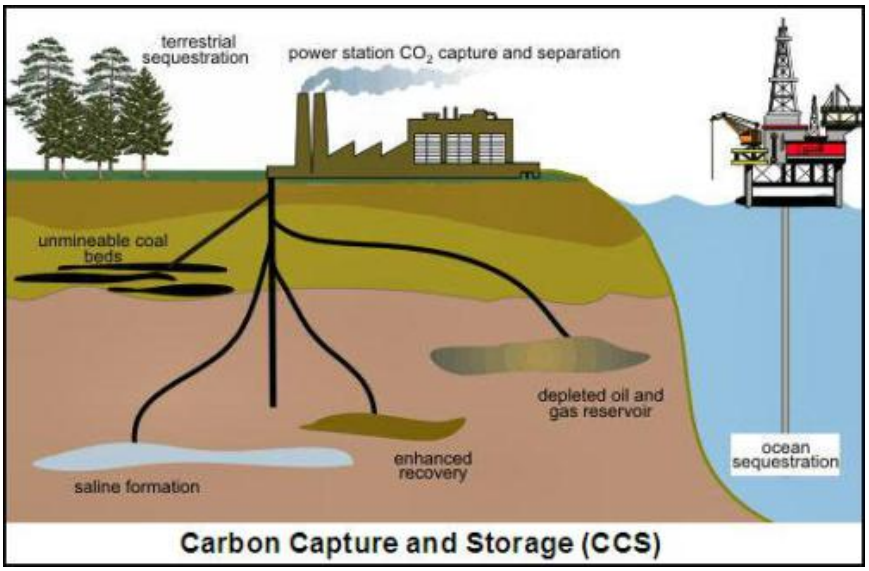
CARBON CAPTURE AND SEQUESTRATION IN UCG

There is growing concern among climate scientists and policy scholars that the global community must reduce greenhouse gas emissions significantly and quickly to prevent catastrophic climate change. Recognizing that fossil fuels now meet 85% of global energy and that global energy demand is increasing, carbon capture and sequestration (CCS) will be an important option to limit carbon dioxide emissions. In fact, carbon capture and storage (CCS) is an approach to mitigate global warming by capturing carbon dioxide (CO2) from large point sources such as fossil fuel power plants and storing it instead of releasing it into the atmosphere. Technology for large scale capture of CO2 is already commercially available and fairly well developed. Although CO2 has been injected into geological formations for various purposes, the long term storage of CO2 is a relatively untried concept and as yet no large scale power plant operates with a full carbon capture and storage system.

In the case of UCG, if the CO2 is to be captured at the surface and sequestered, it must be separated from the syngas. At a UCG production site, a significant percentage of the CO2 would likely be sequestered in the void left by the burned coal seam. Ideally, remaining CO2 can be sequestered in deep geologic formations nearby.

If the CO2 is not sequestered in place, it can be piped to oil fields. Oil companies can then inject it underground to increase production from oil and natural gas wells, a process called enhanced oil recovery. This represents an opportunity to sequester carbon at a lower cost compared with storing it in geologic repositories.



6. Monitoring and Control: In order for the gasification process to be controlled, it is essential that continuous analytical measurement of the product gas stream is available.

Injection flow rate and composition, temperature and pressure were measured at various parts of the circuit to facilitate control of the gasifier and to ensure pressure and temperature design limits of system components were not exceeded. The manipulation of the following variables allowed the reaction rate and the gas quality to be adjusted within certain limits:

(i) Injected gas flow rate and composition

(ii) Reactor back pressure

(iii) Production well base temperature

(iv) Safety monitoring and alarm control

7. Technical requirements: Important technical requirements and considerations in designing a commercial gas production scheme:

(i) A cost-effective means of acquiring high-resolution coal seam geological data

(ii) Reproducible drilling accuracy

(iii) Multiple, independent gasifier units (with separate injection and production wells) to ensure systems failures do not totally halt gas production

(iv) Integrated surface plant using readily available off-the-shelf equipment wherever practicable.

The most critical element of deep UCG is arguably the directional drilling. Technologies exist which are capable of achieving the required precision but there is considerable uncertainty about the general drillability of coal seams in other than ideal conditions.

8. Environmental Impact and its Control: The main environmental issues concerning UCG are:

(i) Atmospheric emissions;

(ii) Surface water;

(iii) Drinking water pollutants;

(iv) Noise;

(v) Site operations;

(vi) Groundwater;

(vii) Subsidence.

Source : http://saferenvironment.wordpress.com/2008/10/15/underground-coal-gasification-ucg-potential-to-increase-coal-reserve-worldwide-in-environment-friendly-manner/