Recovery of Carbon Dioxide from Flue Gases

Design Study

Customer: Department of Trade and Industry (DTI)

Services Provided

- Design study

Benefits to Customer

- A report identifying the technical suitability and costs of carbon capture with potential revenues from increased oil
- Understanding of the key technology developments required to initiate carbon capture and storage via EOR
- An initial strategy for UK development and exploitation of the appropriate technologies - oxygen combustion, CO2 capture, CO2 transport and injection based on a business case assessment.

Background

Large coal-fired power stations are a major source of carbon dioxide. Methods to capture this carbon dioxide as a precursor to transporting and storing it are of great interest. If the carbon dioxide can be captured and used for enhanced oil recovery (EOR) by injecting it into mature oil fields the increased oil revenues may justify the investment cost associated with carbon transportation and injection.

This design study considered the revamping of a major coastal UK coal-fired power station. To simplify carbon capture and reduce the cost of recovery, oxygen based combustion was considered.

Project Description

- Review the available technology (and status) for production of carbon dioxide by oxygen based combustion, followed by CO2 recovery.
- Calculate production costs for carbon dioxide (with and without concurrent nitrogen production from air separation) for a variety of scenarios and hence establish the sensitivity of production costs to parameters such as power station capacity, utilisation rate, CO2 pipeline length, etc.
- Obtain from North Sea oilfield operators their projected demand for carbon dioxide for EOR, and the price they would pay for it.
- Establish in broad terms the likely demand for carbon dioxide and nitrogen in the North Sea and elsewhere, to establish market potential.
- From the above, establish the overall opportunity for plants of this type, and highlight the technology development work required to undertake a project with confidence.