Military Technical College
Kobry Elkobbah, Cairo,
Egypt.

4th International Conference On Chemical & Environmental Engineering
27-29 May 2008

CARBON DIOXIDE CAPTURE & STORAGE (CCS) AND ITS CONTRIBUTION TO CLIMATE CHANGE MITIGATION

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ABSTRACT

Carbon dioxide (CO_2) capture and storage (*CCS*) is a process consisting of the separation of CO_2 from industrial and energy-related sources, transport to a storage location and long-term isolation from the atmosphere. Capture of CO_2 can be applied to large point sources. The CO_2 would then be compressed and transported for storage in geological formations, in the ocean, in mineral carbonates2, or for use in industrial processes. The net reduction of emissions to the atmosphere through *CCS* depends on the fraction of CO_2 captured, the increased CO_2 production resulting from loss in overall efficiency of power plants or industrial processes due to the additional energy required for capture, transport and storage, any leakage from transport and the fraction of CO_2 retained in storage over the long term. There are different types of CO_2 capture systems: post combustion pre-combustion and oxyfuel combustion. The concentration of CO_2 in the gas stream, the pressure of the gas stream and the fuel type (solid or gas) are important factors in selecting the capture system. Storage of CO_2 in deep, onshore or offshore geological formations uses many of the same technologies that have been developed by the oil and gas industry and has been proven to be economically feasible under specific conditions for oil and gas fields and saline formations. The reaction of CO_2 with metal oxides, which are abundant in silicate minerals and available in small quantities in waste streams, produces stable carbonates. With appropriate site selection based on available subsurface information, a monitoring program to detect problems, a regulatory system and the appropriate use of remediation methods to stop or control CO_2 releases if they arise, the local health, safety and environment risks of geological storage would be comparable to the risks of current activities such as natural gas storage and deep underground disposal of acid gas. Environmental impacts of large-scale mineral carbonation would be a consequence of the required mining and disposal of resulting products that have no practical use.

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