



## **IEAGHG Information Paper; 2012-IP16: Environmental Assessment of CO<sub>2</sub> Storage**

### **Background: IEAGHG Workshop Montana, July, 2012**

This workshop was the third in the Environmental Impacts Workshop Series. It was hosted by Montana State University in Bozeman, Montana, over 17-19 July 2012. Montana State University are the hosts and managers of the ZERT controlled CO<sub>2</sub> release project.

The previous workshop in Maria Laach focussed on natural releases. This workshop focussed on controlled release projects. As such, it brought together for the first time most of the world's controlled release projects, ten in number. Several are recently operational, and so we were privileged to hear the early results. These include the world's first offshore sub seabed sediment release project, QICS, in Scotland. This created the opportunity not just for sharing of results, but for future sharing of facilities and techniques, opportunities which were taken advantage of during the meeting.

The workshop also looked at the Environmental Assessments undertaken for real projects, with details being provided by Shell on the Quest project and its recent approval.

In the area of monitoring, great progress is being made. There are increased capabilities and new experiences offshore. The very realisable capability for large-area monitoring was shown, with the potential capability of leak detection, and work on offshore baselines also being ground-breaking. Exciting developments in onshore monitoring included the Process-based technique, for assessing the source of CO<sub>2</sub> found in the near-subsurface, i.e. whether it is from leakage or biogenic sources. This was demonstrated and proven as a technique at the ZERT facility during the workshop.

The meeting included a session on communication messages from natural and controlled releases.

Key points from the meeting included:

- EIA regulations are not a barrier to projects
- There are now a good number of controlled release projects, providing useful knowledge
- CO<sub>2</sub> release behaviour in the near-subsurface can be unpredictable
- Marine work – very good progress on monitoring and on baselines
- Electro-magnetic remote monitoring of brine appears very useful for 'early' leakage detection
- Environmental Assessments will be substantially different for offshore to onshore, we don't have offshore examples yet
- If leakage does occur – it will be patchy and in small localised area, not over a large area
- The Process-based technique example of monitoring moving in right direction – able to provide important information where there are no baselines. This technique uses ratios of gases present to determine source of CO<sub>2</sub>
- Still need baselines for leak detection and impact assessment
- Indicator species are being identified, especially benthic and terrestrial plants
- Seasonality and timing can effect leakage impact
- Broader acceptance of near-surface monitoring than in 2008



Research needs or gaps identified included:

- Need for deep subsurface release experiment
- Understanding overburden processes
- More on brine intrusion – industrial analogues
- Bringing in new research communities
- Challenging to find small leakage spots
- Need more wide area monitoring techniques and prove: need for high spatial resolution
- Need to understand how analogues compare to CCS sites

The recommendations from attendees included:

- Keep up the good work! – gaps identified in the past are being addressed
- Consistency in terminology
- Data sharing in between projects, and engaging with other research communities
- Further meetings could be:
  - focussed on transport mechanisms through the overburden and surface expression
    - Natural attenuation
  - Remediation – risk assessment network?
  - Biological impacts
  - Groundwater impacts
  - Comparison of environments: systems assessment

The meeting concluded with a request from participants to become a full IEAGHG Network, called the “Environmental Research into CO<sub>2</sub> Storage Network”. The Network should have the aim of a “A network to build and advance knowledge for environmental research of geological CO<sub>2</sub> storage”, with the Objectives being to “Stimulate and nurture international collaboration and knowledge sharing to improve understanding for environmental research of CO<sub>2</sub> storage, and to Act as a source of technical information “.

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