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CO₂ Storage Capacity Calculations for Nearly Empty Gas Fields

L.G.H. van der Meer

TNO Built Environment and Geosciences, Utrecht, The Netherlands

Estimation of the capacity of a geological formation to store CO₂ is not a straightforward or simple process. Some scientists have tried to make simplistic estimates at the regional or global level. Bradshaw (Bradshaw et al., 2006) has recently attempted to list various estimations for CO₂ storage capacity for the world and regions of the world. He reports estimations often quoted as “very large” with ranges for the estimates in the order of 100s to 10,000s Gt CO₂. All this work shows clearly the lack of definitions, rules and general practices to calculate storage potentials.

TNO has been involved in earlier studies and feels strongly that at long last we need a more uniform and standard method to calculate the storage potential of any subsurface location, either a partial or empty gas or oil field or aquifer. TNO prefers to consider in any storage capacity calculation the inclusion of a concept of total affected space i.e. all space that has its state or qualities changed by the storage operation over the total storage time. Furthermore, we will have to consider the injectivity of the selected injection location and the pressure and fluid conductivity of the total affected storage space. In addition the intended free CO₂ storage location will need to have enough storage space or enough sealing capacity to contain the CO₂ for at least 10,000 years and prevent it from migrating to the surface

The TNO developed method [1] has been used for calculating of the maximum storage volume for the Netherlands. The method is based on affected space and maximum pressurization, the storage potential is further based on injectivity and finally the storage efficiency of the geological trap is considered. In this paper and presentation we report on the investigation if the chosen method is also applicable to predict the CO₂ storage potential of empty or partial depleted gas fields.

Reference

Van der Meer, L.G.H. (Bert) and P.J.P. (Paul) Egberts, A General Method for Calculating Subsurface CO₂ Storage Capacity”, SPE-OTC 19309, The paper was presented at the 2008 Offshore Technology Conference held in Houston, Texas, U.S.A., 5-8 May 2008.