

Case Study 3 – Renewable Energy from Biofuels

Client: EPR Scotland Limited

Project: Poultry Litter Biomass Used as Fuel to Generate Electricity

Project Outline:

EPR Scotland Limited (EPR) operates a 10 MW power station located at Westfield, in Fife, for which Renewable Energy Consultants provided EPR with technical consultancy during the original design and build stage of the plant. The power station is fuelled by poultry litter that consists of poultry waste mixed with straw or woodchips. This type of material can be spread on land as a fertiliser but this presents a potential pollution risk. The use of a power station to burn the litter overcomes this potential environmental risk and the residual ash can be used as a fertiliser. Furthermore, the heat generated is recovered to raise superheated steam, which drives a turbo-alternator to generate electricity to supply the station loads and export power to the local grid. The Power Station burns the poultry litter in a fluidised bed boiler to supply steam to a turbine generator. The plant is designed to burn 14 t/y (approximately 110,000 t/y) of chicken litter, which has about one third of the net heating value of power station coal. Exhaust gases are passed through abatement plant to reduce emissions prior to discharge to atmosphere through the power station chimney.

Renewable Energy Consultants Role

To satisfy the latest regulatory requirements, EPR needed to obtain a PPC Permit from the Scottish Environment Agency and was also required to demonstrate that the installation satisfied the conditions of the Waste Incineration Directive (WID).

To facilitate these actions, Renewable Energy Consultants prepared the following documents and studies:

- Application for a PPC Permit
- Demonstration of compliance with WID
- Dispersion modelling of emissions
- Site report

Renewable Energy Consultants worked with EPR to prepare the Technical Information Document to support EPR's application for a PPC Permit. This entailed providing a demonstration that the plant uses the best available techniques (BAT), in respect of techniques, such as:

- Process selection
- Combustion and energy recovery
- Emission abatement & monitoring
- Waste handling and recovery

In support of the application for the PPC Permit and to demonstrate compliance with the Waste Incineration Directive, EPR also commissioned Renewable Energy Consultants to model the atmospheric dispersion of emissions from its power station chimney and to assess the potential impact risks. The effects of these emissions upon air quality were predicted by Renewable Energy Consultants using the US EPA Aermid software. The Aermid model is recognised by UK regulatory authorities to incorporate the latest understanding of the atmospheric boundary layer. The model took account of local terrain

and any downwash caused by buildings located on the EPR site. Hourly sequential historical meteorological data was used in the modelling.

Renewable Energy Consultants also prepared a Site Report to provide a ground condition 'baseline' for future comparison, particularly in the event of the PPC Permit being surrendered. It also identified possible future actions to strengthen understanding and mitigate potential environmental risks.