

**Note by the International Maritime Organization to the thirty-fifth session of the  
Subsidiary Body for Scientific and Technical Advice (SBSTA 35)**

**Agenda item 10(a) – Carbon Dioxide capture and storage in geological formations as  
clean development mechanism project activities**

**WORK ON CARBON CAPTURE AND STORAGE AND OCEAN FERTILIZATION  
UNDER THE LONDON CONVENTION AND PROTOCOL**

November 2011

**SUMMARY**

The Contracting Parties to the London Convention and Protocol have recently taken a number of ground-breaking steps to mitigate the impacts of increasing concentrations of CO<sub>2</sub> in the atmosphere and to ensure that new technologies that have the potential to cause harm to the marine environment are effectively controlled and regulated. The London Convention and Protocol have, so far, been the most advanced international regulatory instruments addressing carbon capture and sequestration in sub-sea geological formations and marine geo-engineering such as ocean fertilization.

1 The International Maritime Organization serves as the Secretariat for the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (the "London Convention") which was one of the first global conventions to protect the marine environment from human activities and has been in force since 1975. Its objective is to promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes. Currently, 87 States are Parties to this Convention. In 1996, the "London Protocol" was adopted which modernized the Convention entirely and will eventually replace it. Under the Protocol, all dumping is prohibited, except for possibly acceptable wastes on the so-called "reverse list", including carbon dioxide streams from carbon dioxide capture processes for sequestration. The London Protocol entered into force on 24 March 2006 and has currently 41 State Parties.

**CO<sub>2</sub> sequestration<sup>1</sup> in sub-seabed geological formations under the London Protocol**

2 Contracting Parties to the London Protocol started their discussions on CO<sub>2</sub> sequestration in earnest in 2005, as they were very concerned about the implications for the marine environment of climate change and ocean acidification due to elevated concentrations of CO<sub>2</sub> in the atmosphere. In their view, CO<sub>2</sub> sequestration in sub-seabed geological formations is one of a portfolio of options to reduce the levels of atmospheric CO<sub>2</sub> and represents an important interim solution, while every effort should be made to further develop low-carbon forms of energy. The starting point of their discussion was - at that time - that the London Protocol prohibited CO<sub>2</sub> sequestration which is viewed as a dumping activity.

3 Since 2005, the following has been achieved in this regard:

- .1 Contracting Parties adopted, on 2 November 2006, amendments to Annex 1<sup>2</sup> to the London Protocol to regulate CO<sub>2</sub> sequestration in sub-seabed geological

<sup>1</sup> OECD/IEA estimate that carbon capture and sequestration (land and sea based) could contribute to around 20% of total emissions reductions by 2050.

formations. These amendments entered into force on 10 February 2007 for all Parties to the Protocol. The rules state that carbon dioxide streams may only be considered for dumping, if: (1) disposal is into a sub-seabed geological formation; (2) they consist overwhelmingly of carbon dioxide (they may contain incidental associated substances derived from the source material and the capture and sequestration processes used); and (3) no waste is added for the purpose of its disposal. In other words, these rules do not permit CO<sub>2</sub> sequestration in the deep oceans themselves;

- .2 Contracting Parties also adopted on 2 November 2006, the "Risk Assessment and Management Framework for CO<sub>2</sub> Sequestration in Sub-Seabed Geological Structures". This Framework was developed: (1) to ensure compatibility with Annex 2 to the London Protocol; (2) identify relevant gaps in knowledge; and (3) reach a view on the implications of this practice for the marine environment;
- .3 as sub-seabed geological sequestration of CO<sub>2</sub> will now be subject to licensing, Contracting Parties furthermore adopted, on 9 November 2007, "Specific Guidelines for Assessment of Carbon Dioxide Streams for Disposal into Sub-seabed Geological Formations". These Guidelines advise Parties on how to capture and sequester CO<sub>2</sub> in a manner that meets all the requirements of the Protocol and is safe for the marine environment, over both the short and long terms;
- .4 a specific CO<sub>2</sub> sequestration reporting format was adopted in October 2008, as it is necessary to archive documentation so that future generations would be informed of the existence of the CO<sub>2</sub> sequestration reservoirs, its history and the assessment process leading to their use; and
- .5 in order to ensure that this approach translates into the effective, invaluable climate mitigation tool it is intended to be, Contracting Parties adopted on, 30 October 2009, an amendment to Article 6<sup>3</sup> of the London Protocol enabling the export of carbon dioxide streams for the purpose of sequestration in transboundary sub-seabed geological formations. The amendment will enter into force for those Parties which have accepted it, on the 60<sup>th</sup> day after two-thirds of the Parties have deposited their instruments of acceptance with IMO.

4 Currently, the Contracting Parties are reviewing the "Specific Guidelines for Assessment of Carbon Dioxide Streams for Disposal into Sub-seabed Geological Formations", to take into account the 2009 amendment with a view to including transboundary issues. This work, expected to be completed by 2012, should enable Administrations to implement the expanded Guidelines on an interim, voluntary basis, thus also encouraging Parties to accept the amendment and bring the amendment into force.

5 Protection of the oceans, being part of the 'global commons', requires internationally agreed standards. The use of geological formations on land for CO<sub>2</sub> sequestration, on the other hand, is generally subject to national law. In practical terms, there is significant potential for geological storage in formations beneath the oceans. Oil and gas reservoirs and saline aquifers are expected to have the largest potential to accommodate safe, long-term storage. The aim is to retain CO<sub>2</sub> permanently. Because of the various trapping mechanisms, storage may, in some cases, become more secure over time.

#### **Ocean fertilization discussions under the London Convention and Protocol**

6 In June 2007, the Scientific Groups, established under the London Convention and Protocol, considered several submissions relating to large scale iron fertilization of the oceans to sequester CO<sub>2</sub>. This practice is aimed at drawing down an additional amount of surplus CO<sub>2</sub>

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<sup>2</sup> Resolution LP.1(1).

<sup>3</sup> Resolution LP.3(4).

from the atmosphere in the oceans for sequestration purposes. The Scientific Groups developed a “Statement of Concern”, taking the view that knowledge about the effectiveness and potential environmental impacts of ocean iron fertilization was insufficient to justify large-scale operations and that this could have negative impacts on the marine environment and human health.

7 In November 2007, the Contracting Parties endorsed the “Statement of Concern” on large-scale ocean fertilization of the Scientific Groups and agreed that the scope of work of the London Convention and Protocol included ocean fertilization, as well as iron fertilization, and that they were competent to address this issue due to the general objective to protect and preserve the marine environment from all sources. Recognizing that it was within the purview of each State to consider proposals on a case-by-case basis in accordance with the London Convention and Protocol, they urged States to use the utmost caution when considering proposals for large-scale ocean fertilization operations.

8 In October 2008, the Contracting Parties developed and adopted a (non-binding) resolution<sup>4</sup> on the regulation of ocean fertilization. By this resolution Parties have declared, *inter alia*, that, “given the present state of knowledge, ocean fertilization activities other than legitimate scientific research should not be allowed”. In addition, it was agreed to further consider a potential legally binding resolution or an amendment to the London Protocol on ocean fertilization in the future. Furthermore, the governing bodies commenced the preparation of a document, for the information of all Contracting Parties, summarizing the current state of knowledge on ocean fertilization, relevant to assessing impacts on the marine environment, taking into account the work done on this issue in other fora.

9 In 2009, the Contracting Parties developed and analyzed a broad set of decision options. In 2010, the Contracting Parties adopted resolution LC-LP.2(2010) on the ‘Assessment Framework for Scientific Research Involving Ocean Fertilization’, the development of which was required under the 2008 resolution prohibiting ocean fertilization activities for purposes other than legitimate scientific research. The Assessment Framework guides Parties on how to assess proposals they receive for ocean fertilization research and provides criteria for an initial assessment of such proposals, including detailed steps for completion of an environmental assessment, which encompasses risk management and monitoring.

10 In order to maintain the momentum to regulate ocean fertilization, the Contracting Parties, in 2011, further developed options that would establish a global, transparent and effective control and regulatory mechanism for ocean fertilization activities and other actions falling within the scope of the London Convention and Protocol that have the potential to cause harm to the marine environment. In this regard they focused on: an amendment to the Protocol to permit ocean fertilization as placement, with either a single annex or multiple new annexes; further implementation of, and gathering of experience from, the “Assessment Framework for Scientific Research Involving Ocean Fertilization”; and further development of an interpretative resolution.

11 The Contracting Parties, are continuing the debate on whether the proposed regulation of placement is intended to be restricted to placement activities that are a subset of dumping, or whether the intention is to broaden the scope of the Protocol with respect to other types of placement, and have agreed that further work should be undertaken to consider and develop the options with a view to finalizing their deliberations in 2012.

For further information visit the London Convention and Protocol web-site: [www.londonprotocol.imo.org](http://www.londonprotocol.imo.org)

Or contact the Office for the London Convention and Protocol via [olcp@imo.org](mailto:olcp@imo.org)

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<sup>4</sup> Resolution LC-LP.1 (2008)