

United Kingdom Quality Ash Association

Operating Procedure for the UKQAA Responsibly Sourced Materials Scheme for power station ash products

Version 10.3 – January 2012

Foreword

This document details the requirements of the UK Quality Ash Association's responsibly sourced materials scheme. The scheme recognises those coal fired power station ash products producers who endeavour to minimise their impacts on the planet and act in a sustainable and socially responsibly manner.

1. Scope

This scheme is designed to assess the sustainability aspects of producing and supplying ash products to the construction industry. It is based on a series of Key Performance Indicators (KPIs) suggested by DEFRA and the UK Sustainable Concrete Platform Working Group, though modified as appropriate for the ash industry. These are designed to demonstrate the production and supply of coal fired power station ash products are carried out in a manner to satisfy specifiers, regulators and customers that they are responsibly sourced materials.

This scheme is only applicable to members of the United Kingdom Quality Ash Association. It is a voluntary, self assessment scheme that applies to the fly ash production and marketing facility of operating coal fired power stations. Each power station is considered to be a separate entity for the purposes of this scheme. The scheme does not extend to the parts of the power generation station or disposal site that are not directly connected with the production, processing, testing and sale of ash products. For example the scheme will not assess the whole of operation of an ash disposal site, only those aspects of it that relate to the recovery and sale of ash products to the construction industry.

2. Definitions

2.1. Fly ash or Pulverised Fuel Ash (PFA): The fine ash resulting from the combustion of pulverised coal in coal fired power stations, which may or may not include co-combustion materials, which has been extracted from the furnace gases. This material is a fine powder similar to cement or talcum powder fineness. It has been traditionally known as Pulverised Fuel Ash (PFA) in the UK.

2.2. Furnace Bottom Ash (FBA): The ash that precipitates on the inside of the boiler and subsequently falls to the bottom of the furnace. This granular material ranges in size from sand like material, through to coarse aggregate size of ~40mm.

2.3. Cradle to Site: The assessment of a material from the production facility to the construction site gate. It does include transport to the construction site from the power station, via any intermediate facility owned and controlled by the ash marketing company.

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2.4. Key Performance Indicator (KPI): A statistic to define and measure progress towards a sustainability goal. This will be collected by the power station and reported annually to the UKQAA.

3. Requirements

- 3.1. The member shall establish a responsibly sourced materials management system and be committed to continually improve its effectiveness.
- 3.2. The requirement of the scheme shall apply to all ash products being supplied from a power station.
- 3.3. The member shall have procedures in place in order to evaluate the required KPIs in an accurate manner.
- 3.4. The member shall be prepared to justify any response and/or KPI values submitted, including the supply supporting documentation to the UKQAA upon request.
- 3.5. The member may choose to implement independent auditing and accreditation of the KPIs submitted and that compliance with this scheme is being carried out. This should be reported to the UKQAA, stakeholders and interested parties.
- 3.6. The UKQAA reserves the right to audit a member's submission to the scheme for accuracy.
- 3.7. Each submission shall be based on a single power station producing ash products.

4. The Key Performance Indicators

- 4.1. Explanatory text is given in for each category/KPI to explain the derivation and how it is to be completed.
- 4.2. Each KPI is graded either numerically or alphabetically. For numeric KPIs the lower the grading the more sustainable this is considered to be. Alphabetically graded KPIs are indicative of the type of process(es) being carried out and not intended to indicate whether this is or is not more sustainable.
- 4.3. The resulting numeric KPIs are added together to obtain an overall score. Details of the calculations are given in clause 5.
- 4.4. The KPIs are divided into five categories as follows:

4.5. Category 1 - Sustainable Consumption and Production

4.5.1. Management Systems (including legal compliance)

The power station shall have systems in place to operate in a legal, efficient and financially sustainable manner with continuous improvement in the management of quality, the environment and human resources. This shall be assessed using the following KPIs:

Clause A - Environmental Management Systems: The existence of an operation Environmental Management scheme. There are four Grades as follows:

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- Grade 1 - ISO14001
- Grade 2 - BS8555 - Level 5
- Grade 3 - BS8555 - Level 4
- Grade 4 - BS8555 - <Level 4

4.5.2. Waste

The power station shall manage all waste streams effectively and aim to minimise the waste disposed of to landfill. This shall be assessed by the following KPIs:

Clause B – Waste and type of production facility: Some ash is processed to produce a saleable product, particularly for the concrete and block markets. The processes considered here are those that potentially result in a waste stream and/or consume significant amounts of energy (>5kWh per tonne). They do not include normal selection techniques, which are classified as Category A. This category defines the type production facility being used as follows:

- Category A = Selection and/or no processing of ash carried out.
- Category B = Mechanical size classification of ash when required.
- Category C = Carbon reduction equipment used when required.
- Category D = Both size classification and carbon reduction carried out.

This KPI is not considered a measure of the sustainability of the ash production process. This is because in making some ashes saleable a degree of physical processing may be carried out. For example, the coarser fractions and/or the unburned carbon fractions may be removed in order to make the ash more suitable for sensitive applications. This inevitably involves producing some potential waste streams, though many of these residues will be used for less critical applications or within the power station boundary.

The overall intent of ash processing is to produce more saleable ash, thereby reducing the overall amount of material going to landfill. Therefore, the producers have been graded into four categories, with those operating the most sophisticated equipment either by necessity or design being indicated by the code letter.

4.5.3. Emissions to air and water (excluding CO₂)

The power station shall endeavour to minimise emissions to air and water from the production process (excluding CO₂). This shall be assessed by the following KPIs:

Clause C - No. of reportable environmental incidents on a per site basis: To indicate degree of control in preventing accidental dust emissions, discharges of water, etc to the natural environment. Report the number of significant dust emissions to air and releases to ground water incidents during the year. These are split into 4 grades as follows:

- Grade 1: Zero incidents
- Grade 2: 1 or 2 incidents
- Grade 3: 3 or 4 incidents
- Grade 4: More than 4 incidents

The ash sales plant is only a small part of a coal fired power station. This KPI only relates to environmental incidents associated with the ash sales facilities, such as releases of dust from silo filter, accidental loss of ash destined for sale into water courses, etc. It should NOT include releases associated with the power station that are outside of the control of the ash producer/supply division.

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4.5.4. Stakeholder Engagement

Power station shall aim to communicate and work constructively with the supply chain and other relevant stakeholders. This shall be assessed by the following KPIs:

Clause D - Communication with other parties, e.g. power station staff, ash users, etc:

BS 8900 is Standard for stakeholder engagement and the ash producer shall be able to show there is a provision of methods for communicating with other parties affected by the production of ash products.

- A = Regular consultations with supply chain, e.g. coal buyers, power station engineers, etc.
- B = Provision of data relating to the production and sale of ash products to all parties.
- C = System for providing information to ash users, e.g. newsletters, meetings, etc.

The reported KPI is graded depending on the number of the above that are being carried out, with Grade 1 when all three are being implemented and Grade 4 when none are being implemented.

4.5.5. Quality & Performance

A power station shall market and develop materials and products that contribute to a sustainable built environment. This shall be assessed by the following KPIs:

Clause E - Compliance with products standards: The proportion of material supplied in compliance with the appropriate Approved Product Standards as required by the Quality Protocol for Bound and Grouts, for example EN450-1, EN13242, EN13055-1 or 2, EN13043, EN12620, EN197-1, Customer specification where permitted (Bound) or the Regulatory Position Statement (RPS) for Unbound applications, e.g. the Spec. for Highway Works. Choose the proportion sold to these standards. This KPI requires that compliance is demonstrated by the appropriate text being shown on delivery documentation, certificates of EC conformance made available, etc. Exclude material sold as 'waste'.

There are four grades defined:

- Grade 1 = 100% of material is sold to Approved Product standards.
- Grade 2 = >90% and <100% sold
- Grade 3 = >80% and < 90% sold
- Grade 4 = <80% sold.

Material sold as 'run of station', waste or as unspecified 'fly ash/PFA' will achieve a low grading. For example if all ash is sold as 'run of station' then this is 0% sold complying with the Quality Protocol or RPS, e.g. a grade 4 supplier.

4.6. Category 2 - Climate Change and Energy

4.6.1. Energy Efficiency

The power station shall aim to use energy more efficiently in production and transport processes. This shall be assessed by the following KPIs:

Clause F - CO₂ Emissions (Production): Electricity consumption for processing. Some ash processes require electricity to beneficiate the ash making it saleable in some markets, e.g.

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concrete and block making. So the energy usage is directly associated with trying to reduce waste to landfill, e.g. such processing is beneficial. This KPI is closely associated with Clause B, Waste KPI. There are a number of differing processes available to the ash producer ranging from selection methods through to sophisticated processing equipment.

They are graded into the average electricity consumption per tonne of ash sold and split into Grades A to D.

- Grade A – 0 to 5 kWh per tonne of ash sold
- Grade B – 5 to 10 kWh per tonne of ash sold
- Grade C – 10 to 20 kWh per tonne of ash sold
- Grade D – >20 kWh per tonne of ash sold

4.6.2. CO₂e Emissions (Transport)

Clause G: Transportation from the production facility to the construction site: This KPI reports the CO₂e emissions associated with the transportation of materials and products from the production facility to the construction site. The CO₂e associated with the production of ash is normally accepted as being part of the electricity production cycle. As power stations tend to be located away from the heavily populated areas and the larger construction markets, the resulting haulage may have a significant environmental impact and the biggest potential source of greenhouse gas emissions. This KPI uses standard calculation techniques for CO₂e emissions from transport. These are calculated in two ways, from the base data, e.g. the fuel consumption, the distance travelled (including any empty back haul) and tonnes carried or by use of default values using a dedicated Transport Calculator.

Many ash producers sub-contract their haulage and therefore it becomes commercially sensitive information as to the efficiency of the transport methods, whether back hauls are possible, etc. In such circumstances the producer within this scheme has no option but to use the default values. However, using the assumed road freight values only will result in being classified as Grade 4, the lowest. Transport by train and canal barge default values are also given, which are factored into the overall picture based on the tonnage moved in these ways.

The default values are based on DEFRA Guideline Values for CO₂e values published in October 2010. These have changed since the previous version (September 2009) in that both direct and indirect values are now being provided. The UKQAA KPI in this version uses the CO₂e classified as All Scopes – Grand Total, see Table 7e. The gradings used, 1 to 4, have been adjusted pro-rata from the previous version because of adopting the All Scopes CO₂e data. Comparison with Rigid >17t GVW as used in previous versions changed to Articulated >33t in version 10, which was felt to be a more realistic comparison with PFA operations. All values have been converted from tonne-km to tonne-mile using a conversion factor;

$$\text{miles} / 0.621371192234848 = \text{km.}$$

The values used are as follows:

For all: 3.1787 kg of CO₂e is produced per litre of diesel used. See Annex 7, Table 7a, All Scopes, DEFRA Guideline values.

Type 1: For road freight a default figure of 0.1684 kg of CO₂e/tonne-mile is used. This assumes typical fuel usage for a >33t Articulated vehicle for the default payload of 11.31 tonnes, or 45.24% of typical 25 tonnes payload, which assumes normal backhaul practices, see Annex 7, Table 7e, DEFRA Guidelines values.

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Type 2: For rail freight 0.0594 kg of CO_{2e}/ tonne-mile (All Scopes). This is based on diesel powered freight trains. See Table 7f, Annex 7, DEFRA Guidelines values.

Type 3: For canal freight use 0.0554 kg of CO₂/tonne-mile (All Scopes). This is based on the small bulk carrier rate of 0-9999 dwt at 60% loading. See Table 7g, Annex 7, DEFRA Guidelines values.

From this the overall CO_{2e} emissions are graded as follows:

- Grade 1 – <0.07 kg of CO_{2e}/tonne-mile
- Grade 2 – 0.07 to <0.10 kg of CO_{2e}/tonne-mile
- Grade 3 – 0.10 to <0.12 kg of CO_{2e}/tonne-mile
- Grade 4 – ≥0.12 kg of CO_{2e}/tonne-mile

4.6.3. Provision of Transport information and reduction in impacts

Clause G - Provide information on the environmental impacts of transportation to site of the ash to each contract. This KPI is designed to encourage ash producer and hauliers to keep records of the distances and modes of transport used in the supply of ash products. There are three records as follows:

- A = Record delivery miles by transport mode on delivery ticket.
- B = Collaborate with partners in reduction of transport impacts, by arranging return loads, etc.
- C = Use alternative fuels and methods of transport to reduce impacts wherever possible, e.g. bio diesel, canal, rail, etc.

From these the various permutations are graded as follows:

- Grade 1 – A, B & C
- Grade 2 – A and C or A and B
- Grade 3 – A only
- Grade 4 – None

4.7. Category 3 - Natural Resources and Enhancing the Environment

4.7.1. Materials Efficiency

The power station shall aim to minimise the disposal of ash products to landfill where they can be utilised within the construction industry. This shall be assessed by the following KPIs:

Clause I - Annual Utilisation of PFA (fly ash): This recognises the need to use all primary, secondary and recycled materials in the most efficient manner. This is designed to encourage the producer to market their fly ash (PFA) as much of their as possible for beneficial use within the construction market. Land reclamation has been excluded as this, though more preferable than disposal is less preferable than the product being sold for construction applications.

This is expressed as percentage of total annual production (dry weight) sold to the construction market. This KPI is split into four groups as follows:

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- Grade 1 - >80% of production sold
- Grade 2 - >50% but < 80% sold
- Grade 3 - >20% but <50% sold
- Grade 4 - <20% sold

Clause J - Annual Utilisation of FBA: This recognises the need to use all primary, secondary and recycled materials in the most efficient manner. This is designed to encourage the producer to market their FBA as much of their as possible for beneficial use within the construction market. Land reclamation has been excluded as this, though more preferable than disposal is less preferable than the product being sold for construction applications.

This is expressed as percentage of total annual production (dry weight) sold to the construction market. This KPI is split into four groups as follows:

- Grade 1 - >90% of production sold
- Grade 2 - >70% but < 90% sold
- Grade 3 - >40% but <70% sold
- Grade 4 - <40% sold#

4.7.2. Complaints

Clause K – Complaints: This KPI is designed to record the number of complaints/incidents associated with the production and supply of ash products to the construction industry. It is a measure of the producer’s customer care strategy.

Records of problems associated with the production and delivery of ash products reported by public, site staff, etc are to be kept and reported on an annual basis. It is split into four grades as follows:

- Grade 1 – No incidents p.a.
- Grade 2 – 1 to 2 incidents
- Grade 3 – 3 or 4 incidents
- Grade 4 - >4 incidents

4.8. Category 4 – Creating sustainable communities

The power station shall aim to minimise accidents by adopting health and safety management systems, by engagement with their workforce, by offering education and training and fair employment practices and liaise with the local community. This shall be assessed by the following KPIs:

4.8.1. Health and Safety

Clause L – Health and Safety Lost Time Accidents. This KPI is a measure of the H&S culture and its importance within a company. It is based on the RIDDOR lost time accidents, see <http://www.hse.gov.uk/riddor/guidance.htm>, and reported as the number of days resulting from lost time accidents expressed as the number of days lost per members of staff per annum.

There are four gradings as follows:

- Grade 1 – NIL lost days per staff
- Grade 2 - <1 lost day per staff
- Grade 3 - <3 lost days per staff

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Grade 4 - >3 lost days per staff

Clause M - Health and Safety Management Systems: This KPI is a measure of the level of interest and compliance in Occupational Health and Safety Management Systems (OHSAS) with the company. To demonstrate a competent H&S management system is in operation there are three options as follows:

- A = Compliant with OHSAS 18001
- B = RoSPA awards
- C = Annual UKAS compliance verification carried out

These are graded depending on the number of initiatives the company is involved with as in the following:

- Grade 1 - All of A, B & C compliant
- Grade 2 –Two only of A, B & C carried out
- Grade 3 –One only of A, B & C carried out
- Grade 4 – None

Clause N- Engagement with workforce. This KPI is an indication of the producer's interest in their staff and working conditions and to provide the opportunity of constructive engagement with employees. The three options are as follows;

- A = Investors in People
- B = Liaison with Trade Union or Employee Councils
- C = Regular staff meetings.

Which are graded as follows:

- Grade 1 – A, B & C
- Grade 2 – Any two of A, B & C
- Grade 3 – Any one of A, B & C
- Grade 4 – None

Clause O – Education and training: This KPI is to assess the investment in vocation training and/or professional education courses plus whether any staff training and development programmes are in place. The options are split into four groups as follows:

- Grade 1 - Training programme and professional education courses offered
- Grade 2 - Training programme only or professional education courses only
- Grade 3 - Supervised on the job training only
- Grade 4 - No formal training given

Clause P – Employment: This KPI is to assess the interaction with local communities on employment issues. There are three options as follows:

- A = Have a published equal opportunity policy
- B = Provide evidence of local recruitment initiatives
- C = Provide evidence of established links with local schools/colleges.

These are grouped as follows:

- Grade 1 - A, B & C
- Grade 2 - A & one other
- Grade 3 - A

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Grade 4 – None

Clause Q – Local Community: This KPI is to assess the planning and design of operations in a manner that provides an acceptable quality of life for the local community. It indicates the degree of liaison with the local community and the response to complaints. There are four grades as follows:

Grade 1 – Community engagement programme, a formal system of complaints, the provision of work experience positions and support for community projects including school visits.

Grade 2 - Community engagement programme and a formal system of complaints.

Grade 3 - A formal system of complaints.

Grade 4 – No community engagement or complaints system.

4.9. Category 4 – Creating sustainable communities

The power station parent company shall aim for the highest standards of corporate responsibility. This shall be assessed by the following KPI:

Clause R – Business in the community – The Corporate Responsibility Index¹: Business in the Community's CR Index is the UK's leading benchmark of responsible business. The Index assesses the extent to which corporate strategy is integrated into business practice throughout an organisation. This KPI is not restricted just to the ash producing aspects, but to the whole power station business. The index issues awards on an annual basis and these are graded as follows:

Grade 1 – Platinum Award

Grade 2 – Gold Award

Grade 3 – Silver Award

Grade 4 – Bronze Award

Grade 5 – Participant in alternative scheme

Grade 6 – None participant in any scheme

5. Analysis of the Key Performance Indicators

5.1. **Basic analysis:** The Key Performance Indicators are analysed to produce an overall percentage sustainability rating which ranges from 0% to 100%. The individual KPI gradings are not weighted in any manner. The numeric KPIs are summed to produce a total KPI grading score. The alphabetic KPIs, Clause B and Clause F that relate to the energy consumption and type of processing being carried out are excluded. This total score may range from 16 to 65.

5.2. **Overall Sustainability figure:** The overall sustainability rating is calculated using the following formula:

$$\text{Sustainability rating in \%} = \left[1 - \frac{(\text{Score} - 16)}{50} \right] \times 100$$

5.3. **Issue of certificates: Power station Name:** A certificate bearing the logo of the UKQAA shall be issued by the UKQAA to the power station listing the following information:

- The power station name
- The company name

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- The sustainability rating in %
- The production plant type

It shall also state the five categories that the assessment is based upon as follows:

- Category 1 - Sustainable Consumption and Production
- Category 2 - Climate Change and Energy
- Category 3 - Natural Resources and Enhancing the Environment
- Category 4 - Creating Sustainable Communities
- Category 5 - Overall Business Responsibility

It shall be signed and dated by the Technical Director.

6. Publication of information

- 6.1. The UKQAA shall make available on the members area of the web site, see www.ukqaa.org.uk, certificates for all UKQAA power station operators are in protected PDF format. Certificates can be obtained from the company operating the power station.
- 6.2. The reported KPIs and detailed analysis for each power station shall be confidential to the member company unless they so choose to make this information publically available.
- 6.3. The UKQAA will prepare an overall summary of the KPIs and sustainability ratings annually in order to produce a report indicating sustainability trends within the industry.

7. Targets for KPIs

- 7.1. Subsequent to the first year of reporting, which is 2008; the members of the UKQAA will analyse and set targets for future KPIs and sustainability ratings. These targets shall be included in the annual report.

8. Review of Responsibly Sourced Materials Scheme

- 8.1. The UKQAA reserves the right to modify this operating procedure as required by the members of the UKQAA.
- 8.2. Changes to requirements shall be recorded in the annual RSM report. The current Operating Procedure and the previous version will be kept available on the UKQAA web site as PDF files.

¹ See <http://www.bitc.org.uk/index.html> for full details.