Carbon Sequestration leadership forum
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CSLF-T-2009-06
Revised Draft:: 07 December 2009

TECHNICAL GROUP

Revised Draft
Minutes of the CSLF Technical Group Meeting

London, United Kingdom
11 & 13 October 2009

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MINUTES OF THE CSLF TECHNICAL GROUP MEETING

LONDON, UNITED KINGDOM
11 & 13 OCTOBER 2009

Note by the Secretariat

Background

The Technical Group of the Carbon Sequestration Leadership Forum held a special session on projects on 11 October 2009 and a business meeting on 13 October 2009, in London, United Kingdom. Initial draft minutes of this meeting were compiled by the CSLF Secretariat and were circulated to the Technical Group delegates for comments. Comments received were incorporated into this revised draft. Presentations mentioned in these minutes are now online at the CSLF website.

Action Requested

Technical Group delegates are requested to approve these revised draft minutes.

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CSLF-T-2009-06
Revised Draft: 07 December 2009
Prepared by CSLF Secretariat

DRAFT

Minutes of the Technical Group Meeting

London, United Kingdom

SPECIAL PROJECTS SESSION OF 11 OCTOBER 2009

LIST OF ATTENDEES

Technical Group Delegates

Australia:	Clinton Foster, Peter Cook
Brazil:	Paulo Cunha, Paulo Rocha
Canada:	Stefan Bachu, Kourosh Zanganeh
Denmark:	Søren Frederiksen
European Commission:	Jeroen Schuppers
France:	Pierre Le Thiez, Didier Bonijoly, Christian Fouillac
Germany:	Jürgen-Friedrich Hake, Hubert Höwener
Italy:	Giuseppe Girardi
Japan:	Makoto Akai, Shinichi Terada
Korea:	Chang-Keun Yi, Chong-Kul Ryu
Mexico:	José Miguel González Santaló
Netherlands:	Harry Schreurs
Norway:	Trygve Riis (Chair), Jostein Dahl Karlsen
Saudi Arabia:	Khalid Abuleif, Abdulmuhsen Alsunaid
South Africa:	Tony Surridge, Stan Pillay
United Kingdom:	Nick Otter, Philip Sharman
United States:	Joseph Giove, George Guthrie

CSLF Secretariat John Panek, Rich Lynch, Rhiannon Davis

Invited Speakers

Ben Laenen, VITO, Belgium
Luc de Marliave, Total, France
Tore Amundsen, TCM, Norway
Brenda Barnicki, Eastman Chemical Company, United States
Ed Steadman, EERC, United States

Observers

Australia:	Chris Short
China:	Xi Liang, Jia Li
France:	Bernard Frois, Jean Louis Gelot, Philippe Lacour-Gayet
Japan:	Mike Miyagawa, Nobumichi Morishita, Tomohiro Sembongi
Norway:	Kristofer Hetland
United Kingdom:	Peter Wibberley
United States:	David Denton, John Hammond, John Harju, Gerald Hill, Jeff Jarrett, Arthur Lee, Andrew Paterson, Maria Pineda, Judd Swift
IEA:	Brendan Beck
IEA GHG:	Tim Dixon

1. Opening Remarks

The Chair of the Technical Group, Trygve Riis of Norway, called the meeting to order and welcomed the delegates and observers. Mr. Riis stated that the purpose of this special session was to review and approve projects that had been nominated for CSLF recognition.

2. Introduction of Delegates and Observers

Technical Group delegates and observers present for the session introduced themselves. Seventeen of the 23 CSLF Members were represented at this meeting, including representatives from Australia, Brazil, Canada, Denmark, the European Commission, France, Germany, Italy, Japan, Korea, Mexico, the Netherlands, Norway, Saudi Arabia, South Africa, the United Kingdom, and the United States.

3. Report from Projects Interaction and Review Team

The Chair of the CSLF Projects Interaction and Review Team (PIRT), Nick Otter of the United Kingdom, informed the Technical Group that the following ten projects had been nominated for CSLF recognition:

- Lacq CO_2 Capture and Storage Project (nominated by France and Canada)
- European CO_2 Technology Centre Mongstad Project (nominated by Norway and Netherlands)
- Fort Nelson Carbon Capture and Storage Project (nominated by Canada and United States)
- Heartland Area Redwater Project (nominated by Canada and United States)
- CCS Northern Netherlands Project (nominated by Netherlands and Norway)
- CCS Rotterdam Project (nominated by Netherlands and Germany)
- Storage of CO_2 in Limburg Coal and Sandstone Layers Project (nominated by Netherlands and France)
- TX Energy Carbon Management and Gasification Project (nominated by United States, Canada, and France)
- ZeroGen Project (nominated by Australia and Japan)
- Demonstration of an Oxyfuel Combustion System Project (nominated by United Kingdom and France)

Mr. Otter stated that the PIRT had reviewed and approved each of these projects during a teleconference on October 1st. Chairman Riis then requested representatives from each of the ten projects to provide presentations on these projects.

4. Lacq CO_2 Capture and Storage Project

Luc de Marliave, representing project sponsor Total of France, gave a presentation about the Lacq CO_2 Capture and Storage Project. This is an intermediate-scale project that will test and demonstrate an entire integrated CCS process, from emissions source to underground storage in a depleted gas field. The project will capture and store approximately 60,000 tonnes per year of CO_2 for two years from an oxyfuel industrial boiler in the Lacq industrial complex in southwestern France. The goal is demonstrate the technical feasibility and reliability of the integrated process, including the oxyfuel boiler, at an intermediate scale before proceeding to a large-scale demonstration. The project will also include geological storage qualification methodologies, as well as monitoring and verification techniques, to prepare future larger-scale long term CO_2 storage projects.

After brief discussion, there was consensus by the Technical Group to recommend CSLF recognition for this project.

5. European CO_2 Technology Centre Mongstad Project

Tore Amundsen, representing project sponsor The European CO_2 Technology Centre Mongstad (TCM) of Norway, gave a presentation about the TCM Project. This is a large-scale project (100,000 tonnes per year CO_2 capacity) that will establish a facility for parallel testing of amine-based and chilled ammonia CO_2 capture technologies from two flue gas sources with different CO_2 contents. The goal of the project is to reduce cost and technical, environmental, and financial risks related to large scale CO_2 capture, while allowing evaluation of equipment, materials, process configurations, different capture solvents, and different operating conditions. The project will result in validation of process and engineering design for full-scale application and will provide insight into other aspects such as thermodynamics, kinetics, engineering, materials of construction, and health/safety/environmental (HSE).

After brief discussion, there was consensus by the Technical Group to recommend CSLF recognition for this project.

6. Fort Nelson Carbon Capture and Storage Project

Ed Steadman, representing project sponsor University of North Dakota Energy & Environmental Research Center (EERC) of the United States, gave a presentation about the Fort Nelson Carbon Capture and Storage Project. This is a large-scale project in northeastern British Columbia, Canada, which will permanently sequester approximately two million tonnes per year CO_2 emissions from a large natural gas-processing plant into deep saline formations of the Western Canadian Sedimentary Basin (WCSB). Goals of the project are to verify and validate the technical and economic feasibility of using brine-saturated carbonate formations for large-scale CO_2 injection and demonstrate that robust monitoring, verification, and accounting (MVA) of a brine-saturated CO_2 sequestration project can be conducted cost-effectively. The project will also develop appropriate tenure, regulations, and MVA technologies to support the implementation of future large-scale sour CO_2 injection into saline-filled deep carbonate reservoirs in the northeast British Columbia area of the WCSB.

After brief discussion, there was consensus by the Technical Group to recommend CSLF recognition for this project.

7. Heartland Area Redwater Project

Stefan Bachu, representing project sponsor Alberta Research Council (ARC) of Canada, gave a presentation about the Heartland Area Redwater Project (HARP). This is a combined pilot- and large-scale project that will, after initial pilot-scale operations, permanently sequester at least one million tonnes per year CO_2 emissions from multiple large industrial sources near Edmonton, Alberta, Canada. The goal of the project is to demonstrate feasibility of CO_2 storage in onshore consolidated carbonate rocks with characteristics representative of North America, and the project will also include long-term monitoring and public outreach components. The storage target is a very large carbonate reef with a storage capacity of several hundred million tonnes of CO_2; this type of formation presents different challenges than other geologic storage options because of its mineralogy (which affects geochemical processes) and its geometry/structure and porosity/permeability (which affect the spread of injected CO_2).

After brief discussion, there was consensus by the Technical Group to recommend CSLF recognition for this project.

8. CCS Northern Netherlands Project

Harry Schreurs of the Netherlands gave a presentation about the CCS Northern Netherlands Project. This project will implement a large-scale regional plan for capture, transport and storage of CO_2 around the Eemsharbor complex in Groningen province in the northern part of the Netherlands. The project will capture CO_2 from existing and planned power plants, transport the CO_2 to the storage location, and store the CO_2 safely underground in on-shore and off-shore natural gas fields. The project represents all elements of the CCS chain (capture, transport, reuse and storage), as well as including all CO_2 capture techniques (pre-combustion, post-combustion and oxyfuel combustion). Additionally, the project will develop a communication strategy, engage stakeholders, and work toward developing a legal framework for CCS in the region.

After brief discussion, there was consensus by the Technical Group to recommend CSLF recognition for this project.

9. CCS Rotterdam Project

Harry Schreurs gave a presentation about the CCS Rotterdam Project. This project will implement a large-scale "CO_2 Hub" for capture, transport, utilization, and storage of CO_2 in the Rotterdam metropolitan area. The project is part of the Rotterdam Climate Initiative (RCI), which has a goal of reducing Rotterdam's CO_2 emissions by 50% by 2025 (as compared to 1990 levels). A "CO_2 cluster approach" will be utilized, with various point sources (e.g., CO_2 captured from power plants) connected via a hub/ manifold arrangement to multiple storage sites such as depleted gas fields under the North Sea. This will reduce the costs for capture, transport and storage compared to individual CCS chains. The project will also work toward developing a policy and enabling framework for CCS in the region.

After brief discussion, there was consensus by the Technical Group to recommend CSLF recognition for this project.

10. Storage of CO_2 in Limburg Coal and Sandstone Layers Project

Ben Laenen, representing project sponsor Flemish Institute for Technological Research (VITO) of Belgium, gave a presentation about the Storage of CO_2 in Limburg Coal and Sandstone Layers Project. This is a combined pilot- and large-scale project that will determine the viability of deep underground coal-bearing sandstone layers for large-scale CO_2 storage. The goal of the pilot-scale component of the project is to store 10,000 tonnes of CO_2 in sandstones that underlay and intercalate with coal strata in the southern part of the Netherlands, in order to evaluate the containment and storage concept. If this is successful, the large-scale component of the project will store 250,000 tonnes of CO_2 per year (up to two million tonnes total) from nearby chemicals plants that is now being vented to the atmosphere. The limited amounts of desorbed methane released from the coal seams can be captured and used directly in the industrial processes on-site.

After brief discussion, there was consensus by the Technical Group to recommend CSLF recognition for this project.

11. TX Energy Carbon Management and Gasification Project

Brenda Barnicki, representing project sponsor Eastman Chemical Company of the United States, gave a presentation about the TX Energy Carbon Management and Gasification Project. This project is a large-scale demonstration of CCS utilizing CO_2 produced by polygeneration industrial gasification. The project will capture about five million tons per year of CO_2 from an industrial petroleum coke gasification facility near Beaumont, Texas, USA, for use in enhanced oil recovery (EOR) or other geologic sequestration applications. Goals of the project include demonstration of integrated CCS at very large scale and low incremental cost, and demonstration of technologies, equipment, procedures, methodologies, operations, and supporting infrastructure for each step of the industrial gasification and CCS processes at such a scale.

After brief discussion, there was consensus by the Technical Group to recommend CSLF recognition for this project.

12. ZeroGen Project

Clinton Foster of Australia gave a presentation about the ZeroGen Project. This is a large-scale project that will construct and operate a fully-integrated, commercial IGCC power station with CCS in central Queensland, Australia. The project will initially capture 65% of CO_2 emissions, moving towards 90% as the project proceeds, and will include transport and storage, in underground saline aquifers, of at least two million tonnes per year of CO_2 for the expected 30 year life of project. The goals of the project are to prove the effectiveness, safety and permanence of CO_2 geosequestration; validate the engineering, economic, and environmental viability of advanced, coal based, low emission technologies so that similar industrial-scale facilities will be bankable technically; and to standardize technologies and protocols for CO_2 measuring, monitoring and verification of storage (MMV).

After brief discussion, there was consensus by the Technical Group to recommend CSLF recognition for this project.

13. Demonstration of an Oxyfuel Combustion System Project

Philip Sharman of the United Kingdom gave a presentation about the Demonstration of an Oxyfuel Combustion System Project. This project, located at Renfrew, Scotland, UK,

will demonstrate oxyfuel technology on a full-scale 40-megawatt burner. The goal of the project is to gather sufficient data to establish the operational envelope of a full-scale oxyfuel burner and to determine the performance characteristics of the oxyfuel combustion process at such a scale and across a range of operating conditions. Data from the project will be used to develop advanced computer models of the oxyfuel combustion process, which will be utilized in the design of large oxyfuel boilers.

After brief discussion, there was consensus by the Technical Group to recommend CSLF recognition for this project.

14. Summary of Technical Group Actions

John Panek of the CSLF Secretariat gave a short presentation that summarized the actions of the Technical Group. All ten projects were recommended for CSLF recognition.

15. Closing Comments / Adjourn

Chairman Riis thanked the delegates, project presenters, and Secretariat for their long evening of work and adjourned the session.

SESSION OF 13 OCTOBER 2009

LIST OF ATTENDEES

Technical Group Delegates

Australia:	Clinton Foster, Peter Cook
Brazil:	Paulo Cunha, Paulo Rocha
Canada:	Stefan Bachu, Kourosh Zanganeh
China:	Peng Sizhen
Denmark:	Søren Frederiksen
European Commission:	Jeroen Schuppers
France:	Pierre Le Thiez, Didier Bonijoly, Christian Fouillac
Germany:	Jürgen-Friedrich Hake, Hubert Höwener
Italy:	Giuseppe Girardi, Sergio Persoglia
Japan:	Makoto Akai, Shinichi Terada
Korea:	Chang-Keun Yi, Chong-Kul Ryu
Netherlands:	Harry Schreurs
Norway:	Trygve Riis (Chair), Jostein Dahl Karlsen
Poland:	Elżbieta Wróblewska
Saudi Arabia:	Khalid Abuleif, Ali Meshari
South Africa:	Tony Surridge, Stan Pillay
United Kingdom:	Nick Otter, Philip Sharman
United States:	Joseph Giove, George Guthrie

CSLF Secretariat John Panek, Rich Lynch, Chris Babel, Rhiannon Davis

Invited Speakers

Linda Curran, BP, United States
Tim Dixon, IEA Greenhouse Gas R&D Programme

Observers

Canada:	Wishart Robson, Marc Tessier
France:	Claudia Vivalda
Indonesia:	Hardiv Harris Situmeang
Japan:	Mike Miyagawa, Nobumichi Morishita, Tomohiro Sembongi
Norway:	Derek Taylor
South Africa:	Gina Downes
Spain:	Monica Lupion
United Kingdom:	Jim Fitzgerald, Peter Holland-Lloyd, Calum Hughes, Bill Senior, Gavin Taylor, Katherine Thomasson, Mervyn Wright
United States:	Tom Carter, Victor Der, John Hammond, John Harju, Arthur Lee, Ed Steadman, Judd Swift
IEA:	Brendan Beck
IEA GHG:	John Gale, John Topper

1. Opening Remarks

The Technical Group Chair, Trygve Riis, called the meeting to order and provided an update from the Policy Group meeting of October 12th and the Ministerial Conference earlier on October 13th. All ten projects recommended by the Technical Group were approved by the Policy Group for CSLF recognition. Also, the following four recently-completed projects received CSLF Recognition Awards at the Ministerial Conference:

- Alberta Enhanced Coal-Bed Methane Recovery Project
- CO_2 Capture Project, Phase 2
- Dynamis
- Regional Opportunities for CO_2 Capture and Storage in China

Mr. Riis noted that the CSLF has gained two new Members since the Technical Group's April 2009 meeting in Oslo. New Zealand became the CSLF's 23rd Member at the Policy Group meeting in June 2009, while Poland was admitted as the CSLF's 24th Member at the previous day's Policy Group meeting. Mr. Riis welcomed Elżbieta Wróblewska, the delegate from Poland, to the meeting and invited her to make a few comments.

Ms. Wróblewska stated that Poland was pleased to be a CSLF Member and that there are already some significant CCS activities in progress there. At Bełchatów power plant in central Poland, a pilot plant will come online in 2011 that will capture approximately 100,000 tonnes per year of CO_2 as a medium-scale demonstration of amine-based capture technology. During the second phase of this project, a larger CCS installation would be implemented by about 2015 to capture CO_2 produced by a new lignite-fired unit at the power plant. Also, a new polygeneration coal gasification facility being planned for the city of Kędzierzyn-Koźle in southern Poland is being billed as the world's first zero-emission power and chemical complex. Mr. Riis thanked Ms. Wróblewska for this update and said that the Technical Group would look forward to further news about these activities in the future.

2. Introduction of Delegates and Observers

Technical Group delegates and observers present for the session introduced themselves. Eighteen of the 24 CSLF Members were represented at this meeting, including representatives from Australia, Brazil, Canada, China, Denmark, the European Commission, France, Germany, Italy, Japan, Korea, the Netherlands, Norway, Poland, Saudi Arabia, South Africa, the United Kingdom, and the United States.

3. Adoption of Agenda

The Agenda was adopted with the following change:

- The Report from the Working Group on Performance-Based Standards was moved forward in the agenda so that it would follow the Report from the Risk Assessment Task Force.

4. Review and Approval of Minutes from Oslo Meeting

The Technical Group minutes from the April 2009 meeting in Oslo, Norway, were approved as final with one minor correction to Item 11 (Performance-Based Standards for CO_2 Storage / ISO).

5. Review of Oslo Meeting Action Items

John Panek reported that all action items from the Oslo meeting had been completed.

6. Report from CSLF Secretariat

John Panek provided a brief update on the 2009 San Francisco and London meetings of the Policy Group. Results from the San Francisco meeting were:

- New Zealand became the CSLF's 23rd Member;
- A new Task Force on CCS in the Academic Community was created;
- The CSLF Technology Roadmap was approved with minor modifications;
- A new Incentives Registry unveiled and included 73 different financial incentives for CCS of various types from around the world;
- A new Working Group on Communication of Risk was established under the existing Communications Task Force; and
- The Capacity Building Task Force and the Financing CCS Task Force developed new action plans.

Results from the previous day's Policy Group meeting were:

- Poland became the CSLF's 24th Member;
- Ten projects received CSLF recognition;
- The Capacity Building Program Plan was approved;
- The Financing CCS Task Force Program Plan was approved; and
- The CSLF Secretariat was tasked to research a proposed reciprocal relationship with the Global Carbon Capture and Storage Institute (GCCSI).

7. Report from Projects Interaction and Review Team (PIRT)

The PIRT Chair, Nick Otter, provided a brief summary of PIRT activities of the past and some ideas of what the PIRT should be doing in the future. Over the past year and a half, the PIRT's main activity has been updating the CSLF Technology Roadmap. This is now complete, but since the Roadmap is meant to be a "living document" there needs to be a plan for keeping it current. Mr. Otter stated that one of the key outcomes from the Roadmap update activities was that progress was needed in area of gap analysis – matching major projects to the full chain of CCS to identify where additional projects could be encouraged to fill these gaps. The ten newly recognized projects are the first step in this process. Another area of interest to the PIRT is how to encourage specific work in partnerships between the Technical Group and organizations such as the International Energy Agency's Greenhouse Gas R&D Programme (IEA GHG). Being able to do that would bring additional resources to bear. Finally, planning the way forward for the PIRT is now urgently needed. As an example, an existing arrangement between European Commission and CSLF allows the Technical Group to participate in projects under European Framework. However, this is a two year process from the initial call for proposals to final project approval, so the Technical Group (via the PIRT) would need to develop proposals two years forward for any work to be done under this arrangement.

There was consensus that the Technology Roadmap and the gaps analysis should be updated on a timely basis. Stefan Bachu of Canada suggested that these updates could perhaps be done annually and that the Technical Group not only review the Roadmap but also focus it to prevent duplication with roadmaps of other organizations. Harry Schreurs

suggested that the gaps analysis should be examined with respect to projects, to determine if technology gaps are being addressed by projects. Chairman Riis agreed that the Technical Group, via the PIRT, needs to be more active in following up on projects to see what is coming out of them.

There was also consensus that additional projects are needed in the CSLF portfolio of recognized projects. Mr. Otter stated that CSLF-recognized projects cover the whole spectrum, from basic research, to component and technology validation in pilot plants, to large demonstrations. Clearly, big demos are vital but smaller projects need to be encouraged to maintain the pipeline of new technologies. Mr. Riis stated that the PIRT should consider prioritizing new projects where technology gaps exist. Jürgen-Friedrich Hake of Germany agreed and suggested that focusing on specific technologies, rather than large demonstration projects, would be a good way of advancing CCS. Clinton Foster also agreed on the need to examine current and proposed new projects against the gaps analysis but suggested that a post-analysis and systemization of projects is needed, and maybe even a change in criteria of how projects are selected. Pierre Le Thiez of France also suggested that the PIRT consider developing a classification or categorization of the CCS projects already recognized. Identifying and attracting projects from developing countries should also be a priority.

In regards to partnerships, Mr. Riis suggested that the Technical Group, via the PIRT, become more engaged in national programs and with international organizations. There was general consensus for this. Philip Sharman suggested that the Technical Group could perhaps develop dialogs with CSLF Member country governments to see where activity is needed. Mr. Otter mentioned that any activities with developing countries would be a good thing, but this would need to be linked to the capacity building activities of the Policy Group.

There was discussion on whether to modify the CSLF Project Submission Form. In the section of the Form concerning project timeline, a "yes" answer is required for the question: "Will the project be able to meet its major milestones prior to the expiration of the CSLF Charter (currently 2013)?" for a project to be recommended for CSLF recognition. However, as time progresses and the year 2013 approaches, it will become more and more problematic for projects to complete major milestones by then. Tony Surridge of South Africa stated that if no changes to this question are made, it would eventually become impossible to approve projects. Dr. Bachu noted, on the other hand, that the 2013 date was originally chosen for that question to make sure recognized projects achieve something of significance before the expiration of CSLF Charter in 2013. Consensus was reached that no changes be made to the Project Submission Form for the time being, but that the PIRT should review the entire Form at its next meeting. Any updates recommended by the PIRT would be presented at the next full Technical Group meeting.

Concerning the role of the PIRT, there was general agreement that completion of the Technical Roadmap update and the review process for the ten new projects has provided some forward momentum, and that there needs to be new activities to keep the momentum going. Mr. Otter stated that the PIRT is more than a task force and as such, there needs to be agreement on how the PIRT goes forward in an organizational sense. There was consensus that the PIRT should meet again in the near future in order to reexamine its mission and develop an action plan. The Secretariat was asked to coordinate with Mr. Otter and Mr. Riis to find a suitable time and place for the PIRT meeting.

8. Report from Risk Assessment Task Force (RATF)

The Task Force Chair, George Guthrie of the United States, gave a short presentation of the RATF's recent actions. The RATF has now completed the first phase of its activities and has issued its Phase I Final Report, which examined risk-assessment standards, procedures, and research activities relevant to unique risks associated with the injection and long-term storage of CO_2. Specific topics covered by the report include risk associated with near-term injection processes (e.g., fracturing, fault re-activation, induced seismicity, etc.), and risk associated with long-term processes related to impacts of CO_2 storage, such as health / safety / environmental risks, potential impact on natural resources (e.g., groundwater, mineral resources, etc.), and return to the atmosphere. Planned Phase II Activities will include a gap assessment to identify CCS-specific tools and methodologies that will be needed to support risk assessment, and determination of the feasibility for developing general technical guidelines for risk assessment that could be adapted to specific sites and local needs. There was discussion on whether the RATF should consider liability issues, and it was decided that this question would be presented to the Joint Meeting of the Policy and Technical Groups.

The Technical Group praised and thanked the RATF for its work and accomplishments. There was consensus to accept the Phase I Report and the RATF was authorized to proceed to Phase II. Dr. Guthrie stated that additional members would be welcome in the RATF and that anyone (including stakeholders and project sponsors) who would be interested in participating should contact the Secretariat.

9. Report from Working Group on Performance-based Standards

The Working Group Chair, Didier Bonijoly of France, gave a short presentation about the Working Group and its activities. This Working Group was formed at the Technical Group meeting of April 2009 in Oslo to address Recommendation #14 from the G8-IEA-CSLF report on results from the 3rd Workshop on Near-Term Opportunities for CCS, which states that: "Governments with stakeholders need to develop performance-based standard site safety and integrity." The mandate of the Working Group was to review existing procedures and guidelines. In August, the Working Group completed a draft report that included a review of technical requirements needed for the establishment of performance and safety standards, such exposure effects on human health, ecosystems, and groundwater. This report also examined various regulation approaches that could be used to guarantee the safety and integrity of the storage sites.

Dr. Bonijoly stated that henceforward, this name of this working group would be the more descriptive Safety and Integrity Working Group (SIWG). Since there is overlap with the RATF, there was discussion on whether to merge the SIWG into the RATF, or on the other hand, define the boundaries of the SIWG to eliminate any overlap and elevate the SIWG to task force status. In the end there was consensus that the SIWG should remain as a separate entity, but for now should work closely with the RATF. Mr. Bonijoly stated that new members would be welcome. Tim Dixon of the IEA GHG commended the SIWG on its work and joined as a new member.

10. Report from CCS in the Academic Community Task Force

Tim Dixon gave a short presentation about the Task Force on behalf of its Chair, Marcelo Ketzer of Brazil, who could not attend the meeting. The mission of the Task Force is to identify and engage academic programs on CCS throughout the world, and help determine path forward for CSLF in this area. The Task Force is currently in Stage 1

(reviewing CCS in academic courses). Four regional reports are in progress, and the Task Force will produce a summary report once the regional reports done. Stage 2 activities will include completion of the summary report and coordinating activities with the Working Group on Student Body Initiative and the Policy Group's Task Force on Communications.

The Working Group on Student Body Initiative, initiated by Australia in 2008, is now a subgroup to this Task Force. The purpose of this initiative is to develop an information exchange structure or mechanism that would encourage international interaction and networking, discussion, and collaboration between students and/or professionals on CSLF-related topics. As reported at the April 2009 Technical Group meeting in Oslo, the Working Group has developed a plan for a website that would support this type of interaction. A planning meeting was held in September and the IEA GHG will begin developing the website in the near future.

11. Update on CSLF-recognized CO_2 Capture Project, Phase 2 (CCP2)

Linda Curran, Program Manager of BP's CO_2 Capture Project, gave a presentation of project status and accomplishments. This is a three-phase program, started in 2000, that is working to develop technologies that will reduce the risks and further advance CO_2 capture and geological storage. The project is focused in four key areas: capture technology development; storage, monitoring and verification development; understanding of policy to support development of frameworks that will encourage CCS deployment; and communications with broader stakeholder audiences to improve understanding.

Phase 2 of the project is now complete and results include identification of cost reduction potential of 60-80% for large, fixed combustion sources as well as reduced cost uncertainties. A field of more than 200 technologies was examined to determine which of these are most suitable for widespread deployment. The next phase of the project will further examine these technologies at a much larger scale and will also address CO_2 storage issues so that a certification framework can be developed for regulators and stakeholders.

12. Election of Technical Group Chair and Vice Chairs

Vice Chair Stefan Bachu became Chair *pro tem* for this part of the meeting. By consensus, Norway was reelected as Chair, and Australia and South Africa were elected as Vice Chairs.

13. New Business

Chairman Riis stated that France had offered to host the next Technical Group meeting, which would take place in March or April 2010. The Secretariat was asked to coordinate with France's delegation and the Chairman so that the date and venue for the meeting could be expeditiously established.

14. Review of Action Items

John Panek reviewed the action items from the meeting:

- The Secretariat will coordinate with the PIRT Chair and Technical Group Chair to determine a suitable date and venue for the next PIRT meeting.
- The PIRT will review the CSLF Project Submission Form and make recommendations for changes.
- The Secretariat will work with France's delegation and the Technical Group Chair to determine the date and venue for the next Technical Group meeting.
- The Technical Group Chair will request guidance from Policy Group on whether the RATF should include liability issues in its scope of activities.

15. Closing Remarks / Adjourn

Chairman Riis thanked Nick Otter for his service as PIRT Chair and retiring delegate Christian Fouillac of France for his service to the Technical Group. Mr. Riis congratulated the attendees for a productive meeting, thanked them for their hard work, and adjourned the meeting.