

Summary

Workshop on Confidence Building in the long-term effectiveness of Carbon Dioxide Capture and Geological Storage in Tokyo, Japan

Date: 24 and 25 January, 2007

Venue: Mitsubishi Research Institute, Inc. 2F Seminar Room

The Workshop on Confidence Building in the long-term effectiveness of Carbon Dioxide Capture and Geological Storage in Tokyo was held in Japan 24 and 25 January, 2007. This one and a half day workshop was organized by the Ministry of Economy, Trade and Industry (METI) of government of Japan in collaboration with IEA Greenhouse gas R&D programme. The objectives of the workshop were to exchange state-of-the-art information, knowledge, experience and insights on Carbon Dioxide Capture and Geological Storage and to have in depth discussion among experts in order to build confidence on Carbon Dioxide Capture and Geological Storage amongst experts and policy makers.

Some forty experts and policy makers across the world including METI, IEA GHG R&D programme, Laurence Barkley National Laboratory, CO2GeoNet_BRGM, Quintessa, Monitor Scientific LLC, Ministry of Environment of government of Japan, AIST Japan, Research Institute of Innovative Technology for the Earth (RITE) Japan, Mizuho Information and Research Institute, JGC Corporation, Quintessa Japan and Mitsubishi Research Institute (MIRI) were participated at the workshop. The programme of the workshop is attached in annex of this summary.

The workshop was opened by the welcome address by Mr. Kentaro Endo, METI, and the workshop objectives were briefly explained by Mr. Norio, Shigetomi, MIRI.

In the first session of day 1 of the workshop chaired by Dr Makoto Akai of AIST, two presentation were made by Mr. Hidemitsu Shimada, JGC Corporation on "Proposal for Confidence Building" and by Dr. Harry Audus IEA GHG on "Current Status of IEA GHG's Effort towards CCS Confidence Building". Mr. Shimada introduced a strategy to confidence building and how they tackle this issue by applying a quantitative risk assessment method called ESL (Evidential Support Logic) which is a mathematical tool to evaluate confidence in a decision based on the various evidence theories. Discussions were made on how to engage with wider audience such as financial regulator, industry, policy maker and experts in other field by using this approach and the importance of collecting relevant evidences to support this method. Dr. Audus explained about introduction and background of the whole Carbon Capture and Storage issue touching upon some of the recent progress *i.e.* the IPCC special report, amendment of the London convention / the London protocol *etc.* and some of the challenges we face especially regarding the confidence building issue in order to set the scene for the workshop. Following the presentation, participants pointed out the necessity of CCS introduction in order to achieve stabilize CO2 concentration in the atmosphere with careful leakage management and introduction of other measures such as energy efficiency and renewable energy introduction as well.

In the second session of day 1 chaired by Dr. Sally Benson of Laurence Barkley National Laboratory, two presentation were made by Dr. Michael Stenhouse, Monitor Scientific LLC on "Approach to Building Confidence Concerning Geological CO2 Storage" and Dr. Isabelle Czernichowski-Lauriol, CO2GeoNet_BRGM on "European Efforts towards CCS and

Confidence Building". Dr. Stenhouse discussed about their particular projects involving interaction from regulators and other stakeholders with an interactive feedback process. He also explained about public outreach and some of the efforts that are being made to build up the confidence on one particulate target group. Discussions were made on how they succeed in build confidence by feedback process from both regulatory side and implementation side; and difficulties they experienced how to use the risk assessment results to communicate to the public. Then, Dr. Czernichowski-Lauriol as a deputy Network manger of the CO₂ GeoNet Network of Excellence on CO₂ geological storage talked about European activities on CCS toward confidence building in the technology since 1993 such as Joule Project, SACS project and European technological platform for zero emission power generation (ZEP). Then, she introduced the CO₂ GeoNet activities towards confidence building in the safety and long-term effectiveness of CO₂ geological storage including upcoming event on GEONET Open forum in Venice in April. Following the presentation, discussions were made on amendment of the existing EU legislation in 2007 and implement new EU guidelines.

In the third session of day 1 chaired by Dr. Isabelle Czernichowski-Lauriol of CO₂GeoNet_BRGM, two presentation were made by Dr. Koji Yamamoto, Mizuho Information and Research Institute on "Knowledge about the CCS risk learnt from natural analogues" and Dr. Sally Benson, Lawrence Berkley National Laboratory on "Natural Analogues for Confidence Building in CCS". Dr. Yamamoto discussed about how natural analogues can be used as a strong method to understand the nature of the gas leakage phenomena and be used for the confidence building of CCS. In his presentation, he explained about his study on some of the natural analogue examples including Hakkouda Mt and Matsushiro Earthquake in Japan, and Lake Nyos Cameroon. Following that, discussions were made on the possibility to develop and use natural analogue database to make a risk assessment for certain project site. Then, Dr. Sally Benson explained her personal experiences on discussion to a wide range of people primarily in the US; the concept of safety pyramid and how it can be used to identify key action that contribute to safety and security of geological storage reservoirs; some new work done on quantitative analysis of health and safety risk for industrial analogues; and long terms storage security and confidence building in light of what we know about the industrial analogues performance today.

At the beginning of the wrap up session of the day 1 chaired by Dr. Harry Audus IEA GHG, a short introductory presentation was made by Dr. Kenshi Itaoka of Mizuho Information and research Institutes followed by discussions among all participants around four key questions set for this workshop, namely whose confidence do we need?; what kind of logics and arguments do we need?; do we have enough evidence for those logics and arguments?; and how do we communicate with stakeholders? With regard to the first question, *whose confidence do we need?*, some of the issues raised from the participants include the importance of focusing on policy makers and scientists as the first target of confidence building followed by a confidence building for general public and a necessity to conduct an awareness survey on CCS including general public. With regard to the second question, *what kind of logics and arguments do we need?*, some of the points made include to come up with a list of major issues extracted from risk assessment analysis results in the view point of confidence building and an importance of visual communication using graphs and figures in order for general public to understand the issue. Regarding the third key question, *do we have enough evidence for those logics and arguments?*, some of the issues raised include the importance of continuous collection of relevant evidences and relevant evidence may change whether we want to show there will be no seepage or we want to show there will be many counter measures exist even if leakage happens. Regarding the fourth key question, *how do we communicate with stakeholders?*, participants raised pointed out the importance of recalling the fact that any human activity such as any other industrial

practice or even driving cars can evoke undesirable results, the importance of working together with communication specialists, the importance of solid scientific evidence from reliable information source, and the need of transparency and NGO involvement from the beginning stage.

In the last session in day 2 chaired by Harry Audus of IEA GHG, one presentation was made by Dr. Hiroyasu Takase, Quintessa Japan and David Savage, Quintessa on "A Structure Approach to building and sharing confidence". In this presentation, they introduced a different kind of mathematical model so-called dialogue model which was developed in the field of artificial intelligent in argumentation in law. They explained how to apply this model to confidence building in CCS. Following this presentation, discussions were made on how to communicate with general public by using this model and the difference between ESL model and the dialogue model.

In closing the workshop, participants pointed out the importance to promote demonstration projects and to share these experiences widely; the important role IEA GHG should play as a coordinator in monitoring these demonstration projects; lack of information on leakage mechanisms; necessity to design and develop a publicly accessible natural analog database which can be integrated with industrial analogue database in the future; an importance of governments to communicate the importance of CCS to the general public; an importance of qualitative communication approach such as narrative explanation of ideal CCS sites rather than explaining by statistics and numbers; possibility to publish annual or biennial report covering demonstration projects, issues and monitoring results; possibility to make a short film on CCS; and the importance to recall CDM is one of the measures to promote CCS etc.

ANNEX. Workshop Programme

DAY1: 24 January 2007

8:30 - 9:00	Registration	
Opening		
9:00 - 9:05	Welcome Address	Kentaro Endo, METI
9:05 - 9:15	Workshop Objectives	Norio Shigetomi, MIRI
Confidence Building in CCS 1, Chair: Makoto Akai, AIST		
9:15 - 10:05	Proposals for Confidence Building	Hidemitsu Shimada, JGC Corporation Quintessa Japan
10:05 - 10:55	Current Status of IEA GHG' s Efforts toward CCS Confidence Building	Harry Audus, IEA GHG R&D Programme
10:55 - 11:15	Coffee break	
Case study 1, Chair: Sally Benson, LBNL		
11:15 - 12:05	Approach to Building Confidence Concerning Geological CO2 Storage	Michael Stenhouse, Monitor Scientific LLC
12:05 - 12:55	European Efforts towards CCS and Confidence Building	Isabelle Czernichowski-Lauriol, CO2GeoNet_BRGM
12:55 - 14:30	Lunch	
Confidence Building in CCS 2, Chair: Isabelle Czernichowski-Lauriol, CO2GeoNet_BRGM		
14:30 - 15:20	Knowledge about the CCS risk learnt from natural analogues	Koji Yamamoto, Mizuho Information and Research Institute
15:20 - 16:10	Natural Analogues for Confidence Building in CCS	Sally Benson, Lawrence Berkley National Laboratory, Mizuho Information and Research Institute
16:10 - 16:30	Coffee break	
Confidence Building in CCS 3, Chair: Harry Audus, IEA GHG		
16:30 - 17:00	Common Arguments on CCS	Kenshi Itaoka, Mizuho Information and Research Institute
17:00 - 18:00	Discussion	
Close Day 1		
18:00 - 20:00	Reception	MIRI

DAY2: 25 January 2007

8:30 - 9:00	Registration	
Confidence Building in CCS 4, Chair: Harry Audus, IEA GHG		
9:00 - 9:45	A Structured Approach to Building and Sharing Confidence	JGC Corporation Hiroyasu Takase, Quintessa Japan David Savage, Quintessa
9:45 - 11:45	Discussion	
11:45 - 12:00	Resume of workshop	Makoto Akai, AIST
Close Day 2		