Geophysical Research Abstracts
Vol. 14, EGU2012-3643, 2012
EGU General Assembly 2012

Key site abandonment steps in CO_2 storage

M. Kühn (1), M. Wipki (1), S. Durucan (2), J.-P. Deflandre (3), S. Lüth (1), J. Wollenweber (4), A. Chadwick (5), and G. Böhm (6)

(1) GFZ German Research Centre for Geosciences, Centre for CO_2 Storage, Potsdam, Germany (mkuehn@gfz-potsdam.de), (2) Imperial College London, Great Britain, (3) IFP Energies nouvelles, France, (4) TNO - Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, (5) British Geological Survey, Great Britain, (6) Istituto Nazionale di Oceanografia e Geofisica Sperimentale, Italy

CO_2CARE is an EU funded project within FP7-research, which started in January 2011 with a funding period of three years. The project objectives will be achieved through an international consortium consisting of 23 partners from Europe, USA, Canada, Japan, and Australia, belonging to universities, research institutes, and energy companies.
According to the EC Guidance Document 3, the lifetime of a CO_2 storage site can be generally subdivided into 6 phases: 1. assessment, 2. characterisation, 3. development, 4. operation, 5. post-closure/pre-transfer, and 6. post transfer. CO_2CARE deals with phases 5 and 6. The main goals of the project are closely linked to the three high-level requirements of the EU Directive 2009/31/EC, Article 18 for CO_2 storage which are: (i) absence of any detectable leakage, (ii) conformity of actual behaviour of the injected CO_2 with the modelled behaviour, and (iii) the storage site is evolving towards a situation of long-term stability. These criteria have to be fulfilled prior to subsequent transfer of responsibility to the competent authorities, typically 20 or 30 years after site closure. CO_2CARE aims to formulate robust procedures for site abandonment which will meet the regulatory requirements and ensure long-term integrity of the storage complex.
We present key results from the first year of the project via a report on international regulatory requirements on CO_2 geological storage and site abandonment that includes a general overview on the current state-of-the art in abandonment methodologies in the oil and gas industry worldwide.
Due to the long time–frames involved in CO_2 storage (in the range of several thousands of years), the behaviour of a system with respect to, for example, long-term well stability can be demonstrated only by using long-term predictive modelling tools to study potential leakage pathways.
Trapping mechanisms for CO_2 are of high interest concerning a quantitative estimation of physically captured, capillary bound, dissolved, and precipitated CO_2 in form of specific mineral phases. Useful results, partly supported by laboratory and field experiments, can be gained by process simulations considering periods of hundreds or thousands of years.
Risk management for the post-operational phases is another essential part of the workflow. A first version of a decision support system has been created by means of a number of high-level and low-level criteria, most of which had to be defined in advance. The system provides instructions for the operators on how to act in case of irregularities after site closure.
A compilation of all relevant results will be available at the end of the project in form of best practice guidelines. However, dissemination of information about the latest results and developments in the field of site abandonment are given via the CO_2CARE-website (www.co2care.org) and also in conferences, workshops or radio and TV interviews.

References:
1. DIRECTIVE 2009/31/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006
2. Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide - Guidance Document 3, Climate Action