Open letter to Ms Christiana Figueres, Executive Secretary of the United Nations Framework Convention on Climate Change

08 October 2015

Dear Ms Figueres,

The geological storage of carbon dioxide for Carbon Capture and Storage is secure and safe

As geoscientists and engineers representing decades of scientific research worldwide we would like to reassure the United Nations Framework Convention on Climate Change (UNFCCC) that the geological storage of carbon dioxide (CO_2) with relevance to carbon capture and storage (CCS) is safe, secure and effective, and we have considerable evidence to show this.

Extensive research gives us very high confidence that CO_2 storage in appropriately selected sites is secure over geological timescales and leakage is very unlikely. The residual risk of leakage can be managed by well-understood procedures and presents very low risk of harm to the climate, environment or human health.

The knowledge and techniques required to select secure storage sites are well established, being built upon decades of experience in hydrocarbon exploration and production. A global capacity of suitable CO_2 storage sites has been estimated at several trillion tonnes. There is also extensive experience of CO_2 injection and storage in a variety of situations and locations around the world.

We can state the following with very high confidence:

Natural CO_2 reservoirs have securely held billions of tonnes of CO_2 underground for millions of years. These provide an understanding of CO_2 storage processes and inform the selection of rock formations for secure storage as part of full-chain CCS.

Stored CO_2 is securely contained by physical and chemical processes that increase storage security with time. Injected CO_2, held within the storage site by multiple layers of impermeable rocks, is trapped in isolated pockets, dissolves in fluids in the rock and may eventually react with the rock to make new minerals.

Millions of tonnes of CO_2 have been injected and stored since 1972 in storage pilots and demonstrations, enhanced oil recovery and other industry practices. Accumulated experience of CO_2 injection worldwide has led to the development of routine best practices for the operation and closure of CO_2 storage sites, and provides direct evidence of engineered storage security.

CO_2 injected into underground rocks can be monitored to confirm its containment. A variety of monitoring methods has been developed and demonstrated. In the very unlikely event of poor site selection, these techniques are able to identify unexpected CO_2 migration before leakage to the surface can occur.

Leakage of CO_2 from geological storage presents a very low risk to climate, environment and human health. Research results show that the impacts of any CO_2 leakage on land or at the seabed will be localised and very unlikely to cause significant harm to ecosystems and communities. Should CO_2 move towards the surface, interventions can be made to control, minimise and prevent leakage.

Supporting Evidence: www.sccs.org.uk/cop21-supporting-evidence

Tackling CO_2 emissions from power generation and key industries is critical to delivering climate change mitigation in line with the UNFCCC's objectives. The Intergovernmental Panel on Climate Change finds, with high confidence, that attempting to limit global warming to below 2˚C without CCS is unachievable.

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Full-chain CCS, which integrates CO_2 capture, transport and storage technologies, is already being demonstrated at a growing number of facilities. The security of properly selected and regulated storage sites presents no barrier to its further deployment and enables its important contribution to climate change mitigation. We urge you to reflect this position in the content and outcome of your forthcoming talks in Paris this December.

Yours sincerely,

Dr Maxine Akhurst, Geologist, British Geological Survey, UK
Dr Richard Bates, Senior Lecturer in Earth and Environmental Sciences, University of St Andrews, UK
Professor Sally Benson, Director, Global Climate and Energy Project, Stanford University, USA
Professor Martin Blunt, Professor of Petroleum Engineering, Imperial College London, UK
Professor Andrew Chadwick, Individual Merit Research Scientist, British Geological Survey, UK
Dr Byoung-Young Choi, Senior Researcher, Korea Institute of Geoscience and Mineral Resources, Republic of Korea
Professor Peter Cook, Peter Cook Centre for CCS Research, University of Melbourne, Australia
Dr Isabelle Czernichowski-Lauriol, CO_2GeoNet President Emeritus, BRGM, France
Dr Florian Doster, Assistant Professor, Heriot-Watt University, UK
Dr Stuart Gilfillan, Chancellor's Fellow, University of Edinburgh, UK
Professor Jon Gluyas, Professor in CCS & Geo-Energy, Durham University, UK
Dr William Gunter, Distinguished Scientist, Alberta Research Council, Canada
Professor Stuart Haszeldine, Professor of Carbon Capture and Storage, University of Edinburgh, UK
Dr Susan Hovorka, Senior Research Scientist, Bureau of Economic Geology, The University of Texas at Austin, USA
Professor Ruben Juanes, Associate Professor, Massachusetts Institute of Technology, USA
Dr John Kaldi, Chief Scientist CO2CRC, University of Adelaide, Australia
Professor Joao Marcelo Ketzer, Director, Institute of Petroleum and Natural Resources, Pontifical Catholic University of Rio Grande do Sul, Brazil
Dr Dirk Kirste, Associate Professor, Department of Earth Sciences, Simon Fraser University, Canada
Dr Jun Kita, Senior Researcher, Research Institute of Innovative Technology for the Earth, Japan
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Dr Ton Wildenborg, CO_2GeoNet President, TNO, The Netherlands
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