process i.e. quickly reclassifiy the material as a non-hazardous material.

i. Verification that IBA sampling plan was correctly adopted and followed i.e. was the sampling reliable?

ii. Identify whether there has been an analytical error i.e. was the analysis reliable?

iii. Review all previous test data to identify prior warning or upwards compliance/analysis trends?

iv. Review all wastes accepted in the previous month and check the relevant fuel sampling data to identify possible sources of the breach.

v. Visually examine all loads of waste coming into the facility from any target suppliers as identified in (iv) for a period of a week to try and identify any visual abnormalities.

vi. Discuss any changes in the source or content of the waste delivered at the time of the exceedance with relevant waste suppliers as identified in (iv) and request characterisation data to confirm with the waste supplier that all wastes delivered conforms to stated EWC codes.

Following the investigation and where a factor / source of the breach has been identified, quantifiable measures should be implemented to improve ash quality.

The investigation and remedial action must be recorded and available for audit by NRW.

Specific Action to be taken in the event of a four-times exceedance:

In the event of a 4-times exceedance, the following actions should be undertaken to improve ash quality.

- In the event of a 4-times exceedance the Regulator should be immediately notified;
- The third party reprocessor should also be immediately notified.

Note: If any sample produces a result that is more than 3.5 times a hazard threshold, the reserve laboratory sample or the facility reserve sample from the original sample collection process should be retested and the mean of the 22 replicates used.

In such situations, the ash waste must be kept under control until the retest result is obtained.

If the retest confirms a 4-times exceedance, the waste, from the date of the taking of that sample, should be regarded as hazardous.

Additional chemical speciation tests may be appropriate to refine the original hazard assessment calculation and identify whether the 4-times hazard threshold is still valid and whether the IBA should continue to be classed as non-hazardous.

Where a 4-times exceedance is verified then an investigation should be carried out as detailed within the section above.

Irrespective of the outcome of the investigation the facility should be permitted to move to an immediate accelerated sampling frequency to provide confidence that ash quality has returned to acceptable limits.

Investigations should be continued to find the causal factor of the exceedance.

Agreement that the IBA can be reclassified as non-hazardous should be determined with NRW as soon as possible.

Actions to be taken in the event of a 'three in a row' exceedance

If 3 exceedances of any hazard threshold are experienced in a row i.e. 3 in a row', whilst hazard status is not immediately triggered further actions are required to establish whether the problem is on-going and a change in hazard classification required.

Natural Resources Wales and reprocessor should be informed of the 3 in a row event and an investigation carried out in conjunction with an immediate programme of accelerated testing to identify causal factors.

Concurrently with the investigation 12 accelerated samples should be taken to provide further data on the characteristics of the ash within the standard 6 week timeframe.

Where a causal factor is identified and a change implemented, or additional testing indicates improved ash quality for the hazard thresholds exceeded agreement should be sought from the Regulator that the IBA can remain as non-hazardous.

If no obvious cause for the 3 in a row exceedances can be found subsequent steps should be determined through dialogue with the Regulator.