

Bentofix® - Musselburgh Ash Lagoons - UK

Capping and sealing ash lagoons

- **Project Name**
Musselburgh Ash Lagoons, UK
- **Date**
October 2022
- **Client**
Scottish Power
- **Designer/Consultant**
MHB Consultants Ltd
- **Contractor/Installer**
IH Brown Ltd
- **Product**
Bentofix® NSP 4300





The ash lagoons at Levenhall Links, on the outskirts of Musselburgh, in Scotland, were constructed in the 1960s on land which had been reclaimed from the Forth estuary. Created to accommodate spoil from Scottish Power's coal-fired Cockenzie Power Station, which ceased operation in 2013, waste fly ash was mixed with water to form a slurry and then transported from the plant, through a network of pipes, to be deposited in the lagoons.

Challenge

However, during periods of dry and windy weather, local villages were being affected by ash blowing off the site. Although some lagoons were flooded to reduce the impact, this was never intended to be a long-term solution. Much of the 120-hectare lagoon area has already been reclaimed and grassed, and Scottish Power's planning application to cap the two remaining ash lagoons at Levenhall Links received approval from East Lothian Council. Once capping works are completed, the former industrial waste site will form part of the Firth of Forth Special Protection Area – a Ramsar Site and a Site of Special Scientific Interest for its value to wading birds.

Solution

Capping the lagoons first required them to be drained, followed by removal of slurry pipes and other infrastructure, and then reprofiling. Finally, a capping material was required to effectively seal the ash lagoons; preventing any future contamination of the wildlife and water areas that would be built on the site. A Geosynthetic Clay Liner (GCL) solution was proposed and, following laboratory testing carried out by BTG (formerly British Textile Technology Group), which confirmed that a product from Naue's range of Bentofix® GCLs would deliver the characteristic Bentonite Swell Index properties demanded by MHB Consultants, Naue's Bentofix® NSP 4300 GCL was selected. Bentofix® GCLs are manufactured as a needle-punched, reinforced composite; comprising a core layer of high-swelling sodium bentonite powder encapsulated between two durable, geotextile outer layers.

The composite geotextile is needle-punched with over 2 million fibres per square metre, and this unique construction creates a uniform, multi-directional, shear-resistant hydraulic barrier with self-sealing and re-healing characteristics. The bentonite layer swells to create a low permeability barrier which exhibits a hydraulic performance equal to, or better than, a thick layer of compacted clay and, in addition, a 50cm wide overlap area along the liner's longitudinal edges is impregnated with bentonite powder to ensure an immediate seal once hydrated.

Bentofix® is extremely robust and, although just 6mm in thickness, has a very high resistance to puncture; making it ideally-suited for the task at Musselburgh, where any accidental damage during the installation would self-heal. Bentofix® is also quick, easy and cost-effective to install – the GCL is simply rolled out in place, with the aid of a spreader bar attachment, and then trimmed to length with standard cutting tools.

For the project at Musselburgh, civil engineers, I&H Brown, installed a total of 260 rolls of Bentofix®, each 5m wide and measuring 50m in length, to cover approximately 60,000 square metres of ash lagoon.