EIA Quality Mark Case Study

Wytch Farm Power Generation Project

Key Issues:

This case study demonstrates the importance of understanding the context of a proposed development and integrating mitigation measures into scheme design from the outset.

The Proposed Development is located within the existing South Site Gathering Station at Wytch Farm oilfield, Dorset.

The Gathering Station is located within the Dorset Area of Outstanding Natural Beauty (AONB) and Purbeck Heritage Coast. There are also a number of European and nationally designated nature conservation sites in the area around the Gathering Station, including Special Areas of Conservation, Special Protection Areas, Ramsar sites and Sites of Special Scientific Interest. The sites are mostly designated for their important heathland habitats and species or those associated with Poole Harbour.

The key issues with this project therefore centred around potential landscape and visual impacts and impacts on European and nationally designed sites due to emissions of nitrogen oxides and ammonia; nutrient nitrogen deposition; and acid deposition.

Purpose of the project:

The Proposed Development is required in order to generate more electricity on-site. This would reduce the significant ongoing costs associated with importing electricity and have additional benefits in terms of greater energy efficiency and self-sufficiency.

The existing Gas Turbines are approximately 30% efficient and do not represent best practice for onsite power generation. The Gas Turbines are also aging and becoming less reliable.

Description of the project:

Perenco (UK) Ltd propose to decommission the existing Gas Turbines and Waste Heat Recovery Unit and replace them with a new more efficient 24-megawatt Gas Engine Power Generation Plant comprising two Gas Engines and two Waste Heat Recovery Units (WHRU).

The Gas Engines would be housed in a building. Two 15.2m exhaust stacks, with incorporated WHRUs, would be external to the building. A radiator cooling fan array would be located on the roof of the building, surrounded by a louvered screen.

Associated infrastructure includes a new grid gas connection; an extension to an existing pipe-rack carrying pipes and cabling; and high-voltage cabling buried within the ground to connect to the existing high-voltage sub-station.
Lessons learnt:
Nicholas Pearson Associates has worked at Wytch Farm since the 1980s. The project team was able to draw on over 30 years’ experience of the issues that would need to be addressed from the outset in order to progress a project of this kind in such a sensitive context.

Before identifying the preferred solution, there was detailed consideration of alternatives. This included consideration of:

- management options;
- alternative locations (inside and outside the AONB);
- alternative approaches;
- alternative technologies;
- alternative designs.

The decision regarding the preferred solution was informed by consideration of environmental effects, economic viability, plant availability, efficiency and experience of operating the plant.

Design parameters were established to ensure that noise impacts and landscape and visual impacts were minimised. These were based on existing operational experience and allowed these issues to be scoped out of the ES.

Whilst in other locations the stacks for a similar scheme might be 25-30m tall, here it was quickly established that their height had to be restricted to nearer 15m in order to minimise visual impacts. This then required alternative solutions to be considered in order to minimise air quality impacts. The reduced stack height limited dispersion.

Lessons learnt continued:
Understanding the interaction between air quality and ecological impacts required detailed, iterative assessment and design. This focussed on emissions of nitrogen oxides and ammonia; nutrient nitrogen deposition; and acid deposition. This required close liaison between the client, engineering team, EIA coordinator, ecologist and air quality consultant in order to identify potential impacts, refine the design and incorporate mitigation measures. Consultation with Dorset County Council and Natural England was also undertaken.

Fitting selective catalytic reduction technology (SCR) to the Gas Engines is proposed. This is required to enhance the emissions performance of the Gas Engines to beyond that required by compliance with the Industrial Emissions Directive in order to minimise potential effects on designated sites. SCR technology can, however, result in ammonia emissions which can also cause impacts within the designated sites. Limits, therefore, had to be established for both NOx and ammonia.

Measures to limit the emission of nitrogen oxides and ammonia are integral to the design of the development and will minimise the potential impacts on the European and nationally designated sites.

The mitigation measures will be incorporated into the contract with the preferred supplier and the plant will be managed and maintained during operations to ensure ongoing compliance.

Contact details
Alison Carroll, Associate
Nicholas Pearson Associates, The Farm House, Church Farm Business Park, Corston, Bath. BA2 9AP.
Email: info@npaconsult.co.uk, Tel: 01225 876990

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