

Perspectives on assessment study of unintentional leakage for geological storage of carbon dioxide

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Abstract

The large scale deployment of carbon dioxide capture and storage within the next few decades could significantly help mitigate escalating climate change. Actually more than ten large scale projects are in the operate stage across the globe. Prospective storage formations exist not only onshore but also offshore and an appropriate reservoir is selected considering characteristic features of each country or region. As the offshore reservoir is a realistic option in Japan from the aspect of a scale expansion and economic efficiency, CO₂ storage demonstration project off Tomakomai City is now in the execute stage. Development of legal frameworks for safe operation of CCS project helped the commercial scale CCS to gather forward momentum. However, public acceptance of CCS is needed for the wider deployment of this technology. Evidence-based risk management and both fair and highly transparent operation of a project would be key issues.

Public concern regarding the environmental risks associated with CCS, in particular the possibility of CO₂ leakage from a reservoir into the surface environment, has the potential for stalling the wide-scale industrial deployment of CCS. In North America, an appeal of leaking CO₂ from the storage reservoir to the surface was rejected based on extensive scientific field surveys by a team composed of experts. In Europe, an onshore CCS project was canceled on account of overmuch concern for CO₂ leakage. In the meantime however, some controlled CO₂ release experiments have been carried out to accumulate scientific knowledge to assess risk of CO₂ leakage.

As such representative experiments, onshore ZERT project and offshore QICS project will be introduced by each project leaders, Dr. Spangler and Mr. Blackford. QICS project involves a consortium of UK institutions working in partnership with a consortium from Japan. Furthermore, development of leakage assessment using simulation models will be presented by Dr. Uchimoto. Extended examples of environmental impact assessment of CCS and frontline of the related research will impress that the environmental impact assessment is important process for the safe operation of CCS project and the consensus building.