

Geologic Storage of Carbon Dioxide

Description:

This technology features an apparatus and a process for the capture and storage of carbon dioxide gases in subsurface aquifers. These novel injection well components and well design promote rapid dissolving of carbon dioxide into water derived from distant extraction well fields. Carbon dioxide has a high solubility in water, and at higher hydrostatic pressure the solubility is increased to a maximum at depths of around 2000 feet below the aquifer surface. Water becomes more dense with higher dissolved carbon dioxide. Greater density makes the water negatively buoyant and a competent cap lock/seal is not needed to contain it. The dense carbon dioxide saturated water sinks and does not represent a future threat.

Carbon dioxide capture has been a topic of debate in recent years with respect to global warming caused by greenhouse gases. Adding to the complication of the debate is the question of where to store the captured carbon dioxide. Currently, oil and gas fields have presented the best conditions for underground storage, but the gas must be highly pressurized before storage in these areas. Several other ideas have been presented, but most are too expensive, complicated, or specialized to have large-scale application.

This invention seeks to solve the problem of carbon dioxide storage on a large scale. After the gas is captured from a source, it may be pumped down an injection well. The gas is released into the well's water at the bottom, and allowed to dissolve its CO₂ in the water as it bubbles to the surface. The carbon dioxide enriched water is heavier than pure water, and subsequently sinks to the bottom. The well can allow the water to continue sinking into the groundwater, where it will be stored. Or there may be a seal on the bottom of the well and the carbon dioxide rich water is pumped out, providing a source of pure carbon dioxide for sale. This method incurs significantly less cost than typical pressurization methods, and uses the pressure force of water to separate and capture the CO₂ from other waste gasses.

Applications:

- Coal-fired power plants
- Industrial plants
- Other carbon dioxide emission sources

Benefits:

- Ideal for the long-term geological storage of carbon dioxide gases in a variety of aquifers and reservoirs
- Does not require a cap lock/seal, geologic trap or use of supercritical carbon dioxide pressures
- Can store carbon dioxide in groundwater, which exists everywhere
- Uses the well's natural pressure head and water's natural properties to store carbon dioxide
- Less energy and capital intensive than other methods

Inventors: Gerald C. Blount, Ronald W. Falta, Alvin A. Siddall
Protection Status: Patent issued; # [20,100,170,674](#)
Licensing Status: Available for licensing
CURF Ref No: 09-027, 10-047