



CSLF-T-2007-05

**Carbon Sequestration Leadership Forum
Minutes of the Technical Group Business Meeting
Paris, France
28 March 2007**

LIST OF ATTENDEES

Technical Group Delegates

Australia:	John Bradshaw, Peter Cook
Brazil:	Paulo Cunha, Paulo Rocha
Canada:	Bill Reynen (Vice Chair), Stefan Bachu
Denmark	Niels Peter Cristensen, Flemming Ole Rasmussen
European Commission:	Manuel Sánchez
France:	Christian Fouillac, Pierre Le Thiez
Germany:	Jürgen-Friedrich Hake
India:	R.R. Sonde
Italy	Giuseppe Girardi, Giovanni Ciceri
Japan:	Makoto Akai, Chiaki Shinohara
Korea	Chang-Keun Yi, Chong-Kul Ryu
Netherlands:	Erik Lysen
Norway:	Trude Sundset (Chair), Jostein Dahl Karlsen, Odd-Magne Mathiassen
Russia	Dmitry Volokhov
Saudi Arabia	Khalid Abuleif, Mohammed Alzayer
South Africa	Stan Pillay, Harko Mulder
United Kingdom:	Nick Otter, Philip Sharman
United States:	Victor Der, Howard Herzog

CSLF Secretariat

John Panek
Sean Courtney
Scott Miles

Other Attendees

Peta Ashworth, Australia

Damian Dwyer, Australia

Bill Koppe, Australia

Marcelo Ketzer, Brazil

Anthony Credoz, France

Andreas Ehinger, France

Patrick Faisques, France

Samuel Saysset, France

Fontina Petrakopoulou, Greece

Fabrizio Pisanu, Italy

George Guthrie, United States

John Harju, United States

Jean-Philippe Nicot, United States

Helene Monidol, World Coal Institute

1. **Opening Remarks**

The Chair of the Technical Group, Trude Sundset of Norway, called the meeting to order and thanked the CSLF Projects Interaction and Review Team (PIRT) for organizing the “Overcoming Barriers to CCS Deployment” workshop and The French Petroleum Institute (IFP) for hosting the workshop.

Ms. Sundset set the stage for the meeting by mentioning that the Technical Group is presently at a critical juncture; one of the meeting goals is prioritization of activities assigned to it by the CSLF Action Plan.

Ms. Sundset passed along apologies from Vice Chair Malti Goel of India, who could not be present for the meeting, and introduced Vice Chair Bill Reynen of Canada who welcomed the first-time delegates and observers, while mentioning that the first two days of the CSLF meeting had been very productive with a high level of participation from meeting attendees.

2. **Introduction of Delegates and Observers**

Technical Group delegates and observers present for the session introduced themselves. Eighteen of the twenty-two CSLF Members were represented at this meeting, with China, Colombia, Greece, and Mexico not present. There were fourteen observers attending the meeting, representing six countries and the World Coal Institute.

3. **Adoption of Agenda**

The Agenda was adopted with no changes.

4. **Review and Approval of Minutes of London Meeting**

The Technical Group minutes from the November 2006 CSLF meeting in London, United Kingdom, were approved with the following changes:

- In Item 11 (Discussion of Need for New Task Forces), change the description of the Task Force to Examine Societal Issues Impacting CCS Deployment to indicate that the task force has not yet officially formed, but will instead be scoped out to determine if it should be formed. (requested by Australia)
- Also in Item 11, add “and the IPCC” to the end of the last sentence. (requested by the United Kingdom)
- In the list of Observers, correctly identify Andy Timms as being from the United Kingdom. (requested by the United Kingdom)
- In Item 18 (Areas of Possible Collaboration between the CSLF and IEA GHG), add a fourth bullet: “Risk assessment activities, with possible

coordination with the new Technical Group Task Force to Examine Risk Assessment Standards and Procedures”. (requested by the United Kingdom)

- In Item 17 (Introduction and Review of Possible Projects), in the description of European Commission projects, add a mention of the MOVECBM project. (requested by the United Kingdom)
- Also in Item 17, change the description of Norway projects to indicate that the initial demonstration phase of the planned CCS plant at Mongstad would capture of 100,000 tonnes of CO₂ annually. Also, in the second sentence, change “ten possible” to “possible CCS projects utilizing”. (requested by Norway)
- In Item 8 (Reports and Updates from Technical Group PIRT and Task Forces), make a correction in the title of the Task Force to Identify Gaps in CO₂ Capture and Transport. (requested by Korea)

5. Review of London Meeting Action Items

John Panek of the CSLF Secretariat reviewed the status of action items resulting from the London Technical Group meeting.

The following action items have been completed:

- Chair and Secretariat: Issue invitation for CSLF Members to join PIRT Core Group. (Note: Netherlands and Saudi Arabia accepted and joined the PIRT Core Group in January 2007.)
- Secretariat: Add a link to the European Commission’s Zero Emission Platform (ZEP) to the CSLF website.
- Secretariat: Post final reports from two Technical Group task forces to the CSLF website.
- PIRT: Implement revised project selection criteria, including a new Project Submission Form.
- PIRT: Develop content and an agenda for the “Overcoming Barriers to CCS Deployment” Workshop.
- Chair: Work with the CSLF Executive Committee to establish an acceptable timeframe for the Workshop at the Paris meeting.
- Chair: Work with the CSLF Executive Committee to include an agenda item for the Paris Joint Business Meeting on permitting issues requiring Policy Group guidance.
- Secretariat: Develop a report for Paris Joint Business Meeting on permitting issues requiring Policy Group guidance.
- Chair: Work with the CSLF Executive Committee to include an agenda item for the Paris Joint Business Meeting on possible involvement of Technical Group as advisor to Policy Group’s Capacity Building Task Force. (Note: The Capacity Building Task Force Workshop, in May 2007, will include presentations by several Technical Group delegates.)

The following action items are ongoing, in progress, or deferred:

- PIRT: Consider input from ZEP for all relevant PIRT activities. (Note: Input from other initiatives will also be considered.)
- PIRT: Develop prioritization for implementation of CSLF Action Plan items. (See Item 7 below.)
- PIRT: Develop a mechanism for formalizing a relationship between the IEA Greenhouse Gas R&D Programme (IEA GHG) and the Technical Group. (See Item 7 below.)
- Task Force to Examine Risk Assessment Standards and Procedures: Prepare initial progress report. (Note: This task force held its first meeting two days prior to this Technical Group meeting.)
- Task Force to Examine Societal Issues Impacting CCS Deployment: Prepare initial progress report. (Note: This task force had not yet been officially formed.)
- PIRT: Create a subgroup to examine the CSLF Technology Roadmap and identify sections that need updating. (Note: Organizational issues are still being resolved.)
- Chair: Work with CSLF Executive Committee to include an agenda item for the Paris Joint Business Meeting on the concept of “storage ready”. (Note: This was postponed pending publication of an IEA GHG report on this topic. The IEA GHG will be invited to give a presentation on this topic at the next meeting.)

6. Discussion of Technical Group Task Force Activities (Next Steps)

Projects Interaction and Review Team (PIRT)

The Chair of the PIRT, John Bradshaw of Australia, delivered a presentation that summarized the current activities of the PIRT:

- The PIRT has conducted a review of two projects that have requested CSLF recognition: the Zama Project (nominated by Canada and the United States) and the Otway Basin Pilot Project (nominated by Australia and the United States). Both have met all project recognition criteria.
- Planning activities for the “Overcoming Barriers to CCS Deployment” Workshop has taken up the majority of the PIRT’s available time since the November 2006 London Technical Group meeting. Excessive PIRT workload is an issue, as discussed at the London meeting, and the PIRT is working to develop a prioritization for implementation of CSLF Action Plan items.
- One result of the PIRT’s ongoing Technology Gaps Assessment was the posters that were on display at the Workshop, but several CSLF recognized projects have not yet submitted their individual gaps assessments.
- Discussions with IEA GHG will take place later this year to formalize a relationship between IEA GHG and the PIRT.

- The European Commission has informed the PIRT that it is not sure if it will continue as a PIRT co-chair, and will advise later in the year as to its intentions.

Dr. Bradshaw provided several recommendations from the PIRT to the Technical Group:

- Accept the two new projects and send them on to the Policy Group for its action.
- Provide feedback on the “Overcoming Barriers to CCS Deployment” Workshop.
- Request that all new task forces should consider the PIRT’s Technology Gaps Assessment and the CSLF Technology Roadmap in their reporting and consult with the PIRT and CSLF recognized projects where appropriate.
- If the European Commission does not wish to continue as PIRT co-chair, the Technical Group will be asked to help find a replacement.

Further discussion of PIRT activities regarding the CSLF Action Plan was deferred until the agenda item on that topic later in the meeting.

Task Force to Review and Identify Standards for CO₂ Storage Capacity Estimation

A Phase II Final Report had been submitted by this Task Force prior to the meeting. The report was accepted after consensus was reached that a minor change regarding suitability of basalt formations will be discussed with India and then incorporated into the final report.

The Task Force leader, Stefan Bachu of Canada, delivered a short presentation that recommended three potential focal areas for Phase III of the Task Force’s activities:

- Coordination of methodology for CO₂ storage capacity estimation with other national and international organizations that are working in this area;
- Compilation of representative case-studies of CO₂ storage capacity estimation at various scales and in different geological settings; and
- Support for the Policy Group’s Task Force on Capacity Building, in terms of training and applying the methodologies for estimating CO₂ storage capacity along the full chain from country-scale to site-scale, and from theoretical to matched capacity, to one or more CSLF Member countries with developing economies.

All of these recommendations were accepted, and the Task Force was authorized to proceed to Phase III.

Task Force to Examine Risk Assessment Standards and Procedures

The Task Force leader, Howard Herzog of the United States, reported on the Task Force's initial meeting, which had been held two days earlier. CSLF Members represented on the Task Force include Australia, Canada, France, Japan, Netherlands, Norway, and the United States. The IEA GHG will also be represented at future Task Force meetings. The initial meeting of the Task Force resulted in a scope of the work to be done, and the goal is to have all Task Force activities concluded and a report issued by the time of the next full CSLF meeting.

Mr. Herzog reported that the Task Force will focus its activities on CO₂ storage aspects, as risk aspects of CO₂ capture and transport are already considered as relatively well known. In particular, long-term storage aspects will be examined, as this is where the large uncertainties are. The Task Force will consider the impact of impurities in the CO₂ and its scope will include examination of three key impacts:

- Understanding the health, safety, and environmental aspects of long-term CO₂ storage;
- Understanding the possible effect of potential contamination of natural resources such as groundwater and hydrocarbon deposits; and
- Understanding the climate impact, if leakage should occur

Future meetings of the Task Force may be possible in Oslo, Norway, in June and Calgary, Canada, in November.

Following Mr. Herzog's report, India and the United Kingdom expressed an interest in joining and were added to the Task Force. Additionally, an Australian stakeholder (Bill Koppe), who has specific experience in this area, was extended an offer to participate in the Task Force.

Task Force to Examine Societal Issues Impacting CCS Deployment

John Bradshaw of Australia delivered a short presentation on a proposed overall scope for this Task Force, which has not yet been officially formed. The intent of the Task Force would be to examine various technical and social matters for co-management of land use in developing CO₂ storage sites. In that regard, Dr. Bradshaw recommended a change of name to the "Geological Storage Co-existence Task Force". The mission would be different than the Risk Assessment Standards and Procedures Task Force, in that this new task force would draw on results from the completed and ongoing technical task forces and integrate any technical issues into a list of technical issues that would need to be considered for co-existence of any CO₂ geological storage site, in terms of potentially compromising natural resources such as coal, oil, gas, or water. This could include examining societal expectations such as public acceptance, as well as technical perspectives, on matters such as groundwater and location near urban development or national parks.

Ensuing discussion led to consensus that enough policy aspects were involved that this should actually be a joint Technical Group / Policy Group task force. It was recommended that Ms. Sundset make this proposal at the Joint Meeting of Policy and Technical Groups.

7. Implementation of CSLF Action Plan

John Bradshaw, representing the PIRT, delivered a short presentation on the timeline for implementing Technical Group items from the CSLF Action Plan. The PIRT is working to prioritize these items and will make a progress report at the next Technical Group meeting. The PIRT will also meet with IEA GHG later this year to formalize a relationship, as some of IEA GHG's activities have commonality with Technical Group activities and IEA GHG previously expressed, at the London meeting, a willingness to work with the CSLF on items of joint interest.

Ensuing discussion led to consensus on this way forward, and also to explore possible cooperative opportunities with other organizations such as the European Commission's Seventh Framework Programme (FP7), which could include preparation of proposals to obtain additional resources.

8. Introduction and Review of Possible Projects

Ms. Sundset called upon Mr. Reynen to administer this item, who then introduced speakers representing the Zama Field Validation Project (nominated by Canada and the United States) and the Otway Basin Pilot Project (nominated by Australia and the United States).

John Harju of the Energy and Environmental Research Center in the United States, representing the Plains CO₂ Reduction (PCOR) Partnership, provided a brief description of the Zama Field Validation Project. This project involves utilization of acid gas (approximately 70% CO₂ and 30% hydrogen sulfide) derived from natural gas extraction for enhanced oil recovery. Project objectives are to predict, monitor, and evaluate the fate of the injected acid gas; to determine the effect of hydrogen sulfide on CO₂ sequestration; and to develop a "best practices manual" for measurement, monitoring, and verification of storage (MMV) of the acid gas. Acid gas injection was initiated in December 2006 and will result in sequestration of about 25,000 tons (or 375 million cubic feet) of CO₂ per year.

Peter Cook of Australia's Cooperative Research Centre for Greenhouse Gas Technologies (CO₂CRC) provided a brief description of the Otway Basin Pilot Project. This project will involve transport and injection of approximately 100,000 tons of CO₂ into a depleted natural gas well over a two year period. Besides the operational aspects of processing, transport and injection of a CO₂-containing gas stream, the project also includes development and testing of new

and enhanced MMV technologies, modeling of post-injection CO₂ behavior, and implementation of an outreach program for stakeholders and nearby communities. Data from the project will be used in developing a future regulatory regime for CCS in Australia.

Following the presentations, John Bradshaw, representing the PIRT, stated that the PIRT considered both of these projects at its meeting on 25 March, and has recommended that both of the projects be considered for CSLF recognition. Ensuing discussion led to consensus to approve both projects and pass them on to the Policy Group for its action.

9. Discussion of Overcoming Obstacles to CCS Deployment Workshop

Nick Otter of the United Kingdom, representing the PIRT, provided some feedback and reactions on the previous day's "Overcoming Barriers to CCS Deployment" Workshop.

- The quality of information presented was very high.
- The topic of workshop was adequately addressed, but the workshop may have tried to do too much in the amount of time that was available.
- The poster session was well received.
- The workshop was well attended, with more than 100 people present at the late afternoon session.

Ensuing discussion provided additional feedback that the panel sessions seemed to work very effectively in transferring information, and that a similar event would be worthwhile in the future, particularly if it involves industry. The Workshop was also effective in involving the Policy Group and getting them thinking about some of the issues that are associated with CCS projects.

There was consensus that the Secretariat conduct a survey to determine the preferences and reactions of the people who attended the Workshop. The Secretariat will prepare a draft survey of the Workshop and submit it to the PIRT before sending it to Workshop attendees. This survey will request information on what items attendees would like to see in future CSLF workshops and their overall impression of this Workshop.

10. Recommendation of Agenda Items for Next Meeting

Ms. Sundset noted that substantial progress had been made at the London Technical Group meeting. Ensuing discussion led to consensus that the Technical Group should meet every 6-8 months, and that there should be a Technical Group meeting prior to the next full meeting of the CSLF. Saudi Arabia reported that it would consider hosting the next Technical Group meeting in early 2008. Canada reported that in November 2007, in Calgary, there will be an invitational workshop on Near Term Opportunities for Carbon Capture and Storage; a

Technical Group meeting could be held in conjunction with this event if the Saudi Arabia meeting possibility does not work. There was consensus to wait on a response from Saudi Arabia before considering other options.

There was no consensus on any agenda items for the next meeting.

11. New Business

Erik Lysen of the Netherlands informed the Technical Group of a development in Rotterdam, Netherlands, where a new liquefied natural gas terminal was being built that will include CCS.

There was no other new business.

12. Review of New Action Items

New action items resulting from this meeting were reviewed and are listed below.

Action Items arising from Paris Technical Group Meeting

Item	Lead	Action
1	Chair and Secretariat	Issue invitation to IEA GHG to make a presentation on their “Capture Ready” study at next meeting.
2	Storage Capacity Estimation Task Force	Finalize its Phase II Report.
3	Storage Capacity Estimation Task Force	Proceed to Phase III of its planned activities.
4	Secretariat	Post Phase II Report of the Storage Capacity Estimation Task Force to the CSLF website once it is finalized.
5	Secretariat	Conduct a survey to determine the preferences and reactions of the people who attended the “Overcoming Barriers to CCS Deployment” Workshop. The survey will request information on what items attendees would like to see in future CSLF workshops and their overall impression of this Workshop. The Secretariat will coordinate this activity with the PIRT.
6	PIRT	Continue developing prioritization for implementation of CSLF Action Plan items.
7	PIRT	Develop a mechanism for formalizing a relationship between IEA GHG and the Technical Group.
8	PIRT	Create a subgroup to examine the CSLF Technology Roadmap and identify sections that need updating.
9	Chair	Recommend to the Policy Group the establishment of a joint Policy Group / Technical Group “Geological Storage Co-existence” Task Force which would examine societal issues impacting CCS deployment.