

## CASE STUDY

# RWE'S PULVERISED FUEL ASH (PFA) REDUCES CO<sub>2</sub> EMISSIONS IN THE CREATION OF THE RYDER CUP TWENTY TEN GOLF COURSE

Set in 1,400 acres of panoramic parkland to the east of Newport, the Celtic Manor resort now features three golf courses, two hotels, health clubs, a spa, world class club houses and restaurants.

The Resort's Twenty Ten course, which opened in July 2007, is the first golf course in history designed specifically for hosting the Ryder Cup, which will be held at Celtic Manor in 2010.

In order to host the world's third most watched sporting event and accommodate Europe and America's top golfers, plus the expected influx of media and thousands of international visitors, significant improvements to the course were needed, including a new television compound, driving range and practice area.

### PFA as fill

In order for these new facilities to be constructed, it was necessary to raise areas of the Twenty Ten course, with PFA identified as a suitable fill material to achieve this.

The project required the supply of over 150,000 tonnes of PFA from RWE's Aberthaw Power Station in South Wales, a task that was coordinated by RWE Power International.

The PFA was all supplied as conditioned ash in sheeted tipping vehicles. Conditioned ash is taken directly from the silos at the power station and mixed with water. This assists with the delivery and subsequent compaction on site.

After tipping, it was levelled out on site using a Komatsu 65PS dozer, then compacted to a 150mm thickness using a Bomag vibrating roller.

PFA was used to raise and level off the ground, before construction of the new facilities could commence. Conditioned PFA has a low density so was useful in this application as a fill material over weak ground. Although the site was designed to be level and conditioned PFA has low permeability, assisting water runoff, a slight fall was needed to provide proper drainage. A textile capillary break was used to prevent saturation of the ash from sub-surface water, which was then covered in top soil to the final levels. To ensure unbound PFA was not left exposed, topsoil to a minimum level of 300mm was used to cover the material.

GD Environmental, the contractors responsible for carrying out the works at Celtic Manor, found PFA to be an easy material to place and compact, using readily available equipment.

In fact, the initial stage of development, involving 100,000 tonnes of PFA, proved so successful that an additional 50,000 tonnes was requested to complete the work. The supply of ash by RWE Power International to Celtic Manor for use as



a fill material was completed in the fourth quarter of 2008.

The use of PFA helped to lessen the environmental impact of the project. This was achieved through the a reduction of CO<sub>2</sub> emissions; the weight of primary aggregates would have been approximately 2 tonnes per cubic metre compared to 1.5 tonnes per cubic metre of PFA, resulting in less vehicle movements to transport the ash. RWE Power International's PFA is readily available, avoiding the need to excavate virgin raw materials.

James Norvill of GD Environmental said, *"This has been a great project to be involved in and it has been extremely successful. Ash is the perfect product for the job, both from an environmental and construction perspective"*.



### RWE Power International

Generation Aggregates  
Electron  
Windmill Hill Business Park  
Whitehill Way, Swindon  
Wiltshire SN5 6PB  
United Kingdom

T +44 (0)800 731 2865  
F +44 (0)1793 892421  
E [generation.aggregates@rwenpower.com](mailto:generation.aggregates@rwenpower.com)  
I [www.generationaggregates.com](http://www.generationaggregates.com)

### Registered office:

RWE Npower plc  
Windmill Hill Business Park  
Whitehill Way, Swindon  
Wiltshire SN5 6PB

Registered in England and Wales no. 3892782