

## Position Paper

# The proposal by the EPA (USA) to classify fly ash as a hazardous waste

## Background to the problem

On 22 December 2008 at 1.00 a.m. in the Tennessee Valley, USA near Harriman, Roane County, suffered the failure of a sixty foot earthen dam at the Kingston Fossil Fuel power station, containing 4,100,000 m<sup>3</sup> of saturated coal fly ash. This resulted in the slurried fly ash (known as Pulverised Fuel Ash – PFA in the UK) covering surrounding land up to a depth of 10m, seriously damaging 3 houses and with most of the material entering surrounding rivers. The site is located over flood plain that lies between the former Swan Pond Creek and Emory River.

The cause of this failure was apparently due a considerable number of factors including a lack of drainage of the wet ash and understanding the hydrogeology of the material being disposed of. There are available from the internet a number of detailed reports of the failure of this dam.

As one would imagine, when so much fine grained material enters a river the turbidity and what would normally be minor quantities of leachable elements suddenly become an major issue. In addition cenospheres, the hollow ash particles found in fly ash, caused problems as they floated down the river.

Within the UK such dam systems, more commonly known as lagoons within the UK, have gradually died out in favour of conditioned ash disposal systems. Lagoons involve the use of very large quantities of water and require significant engineering to ensure they are safe. Disposal using lagoons requires detailed study of the properties of the fly ash, local terrain, etc and is carried out in conjunction with the Environment Agency. These have to be compliant with the Pollution Prevention and Control regulations (PPC): 2000. Only when it is confirmed the proposals are safe both environmentally and hydro-geologically, will they proceed.

There remain lagoons at only four power stations in the UK and these are fully complaint with PPC requirements and with the approval of the Environment Agency/SEPA. It is standard practice to harvest PFA from lagoons, e.g.

recover the ash from the lagoon, allow it to drain and then sell it for fill and grouting applications.

Within the USA, there was no National standard set by the EPA for fly ash ponds within the USA and federal regulations varied from state to state, with little ongoing monitoring taking place. In addition there is little recovery of material for sale in the USA in comparison with the UK.

As direct result of this unfortunate accident, the Environment Protection Agency (USA) has been under increasing pressure to ensure that no re-occurrence could take place. In order to achieve this, the EPA has been under pressure to declare fly ash as a Hazardous Waste, after which they could dictate the methods of disposal, etc. However, this appears to be a knee-jerk reaction resulting from the EPAs past failure to properly regulate and standardise disposal procedures.

## The American Coal Ash Association Position

The ACCA, the equivalent to the UKQAA, states in their fact sheet "*Coal Combustion Products: Not a Hazardous Waste*";

*Coal ash has been studied extensively for decades by universities and government regulatory agencies. The U.S. Environmental Protection Agency and other government bodies have determined that it is non-hazardous.*

- *Based on all of the available information, EPA has concluded that regulation of the four large-volume fossil-fuel combustion wastes as hazardous waste under RCRA Subtitle C is unwarranted. (U.S. EPA, August 9, 1993)*
- *"In today's action, we are determining that regulation of fossil fuel combustion (FFC) wastes under Subtitle C of the Resource Conservation and Recovery Act (RCRA) is not warranted." (U.S. EPA, May 22, 2000)*
- *Mercury is strongly retained by the resulting coal combustion residues and is unlikely to be leached at levels of environmental concern. (U.S. EPA, January 2006)*

This confirms the regulators UK position on PFA and FBA, it is a non-hazardous material.

## The UK Situation

The disposal of material like PFA is controlled through the Integrated Pollution Prevention and Control regulations (IPPC). In the UK all disposal sites, including existing ones, have been reassessed and the techniques employed and engineering aspects agreed with the Environmental Agency or SEPA as appropriate. There have never been any recorded failures of lagoon containment walls within the UK during the 60+ years of operation.

Any lagoon over 500,000m<sup>3</sup> is treated as a reservoir and is subject to the design and inspection regime required by the Reservoirs Act (1975) carried out by the Environment Agency, hence any risk of failure should be anticipated during construction and inspection should prevent any subsequent failures. Some of the UK lagoons are registered under the act and some not, however, ALL are inspected and designed in accordance with the Reservoirs Act (1975).

The disposal of PFA is not inevitably negative, as significant benefits are often found. PFA disposal sites have been turned into farmland, nature reserves, industrial/business parks and even housing sites. Studies have shown such PFA sites encourage the creation of sand dune flora<sup>1</sup>, the establishment of orchid woods<sup>2&3</sup> and positive changes in vegetation and soil development, as PFA is replaced by woodland<sup>4&5</sup>. For more information see "Ashes to Assets<sup>6</sup>".

## Conclusions

The proposal within the USA to classify fly ash as a Hazardous Waste is not justified on the basis of the chemistry and morphology of the material. It would appear to be a knee-jerk reaction resulting from the catastrophic failure of an ash lagoon dam. This failure is apparently due to a lack nation-wide regulation and understanding of the hydro-geology of the material. Re-classification of fly ash as hazardous waste is likely lead to less material being recycled and more material being disposed of – which must lead to an increased risk of another failure.

In the current UK climate of regulation and control on coal fired power station fly ash (PFA) disposal sites, a similar failure of a lagoon is virtually impossible as both environmental and engineering assessments have been carried out as part of the IPPC and Landfill Directive regulations.

This position paper will be updated when required.

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It is the reader's responsibility to check the latest situation and draw their own conclusion. The UKQAA can accept no responsibility or liability for errors, omissions or misinterpretation of the issues contained within this position paper.

<sup>1</sup> Shaw, P.J.A., (1995). Establishment of sand dune flora on power station wastes. Land Contamination and Reclamation, 3 148-149.

<sup>2</sup> Shaw, P.J.A., (1994) Orchid woods and floating islands – the ecology of fly ash. British Wildlife 5, 149-157.

<sup>3</sup> Shaw, P.J.A., (1998). Morphometric analyses of mixed *Dactylorhiza* colonies (Orchidaceae) on industrial waste sites in England. Botanical Journal of the Linnean Society, 128, 385-401.

<sup>4</sup> Shaw P.J.A, (1992). Successional changes in vegetation and soil development on unamended fly ash (PFA) in southern England. Journal of Applied Ecology, 29 728-736.

<sup>5</sup> Shaw, P.J.A, (2003). Nature reserves, orchids and fly ash: the dynamics of *Dactylorhiza* colonies during ecological succession. In The Ecology of Urban Environments: Proceedings of a conference, Sheffield 6/12/2003.

<sup>6</sup> Woolley, G.R. et al, Ashes to Assets? Studies of the usefulness and environmental management of ash from coal fired power stations, CEGB, Innogy plc & Powergen UK plc under their Joint Environmental Programme.