



## **IEAGHG Information Paper 2017-IP45; Three revised Best Practice Manuals have been released by NETL**

The first three of five 2017 revised editions of best practice manuals for geological storage projects have been announced by the U.S. Department of Energy's (DOE's) National Energy Technology Laboratory (NETL). These manuals provide a suite of linked guides to the development of CO<sub>2</sub> geological storage from inception to completion.

The DOE's Office of Fossil Energy and NETL launched the [Regional Carbon Sequestration Partnership \(RCSP\) Initiative](#) in 2003. Six regional partnerships were selected across the United States to develop and test the best technologies and sites for safe and permanent CO<sub>2</sub> storage. Each RCSP research consortium, in collaboration with local industry partners, have built up expertise in the development of different prospective storage sites and technology to track and monitor subsurface CO<sub>2</sub>. Experts from DOE and RCSPs have subsequently worked together on best practice manuals, which incorporate knowledge gained through six of the partnership projects. The 2017 revisions include new information acquired as some of the RCSP projects have progressed to large-scale Development Phase field projects.

The three 2017 revised edition best practice manuals which have been released for use are—

- [Public Outreach and Education for Geologic Storage Projects \(June 2017\)](#)
- [Risk Management and Simulation for Geologic Storage Projects \(June 2017\)](#)
- [Site Screening, Site Selection, and Site Characterization for Geologic Storage Projects \(June 2017\)](#)

These best practice manuals are intended to disseminate the knowledge gained through the RCSP initiative and to establish uniform approaches for the implementation of successful projects. As some of these projects have progressed to full-scale development the interaction with local communities has become paramount. Experience has shown that public outreach needs to be an integral component of project management. Engagement with local communities can make important contributions to efficient project progress, cost controls, and positive civic relations. This latest manual has concluded that effective public outreach needs to include a combination of listening to local concerns, sharing information, and addressing concerns through proactive community initiatives.

Since the inception of the RCSP programme both NETL and a variety of research institutions and universities across the United States have been developing numerical simulations or models to predict the behaviour of CO<sub>2</sub> injected into storage reservoirs. Models are the primary tools for the prediction of CO<sub>2</sub> migration within a reservoir and they can be used to highlight potential risks. The modelled pattern of CO<sub>2</sub> behaviour can also be used to optimise the design of monitoring systems, develop risk mitigation strategies and improve site characterisation. The observed pattern of subsurface CO<sub>2</sub> plume can be compared with a model and used to modify and enhance its value. The latest manual presents a framework of best practices for the implementation of models that are able to simulate a range of geological processes within storage sites including thermal, hydrological, geochemical, mechanical and biological processes.

The latest best practice manual includes summaries of 18 case studies from different RCSPs as well as generic guidance on the development and implementation of risk management plans and numerical simulations. The case studies cover topics such as risks posed by the impact of the project on culturally



or environmentally sensitive sites to fracture pressure and field operations. Case studies of models cover fluid injection simulation with actual operations, simulations of multiphase flow and transport within a reservoir, prediction of plume migration, geochemical modelling of CO<sub>2</sub> with brine and oil bearing systems and pressure simulations. The manual also includes a case history of a dynamic simulation with operational data for the Aquistore Project. This project is part of the world's first commercial post-combustion carbon capture, utilisation and storage project from a coal-fired power plant.

Site screening, selection and characterisation has rapidly advanced since inauguration of the RCSP programme. The latest best practice manual highlights how additional technical information from core samples, seismic surveys, well logs, fluid samples and even sample descriptions from plugged and abandoned wells can be used for site characterisation for CO<sub>2</sub> storage projects. Once a key site has been identified a detailed site-specific assessment is conducted that needs to include all of the geological, regulatory and social issues associated with it. At this stage the suitability of the site is either confirmed or rejected.

The best practice manual includes examples from the six different RCSP on project analysis, site screening, site selection and site characterisation. It also includes a CO<sub>2</sub> storage classification framework based on a petroleum resources management system developed by the oil and gas industry.

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