



**The National Coal Mining Museum for England has been receiving visitors for over 25 years. As with most coal mines, there is a constant build up of water in the underground workings that makes its way to the old mineshafts. This water needs to be pumped out and treated before it is discharged into the local watercourse. ECS Engineering Services has been responsible for maintaining the pumps and the treatment works for the past 18 years.**

The museum is based at the site of Caphouse Colliery in Overton, West Yorkshire after the colliery was closed. In 1995, it gained national status and ECS were appointed to maintain the water pumping equipment and the treatment works. The contract has seen a permanent presence of ECS engineers, who are responsible for preventing the museum from filling up with ground water and ensuring that the treated water meets the standards set by the Environment Agency (EA).

# Maintenance Services for NCMEM

# Case Study: 012

## Maintenance Services for NCMM



The on-going contract with the National Coal Mining Museum starts with two 3.3KV, 260 KW pumps located in the Hope shaft, some 140m below the surface. These pumps are used to keep the water level within the required limits and pump out the excess to the water treatment plant. The water passes over a cascade to increase oxygen levels and into a settling lagoon, which is the starting point in the process to remove the majority of the solids, mainly iron ochre. From the lagoon the water transfers to a balancing tank, which is designed as a storage point to ensure that the flow rate into the settlement tanks is optimised.

After passing through the settlement tanks, the water passes into reed beds, which remove the majority of any remaining ochre before it is discharged into the nearby stream. Water quality readings are taken at the discharge point to ensure compliance with the consent levels set by the EA. In this case, readings for both suspended solids and pH are required. The raw water from the mine contains 30-40ppm of iron ochre but after treatment, the final discharge is 3ppm or below.

Neil Ardron, Project Engineer at ECS comments: "We use remote level monitoring equipment at four boreholes to give us an 'early-warning' of the amount of water that could flow to the National Mining Museum and would need to be pumped from Hope shaft. This information is combined with monthly readings from an additional 14 satellite stations to give a complete picture of the groundwater levels in the area."

ECS has a permanent presence on site and works closely with both the museum and the Coal Authority to collate all of the data and to maintain all of the equipment involved in the mine water treatment process as well as investigate new treatment methods that can be used in other locations across the UK and Europe.

Due to the essential nature of the pumping station, the operational status of the pumps is constantly monitored. In the event of a pump failing to operate, an alarm signal is sent via the telemetry system to the ECS engineers responsible for the site maintenance. The alarm initiates an immediate site visit to determine the cause of the alarm and to confirm that the standby pump is online; ensuring that the safe working levels are maintained within the mine.

The maintenance aspect of the contract aims to ensure continued efficient operation of the pumping and treatment equipment. The main issue to be addressed is the continuous build-up of ochre deposits which restrict pipes, block the cascade and fill up the settlement lagoons. The pumps themselves are removed for maintenance on a rotational basis about every 18 months, but this is no small operation.

The Hope shaft in which the pumps are located is within the Museum area, with the head works still in place above the mineshaft. In order to remove a pump, the head works must be lifted off the building to allow the discharge pipework



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and pump to be lifted out of the shaft. Once the replacement pump has been installed, the head works have to be replaced to maintain the appearance of what is a historic building.

The pipework which transfers the water to the cascade is prone to ochre build-up and is continuously monitored for flow rate. Without intervention, this restriction can cause increased load on the pumps, so as soon as the flow rate drops to a defined limit, the pipes are cleaned to ensure continued reliable service from the pumps. This ochre build-up also affects the cascade which needs to be cleaned every week; otherwise the water will not be oxygenated properly.

This ongoing contract is carefully managed by ECS to ensure that the public can continue to visit the National Coal Mining Museum, safe in the knowledge that a trip down the mine will not involve getting their feet wet.



Engineering Services ■■

Water Control ■■ Site Services ■■  
Environmental ■■ Fabrications ■■

