



# Newsletter

## CO<sub>2</sub>CARE

July 2013

### CO<sub>2</sub>CARE-Regulators workshop



Photo: M. Wipki

An important workshop was held at TNO, Hoofddorp, on the 9<sup>th</sup> July 2013, chaired by NERC-BGS. Research institutes and energy companies were discussing with representatives of the national authorities (regulators)

from France, Germany, Italy, The Netherlands, and Norway were discussing about a hypothetical closure of the CO<sub>2</sub> storage sites **K12-B, Ketzin, and Sleipner**.

The discussion was based on the application for storage abandonment according to the *Directive 2009/31/EC* and the respective national CCS laws. So-called "dry-runs" for site abandonment were developed in advance for each of the three sites.

Result of this interesting and fruitful workshop was a catalogue of requirements recommended for an approval of site closure and a transfer of liability from the operator to the authorities. These results will feed into the "Best Practice Guidelines for Site Abandonment", available at the end of the project. Ultimately, the *Guidelines* will reflect the key findings of the project. It will be disseminated to key stakeholders worldwide. (Mario Wipki, GFZ)

### Upcoming - The 4<sup>th</sup> Annual Global Carbon Capture utilization & Storage Summit

The international Global Carbon Capture utilization & Storage Summit, taking place during 22<sup>nd</sup> - 23<sup>rd</sup> of October 2013 in Beijing, China, is a broad platform for over 150 major CCUS stakeholders who will be presenting their newest research results and addressing the challenges of the future.

Although, China is still no. 1 in the list of the world's major CO<sub>2</sub> emitters, the country has also emerged as one of the biggest influencer of deployment of CCUS. Meanwhile, China has released a series of policy and R&D programs on CCUS and demonstration projects.



(Source: Asia Carbon Energy)

CO<sub>2</sub>CARE partner IFPEN will give a presentation focusing on latest CO<sub>2</sub> storage performance assessment issues especially for short and long term field pressure prediction and CO<sub>2</sub> migration. Illustrations (results from CO<sub>2</sub>ReMoVe and CO<sub>2</sub>CARE R&D EU projects) will highlight the influence of reservoir heterogeneities in the CO<sub>2</sub> trapping process while considering major risk scenarios during the storage and abandonment phases. Modelling issues will be also depicted by presenting a case study of the CO<sub>2</sub> plume intersecting with a distant well. (Mario Wipki, GFZ; Jean-Pierre Deflandre, IFPEN)

### Information films on CO<sub>2</sub>CARE website

The section "Multimedia" has been updated and expanded. A new HD-information film "**Storing CO<sub>2</sub> to Protect the Climate**" from February 2013 (7:51 length) about Sleipner is now available via the website.



New information film about Sleipner (Source: American Museum of Natural History).



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For Ketzin information film no. 2 "Geological Requirements and Capacities" (06:00)" has been produced using the English language. For two other films, GFZ created English subtitles, in cooperation with Imperial College. The subtitled films "Ketzin Pilot Site" (05:05) (GFZ), and "Scientific Drilling at the pilot site Ketzin" (08:53) (GFZ) are now available via the website.  
(Mario Wipki, GFZ)

### CO<sub>2</sub>CARE – Final Conference at GFZ Potsdam

First preparations for the final CO<sub>2</sub>CARE conference at GFZ during 4<sup>th</sup> and 5<sup>th</sup> November 2013 have already started.

Interesting presentations are expected from CO<sub>2</sub>CARE partners and invited external participants.



(GFZ main building – photo M. Wipki)

Fortunately, nearly all CO<sub>2</sub>CARE partners from overseas - USA, Canada, Australia, and Japan - have already confirmed their attendance. (Mario Wipki, GFZ)

### What is CCS? - Dissemination ways to communicate and disseminate on CCS

It is part of IFPEN's mission to train professionals and prepare students to the energy transition from fossil energy to a mix with an increasing proportion of renewables.

During a Personal Skills Management training course at IFPEN, 36 students from 16 countries developed individual and humorous contributions explaining CCS. The idea is to sensitize people on CCS technology and eventually to minimize the NIMBY syndrome our civilization is suffering. The lack of detailed knowledge of lay people on CCS seemed to be crucial to start public engagement activities with public awareness on the general context rather than focusing in particular on site characterisation (SiteChar) and site abandonment (CO<sub>2</sub>CARE).



What is CCS? A humorous and basic approach of the Carbon Capture and Storage by students from IFP School.  
(source: <http://www.youtube.com/watch?v=uRxBFB5ejJc9>)

It has been suggested to the students to use attractive communication tools such as comics, cartoons, websites but this was not mandatory. They have been required to comment on their way to address the subject and their choices in communicating. In addition, presentations have been presented at Ecole Normale Supérieure de Cachan (France) and at the University of Montpellier where students had to fill a questionnaire on CCS prior and/or after the oral presentation on CCS. IFPEN had a very enthusiastic feedback from the different students groups. They now better understand the challenges of CCS and the necessity to communicate at a larger scale with the public. (Jean-Pierre Deflandre, IFPEN)



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### Wallula CO<sub>2</sub> injection into deep basalt formation underway

Although there has been a long preparation period and struggles for financing matters, an injection of CO<sub>2</sub> has now begun at the Wallula site in Washington State.

CO<sub>2</sub>CARE partner Pacific Northwest National Laboratory (PNNL) in collaboration with Boise Inc. and Montana State University are injecting 1,000 tons of CO<sub>2</sub> in a first step into deep lying porous lava flows of the Columbia River flood basalts. This research work is conducted under the "Big Sky Carbon Sequestration Partnership", which is led by Montana State University and funded by DOE and a consortium of industrial partners.

*"We have been conducting laboratory tests on basalts from the region for several years that have conclusively demonstrated the unique geochemical nature of basalts to quickly react with CO<sub>2</sub> and form carbonate minerals or solid rock, the safest and most permanent form for storage in the subsurface,"* said Battelle project manager Pete McGrail. *"However convincing the laboratory data may be, proving the same processes operate deep underground can only be done by conducting a successful field demonstration. We have taken the very first steps to do that here in Wallula."*

In a 14 month monitoring phase, rock samples will be examined in terms of changes in chemical and mineralogical composition in comparison to baseline data which were taken prior to injection. The reaction between the injected CO<sub>2</sub> and the porous basalt rocks should lead predominantly to a formation of solid carbonates. This is what the scientists are expecting and what they have calculated in predictive modelling programs as well. However, this needs to be proven by studying rock samples which will be taken from the well at the end of the monitoring period.

If the studies and tests, demonstrated under real conditions, confirm a rapid transformation of CO<sub>2</sub> into solid rock, such as limestone, it will be a great success and would again contribute to mitigate the risk of long term storage. Moreover, the potential of

CO<sub>2</sub> storage capacities is expected to become much larger which is also of particular importance. Basalt flows can be found in many parts of the world and especially ancient continental flood basalts like in Canada, India, or Siberia covering large areas with thicknesses of up to 2000 meters. Also most of the deep ocean floor consists of basalt which might be an additional storage potential as well.

More information can be found on the PNNL-website:

<http://www.pnnl.gov/news/release.aspx?id=997>  
(Mario Wipki)



Technicians align a downhole packer and pressure /temperature monitoring system into the CO<sub>2</sub> injection well  
(Photo courtesy of [Energy Solutions Inc.](#)).