Certification framework based on effective trapping for geologic carbon sequestration

GCCC Digital Publication Series #09-08

C. M. Oldenburg
S. L. Bryant
J. –P. Nicot

Keywords:
Risk–Certification Framework

Cited as:
Abstract:
We have developed a certification framework (CF) for certifying the safety and effectiveness of geologic carbon sequestration (GCS) sites. Safety and effectiveness are achieved if CO₂ and displaced brine have no significant impact on humans, other living things, resources, or the environment. In the CF, we relate effective trapping to CO₂ leakage risk which takes into account both the impact and probability of leakage. We achieve simplicity in the CF by using (1) wells and faults as the potential leakage pathways, (2) compartments to represent environmental resources that may be impacted by leakage, (3) CO₂ fluxes and concentrations in the compartments as proxies for impact to vulnerable entities, (4) broad ranges of storage formation properties to generate a catalog of simulated plume movements, and (5) probabilities of intersection of the CO₂ plume with the conduits and compartments. We demonstrate the approach on a hypothetical GCS site in a Texas Gulf Coast saline formation. Through its generality and flexibility, the CF can contribute to the assessment of risk of CO₂ and brine leakage as part of the certification process for licensing and permitting of GCS sites around the world regardless of the specific regulations in place in any given country.

To access full text, please contact the author or visit:
http://repositories.cdlib.org/cgi/viewcontent.cgi?article=8528&context=lbnl