2016-IP32: US DOE 2016 Carbon Storage Meeting

The US DOE's annual Carbon Storage R&D Project Review Meeting was held in Pittsburgh 16-18 August 2017. These meetings present all the current DOE funded research and development projects in CO_2 storage, and are impressive gatherings of US research activity. This year it was combined with the DOE's oil and natural gas technologies research review meeting and titled "Mastering the Subsurface Through Technology Innovation and Collaboration", attracting some 250 attendees. As you might expect, there were many topics of common interest, which the DOE's Subsurface Technology and Engineering R,D and D Crosscut Initiative (SubTER) gathers under the four themes of wellbore technologies, stress and induced seismicity, permeability manipulation, and new subsurface signals.

Current priorities of the DOE's Clean Coal and Carbon Management program were described, including getting the demonstration projects to successful operation, large-scale pilots for capture, reducing risk and uncertainty for storage, and reducing water use.

IEAGHG was invited to organise a plenary panel on offshore CCS, drawing on the international workshop on this topic organised in April in Austin (see IEAGHG 2016-TR2). Tim Dixon chaired and gave a summary of the Norwegian developments in offshore storage and transport option assessments, developments in Africa and the overall workshop outcomes. Presentations were given by Tip Meckel of BEG on storage capacity assessment offshore and the survey of countries' needs undertaken for the workshop. Owain Tucker of Shell presented on risk assessment offshore and the need for techniques to prove no leakage. Jun Kita of RITE was unable to attend so Tim presented his slides on an update on environmental monitoring at Japan's Tomakomai project and the real possibility that the marine baselines are changing due to climate change, which is generating interest from the regulator and prompting more intensive environmental monitoring to investigate. Melissa Batum of BOEM gave an update from their offshore regulatory perspective.

IEAGHG was also invited to organise a plenary panel on the recent Monitoring Network meeting which was hosted by BGS and held in Edinburgh, using members of its International Steering Committee to present highlights. Drawing upon the outcomes from the Network meeting, the theme for this panel was 'monitoring optimisation increasing monitoring cost-effectiveness and reducing costs'. Tim presented an overview of the meeting and conclusions. Tom Daley of LBNL presented the highlights from a deep subsurface perspective, including the developments and positive experiences in cost-effective monitoring with permanent fibre optic distributed acoustic sensors (DAS) at several projects around the world, and the well incident lessons which can be drawn from the natural gas sector. Katherine Romanak of BEG presented highlights from a near-surface and surface perspective, continuing the issue raised by Jun on complex and changing baselines and the risk of false-positives in leakage detection as a result. Simon O'Brien of Shell presented on the MMV in practice at the QUEST project, and how they are refining the monitoring strategy, dropping some techniques such as 3D VSP and eddy covarience whilst maintaining the effectiveness of the monitoring with other techniques

such as 2D VSP with DAS and laser-scanning leakage detection. He also announced that they are nearly at a milestone of a million tonnes injected, and that the reservoir is performing better than expected. This raises interesting questions on the Network meeting's theme of 'how to demonstrate conformance in the modelling-monitoring loop' when the plume and pressure may be different due to the better-than-predicted reservoir performance. This would be a good topic to be picked up at next year's Monitoring Network meeting, which incidentally will be hosted by Battelle and the MRCSP in the USA (dates and location tbd).

Other developments shared including the US work on better understanding and predicting induced seismicity (IS) from injection operations, bringing together knowledge and experiences from the oil and gas sector, CCS and geothermal. Many useful learnings are being brought out, such as triggers of IS, pressure change speed, and fault location and orientation most likely to be triggered.

Updates on the large-scale injection projects in the Regional Carbon Sequestration Project program were also provided, with most of these at the later stages of their duration.

Technical sessions included updates on the offshore storage resource assessments currently being undertaken around the USA, on monitoring developments including the experiences with DAS at projects, on the current brine-extraction and pressure management projects, and on hydraulic fracturing.

The National Risk Assessment Programme (NRAP) has developed ten tools covering a range of topics such as leakage risk assessment, reservoir performance, induced seismicity, and wellbore risk, and these are now out for beta-testing. IEAGHG is helping with some international beta-testing, organising a feedback session at the recent Network meeting in Edinburgh, and IEAGHG was invited to present on the NRAP plenary panel here. These tools will be made available for public use by researchers, industry and regulators and are a unique asset in integrating subsurface processes with the intention of reducing uncertainty and managing risk. There is a new virtual special issue of the International Journal of Greenhouse Gas Control on this NRAP work and tools.

More information including ppts can be found at http://netl.doe.gov/events/fy16-c-store-rd . The wealth of R, D and D on CO_2 storage underway in the US is impressive and world-leading. DOE's efforts to ensure the results are shared and to exploit synergies between the research programs are highly commendable. This all helps to provide a substantial knowledge-base to undertake CO_2 geological storage in a sound and more cost-effective way.

Tim Dixon

22/08/16