POLLUTION ASPECTS

(573) - FEED STUDY FOR THE DESIGN OF A 50000TPA PRODUCTION PLANT TO PRODUCE LIME WITH ZERO CO2 EMISSIONS TO ATMOSPHERE.

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Draft Paper

The Origen Power process for the production of high purity lime and CO_2 uses an oxy-fuel fired flash calciner with flue gas recycle. Natural gas is used to provide the heat to power the calciner, breaking down calcitic minerals (calcium carbonate bearing rock - typically limestone or chalk) into lime (calcium oxide) and carbon dioxide. The system is configured in such a way that all the carbon dioxide generated from both the combustion of the natural gas and the calcination of calcite is produced as pure CO_2 at a purity suitable for sequestration. The ultimate objective of this work is to use the lime produced for the capture of atmospheric CO_2 (CCS), creating a carbon negative lime cycle, and an economically viable technology for the future objective of atmospheric restoration.

The paper presents the results of a FEED study for the construction of a 50000 TPA lime/CO_2 production unit funded by the UK government CCUD programme. The paper will include:-

- process flowsheets
- mass and energy balances
- results from the design of system components using a range of modelling techniques including:-
- CFD
- zoned heat transfer simulations
- condensing heat exchanger simulation
- analysis of CO_2 gas compression designs
- analysis of oxygen generation options
- results of an analysis of the carbon footprint for construction

Origen is currently building a 3000TPA demonstration pilot plant at a leading UK lime producer's works (Singleton Birch Ltd), which is due to be commissioned at the start of 2022, and any preliminary results from this unit will be included in the final presentation.

Palavras-chave : Atmospheric CO2 capture, Production plant, Zero Carbon Lime