## CO<sub>2</sub> capture and in geological storage in depth

Carbon dioxide (CO<sub>2</sub>) 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 CO<sub>2</sub>

41/2" Steel Casing At the storage site, the CO<sub>2</sub> is pumped into a geological formation, typically more than a mile underground. The CO<sub>2</sub> 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 CO<sub>2</sub> moves in the formation a portion will become trapped between the tiny pore spaces, stopping the movement of the CO<sub>2</sub>. (Residual Trapping)

to Protect 8" Diameter A fraction of the CO<sub>2</sub> 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, CO<sub>2</sub> 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 CO<sub>2</sub> can be injected into unmineable coal seams, which may add to natural gas supply by displacing methane. Gas / Sandstone CO<sub>2</sub> can be injected into natural gas 2 Formation fields to displace trapped gas. 1 mfle CO<sub>2</sub> Displaces CO<sub>2</sub> can be injected into depleted Dolomite **Trapped Gas** and declining oil fields, where it is now used to enhance oil recovery. Injected CO<sub>2</sub> helps drive oil towards Depleted Oil / a production well. 6000 ft Sandstone CO<sub>2</sub> 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 CO<sub>2</sub> Anhydrite Finally, the dissolved CO<sub>2</sub> reacts CAP ROCK (impermeable) Acts as a Seal chemically with the rocks to 7500 ft Trapping CO<sub>2</sub> produce minerals, effectively Caprock – Shale binding it to the rocks. 11/2 (Mineral Trapping) mile **Deep Saline Saline Formation Reservoirs** Residual Store CO<sub>2</sub> 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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