

Review of risk assessment methods for geological storage of CO₂

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Abstract

Assessing the risks with geological storage of CO₂ is a key issue in achieving confidence from stakeholders. The identification of risks associated with geological storage of CO₂ requires methods that can analyse and assess the hazards. Such methods are under development, e.g. in the SAMCARDS and the IEA Weyburn CO₂ Monitoring and Storage project. Further, experiences about risk assessment can be gained from geological storage of other products, i.e. underground injection of liquid waste, natural gas storage and nuclear waste disposal. These products have similarities to CO₂ storage in aspects such as injection volume, density of fluid and long term considerations for risks.

The best available method that provides this has its origin in nuclear waste storage and it uses both qualitative judgements and quantitative modelling to calculate risks, and it includes special tools as FEP analysis, top-down scenario formation and probabilistic risk calculations. This method has also been applied on the SAMCARDS as well as in some of the risk assessment work within IEA Weyburn CO₂ Monitoring and Storage project. Still, when reviewing the experiences from natural gas storage and injection of hazardous waste, it can be concluded that several risks associated with subsurface storage can be managed with strict regulations on matters as site selection and well construction. Thus in addition to a probabilistic risk assessment, it is important to establish procedural directives to obtain robust technical design.

Gain further knowledge about the used risk assessment method by examining concluded and ongoing risk assessments for CO₂ storage performed by both the conductor chosen for the CO₂STORE project as well as risk assessments performed by other conductors, e.g. by joining the Phase II of the IEA Weyburn CO₂ Monitoring and Storage Project.