

## CASE STUDY

# ENVIRONMENTAL BENEFITS OF PFA HIGHLIGHTED THROUGH THE CONSTRUCTION OF ECO-FRIENDLY EDUCATION CENTRE

36,000 tonnes of Pulverised Fuel Ash (PFA) from RWE npower's Aberthaw Power Station was used during the construction of their Aberthaw Centre for Energy and Environment – ACE<sup>2</sup>.



Aberthaw Centre for Energy and Environment – ACE<sup>2</sup>

RWE npower's new, £1million eco-friendly education centre at Aberthaw Power Station in South Wales is now complete. ACE<sup>2</sup> opened in January 2011 and is now an important resource for schools and community groups wishing to learn about energy and its impact on the environment.

RWE npower, owners of Aberthaw Power Station, commissioned the facility and placed an emphasis on ensuring the building includes impressive environmental credentials. Recognising this, 36,000 tonnes of PFA – a by-product of burning coal to generate electricity – was used during construction, as well as other eco-friendly building materials.

### The scheme

ACE<sup>2</sup> was designed and built by civil engineering firm Jones Bros of Ruthin, Denbighshire, working with local South Wales architects, Loyn & Co.

Building work began in April 2010, with PFA from Aberthaw used in the construction of the Centre's foundations. Approximately 18,000 tonnes was used within the sub base, raising the ground level by two metres. A further 15,000 tonnes was utilised as engineering fill material to form a contoured landscape around the building, including an outdoor classroom. The landscape is hydroseeded with grass and tree planting to compliment the building. In addition, small amounts of PFA were used in the blockwork grout to ensure a distinct dark grey colour, and a small amount of processed PFA was used to manufacture the 320m<sup>3</sup> of concrete needed for the building base.

### Why PFA?

Other recycled aggregates, such as crushed concrete, were considered for the project and some small quantities, displaced as part of a recent plant refurbishment (Flue Gas Desulphurisation) project at the station, were used.

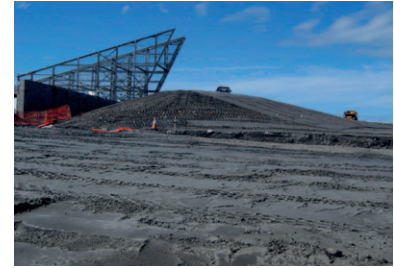
However, due to the physical properties of the PFA produced at Aberthaw, and the reduction in lorry movements by using material from the power station, this was the preferred material utilised for the construction of the Centre's foundations and subsequent landscaping.



ACE<sup>2</sup> under construction July 2010



ACE<sup>2</sup> under construction August 2010



Profiling of the PFA

Aberthaw's PFA has a compacted density of 1.35 Mg/m<sup>3</sup> to 1.40 Mg/m<sup>3</sup> compared to around 2Mg/m<sup>3</sup> for soils which reduces bearing capacity. It also has a low permeability of around 10<sup>-8</sup>m/sec, close to that of some clays, which are typically less than 10<sup>-9</sup>m/sec. This means PFA will restrict water percolation and reduce problems that can be associated with damp conditions.

The ability to hydraseed directly onto the PFA also greatly aided the landscaping process and ensured a compacted, free draining surface at minimum cost. All these benefits made the material ideal for use within the sub base and as an engineering fill material.

In addition to the technical benefits arising from the utilisation of PFA during construction, use of this material also helped to ensure that large quantities of material were

being recycled in order to build ACE<sup>2</sup>, which helped to reduce the Centre's carbon footprint.

Once erected, the building was insulated with material manufactured from recycled glass bottles. ACE<sup>2</sup> is heated via energy saving air heat pumps mounted in a spectacular 15m high fin and cooled by ducts on the roof designed to catch the wind. Rain water is captured for recycled applications such as the flushing of toilets.

The construction of ACE<sup>2</sup> allowed Aberthaw Power Station to test their production control procedures, which were developed for the supply of ash to similar applications, prior to the full implementation of the WRAP Waste Quality Protocol for PFA.

Throughout the construction of ACE<sup>2</sup>, the power station liaised

closely with both Generation Aggregates and the Environment Agency ensuring full compliance with environmental legislation.

**Phil Allen**, Station Manager, Aberthaw Power Station commented: *"We have wanted to provide this facility for the local community for a long time and from an environmental perspective, to know it has been built by recycling large quantities of quality, recycled ash from a power station literally on its doorstep makes the entire project even more rewarding."*

RWE Power International supplies PFA from RWE npower's power stations at Didcot, Tilbury and Aberthaw, to major construction projects throughout the UK as well as utilising its PFA for its own environmentally friendly building projects wherever possible.

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