



CASE STUDY

Turnkey upgrade of electrostatic precipitators on Puertollano Power Plant, Spain

The situation

Puertollano Power Plant, owned by E.On España, is located in the town of Puertollano in Spain, 258km south of Madrid. The plant has one 220 MW boiler which has been operational since 1972 and is fuelled by bituminous coal.

In order to significantly reduce emissions to comply with EU legislation, E.On España made a decision to upgrade the Electrostatic Precipitators (ESP's) which would include replacement of the existing CECA ESP's and refurbishment of the existing fifth field of the FLS ESP's. The aim of the project was to reduce emission levels that were typically greater than 200 mg/m³ to below 50 mg/m³.

Clyde Bergemann competitors offered the solution to dismantle the two existing CECA ESP's and rebuild two new ESP's in the same location which would result in a shutdown of 100 days or greater. Clyde Bergemann offered a parallel ESP solution, incorporating the dismantling of the two existing CECA ESP's and in their place installing new ductwork linking the air heater outlet to the existing FLS ESP's. The proposal also included populating the final spare fields of the FLS ESP's with new internal components. This would result in a shutdown of only 50 days which gave Clyde Bergemann the leading edge.

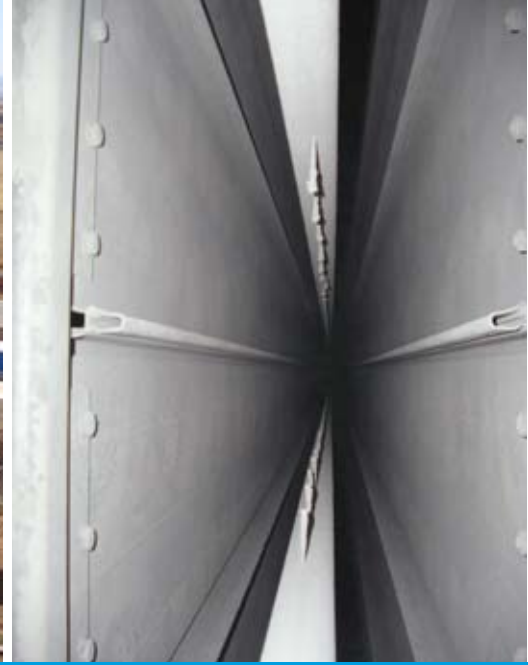
Our solution

The key to the solution provided was to enhance the performance of the existing FLS ESP's. This was achieved by the new ESP taking a portion of the gas volume and therefore reducing the gas volume entering the FLS ESP units. The resulting FLS gas flow velocity was significantly reduced therefore increased treatment time.

Clyde Bergemann offered a full turnkey solution including demolition of the existing CECA ESP's, installation of ESP components to the existing spare final field of the FLS ESP's, ducting from the airheater outlet (replacing the CECA ESP's) and the addition of a new parallel Clyde Bergemann ESP. Additionally, new transformer rectifiers and controls, inlet and outlet ducting, ash handling system, access walkways and insulation and sheeting were all included.

The solution took a total of 17 months to complete and involved only 50 days of shutdown period which was half the time of that proposed by the competitors.





Increasing plant availability with a parallel ESP

The results

The terms of contract initially required Clyde Bergemann technology to reduce emissions to under 50mg/Nm³ for five different fuel blends. Due to various reasons, the number of fuel blends was reduced to two. The results of the preliminary testing carried out in December 2009 and March 2010 were as follows:

Particulates emissions measured for dry gas at 0°C, 101.3 kPa @ 6% O₂ were:

220MW firing blend of 50% local coal and 50% Ukrainian:

- Test 1 outlet duct 42.2 mg/m³
- Test 2 outlet duct 46.0 mg/m³

110MW firing 100% Ukrainian coal:

- Test 3 outlet duct 23.0 mg/m³

220MW firing 100% Ukrainian coal:

- Test 4 outlet duct 40.4 mg/m³
- Test 5 outlet duct 42.3 mg/m³
- Test 6 outlet duct 48.9 mg/m³
- Test 7 outlet duct 49.3 mg/m³

Further testing will be carried out to monitor emission levels as a result of the ESP upgrade.

Benefits

- Shutdown of only 50 days compared to competitors 100 days therefore increased plant availability
- Preliminary testing showed reduced emission levels from 200 mg/m³ to below 50 mg/m³
- Lower cost solution in comparison to competitor solutions offered
- Low maintenance design of Clyde Bergemann ESP



Clyde Bergemann reference list for replacement ESP on coal-fired power plant (extract)

Country	Installation	Boiler (MW)
USA	Mid-Atlantic Utility	2 x 405
USA	Southeastern Utility	157
USA	Mid-South Utility	750
USA	Southeastern Utility	420



Clyde Bergemann Materials Handling Ltd (APC Division)

Lakeside Boulevard, Lakeside
Doncaster, DN4 5PL
England UK

T: +44 1302 552200
F: +44 1302 369055

Website: www.cbmh.co.uk
eMail: powersales@cbmh.co.uk