CO₂ capture and in geological storage in depth

Carbon dioxide (CO₂) is captured from the power plant or industrial source, compressed into a dense fluid, then transported (usually via a pipeline) to the storage site.

FINING

"Barrier of

5/8"Ste

Casing

Diameter

Cemented in to Protect 12

7" Steel Casing Cemented in

Injected CO₂

41/2" Steel Casing At the storage site, the CO₂ is pumped into a geological formation, typically more than a mile underground. The CO₂ is buoyant so it tends to rise in the formation until it meets the bottom of the caprock where it is trapped. (Bouyancy Trapping)

As the CO₂ moves in the formation a portion will become trapped between the tiny pore spaces, stopping the movement of the CO₂. (Residual Trapping)

to Protect 8" Diameter A fraction of the CO₂ will also Unmineable dissolve into the saline water (like 1/2 mile -**Coal Seam** sugar dissolves into tea). The saline water becomes heavier and sinks to 3000 ft the bottom of the formation, CO₂ Displaces Limestone ensuring the CO2 remains in the **Methane** formation indefinitely. from Deep Unmineable (Solubility Trapping) **Coal Seams** Caprock -**Possible Uses for Carbon** Shale **Dioxide at Storage Sites:** 4500 ft CO₂ can be injected into unmineable coal seams, which may add to natural gas supply by displacing methane. Gas / Sandstone CO₂ can be injected into natural gas 2 Formation fields to displace trapped gas. 1 mfle CO₂ Displaces CO₂ can be injected into depleted Dolomite **Trapped Gas** and declining oil fields, where it is now used to enhance oil recovery. Injected CO₂ helps drive oil towards Depleted Oil / a production well. 6000 ft Sandstone CO₂ can be stored in very deep saline 4 Formation formations and other significant **Depleted** Oil 3 geologic formations, such as basalt. <u>Sandstone</u> Formation Caprock – Store CO₂ Anhydrite Finally, the dissolved CO₂ reacts CAP ROCK (impermeable) Acts as a Seal chemically with the rocks to 7500 ft Trapping CO₂ produce minerals, effectively Caprock – Shale binding it to the rocks. 11/2 (Mineral Trapping) mile **Deep Saline Saline Formation Reservoirs** Residual Store CO₂ 9000 ft Trapping Pre-Cambrian Bedrock

10125 ft

Oft

1500 ft

Overburden /

Sand / Gravel

Impervious Clay

Fresh Water / Sand / Gravel

Impermeable

Caprock –

Shale or

Anhydrite



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