

GHGT-12

Update on the London Protocol – Developments on Transboundary CCS and on Geoengineering

Tim Dixon^{a*}, Justine Garrett^b, Edward Kleverlaan³

*

^a IEAGHG^b International Energy Agency CCS Unit, Paris³ International Maritime Organisation

Abstract

This paper reviews the recent regulatory developments relating to transboundary carbon dioxide capture and storage (CCS) activities and regulation of ocean fertilization and other marine geoengineering activities arising from the work and agreements under the London Protocol from 2010 to 2013. Geological storage of CO₂ in transboundary sub-seabed geological formations is now possible and regulated under the London Protocol, but not yet the export of CO₂ for geological storage in sub-seabed geological formation until an export amendment is ratified by two-thirds of the Parties to the London Protocol and comes into force. With marine geoengineering based upon placement of matter in the marine environment, the London Protocol has decided that such activities fall under its scope. It has considered and prohibited ocean fertilization except for research purposes only, and a procedure is provided for new marine geoengineering activities to be considered. For both activities, detailed guidance is provided on the assessments and conditions for issuing of permits.

© 2014 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

Peer-review under responsibility of the Organizing Committee of GHGT-12

Keywords: Legal; Regulation; Environmental protection; Marine environment; CO₂ geological storage; Transboundary; Geoengineering; Ocean Fertilization

* Corresponding author. Tel.: +44 1242802988;
E-mail address: tim.dixon@ieaghg.org

1. Introduction

The London Convention (1972) and its 1996 Protocol are the global agreements regulating dumping of wastes at sea [1 and 2]. The 1996 Protocol, which comprehensively and substantially amends the parent convention, entered into force in March 2006 and eventually it will replace the London Convention. The Protocol prohibits dumping of wastes or other matter at sea and in the sub-seabed except those specified in its Annex 1, and these require permitting with extensive impact assessments, conditions and monitoring. Examples of wastes or other matter which may be dumped include dredged material, fish waste, inert, inorganic geological material, and, because of the 2006 amendment, CO₂ streams for disposal in sub-seabed geological formations. The amendment entered into force in February 2007. To provide the assessments and conditions required in issuing a permit, CO₂ Specific Guidelines were developed and agreed in 2007 [3]. For a more detailed description and background to the 2006 CCS amendment and associated guidelines see Dixon et al [4]. IEAGHG and the International Energy Agency CCS Unit actively participate and contribute technical and policy evidence base on CCS. The International Maritime Organization (IMO) performs secretariat duties for the London Protocol.

The main issue for CCS at the London Protocol since the 2006 amendment is the topic of transboundary export of CO₂ for sub-seabed geological storage. The London Protocol Article 6 prohibits exports of wastes for dumping in the marine environment.

ARTICLE 6. EXPORT OF WASTES OR OTHER MATTER.

“Contracting Parties shall not allow the export of wastes or other matter to other countries for dumping or incineration at sea.”. [2]

This is intended to stop Parties exporting their waste to non-Parties so as to get around the London Protocol controls. However, this prohibits transboundary transport, ie export, of CO₂ for sub-seabed geological storage. There may well be a need for such export in the situations where a Party does not have sufficient suitable geological storage capacity but they still wish to use CCS to reduce emissions. In LP4 in October 2009 an amendment was adopted to remove this restriction (resolution LP.3(4)) [5]. The amendment requires that an agreement or arrangement has been entered into by countries concerned, which should include permitting responsibilities and, for export to non-parties, equivalent provisions as those required of Protocol Parties.

AMENDMENT TO ARTICLE 6 OF THE LONDON PROTOCOL

“2 Notwithstanding paragraph 1, the export of carbon dioxide streams for disposal in accordance with Annex 1 may occur, provided that an agreement or arrangement has been entered into by the countries concerned. Such an agreement or arrangement shall include:

- 2.1 confirmation and allocation of permitting responsibilities between the exporting and receiving countries, consistent with the provisions of this Protocol and other applicable international law; and*
- 2.2 in the case of export to non-Contracting Parties, provisions at a minimum equivalent to those contained in this Protocol, including those relating to the issuance of permits and permit conditions for complying with the provisions of annex 2, to ensure that the agreement or arrangement does not derogate from the obligations of Contracting Parties under this Protocol to protect and preserve the marine environment.*

A Contracting Party entering into such an agreement or arrangement shall notify it to the Organization.” [5]

Work commenced to revise the CO₂ Specific Guidelines for the assessment of carbon dioxide streams for disposal into sub-seabed geological formations to take into account transboundary activities (export and migration). Through this work, it was decided that sub-seabed migration across national boundaries does not constitute export, and so was not prohibited by Article 6, but was not covered by the CO₂ Specific Guidelines. Progress was made in 2012 by separating the guidance into technical and permitting responsibility issues, and so two new documents were produced: revised CO₂ Specific Guidelines covering subsurface transboundary migration; and Guidance on the implementation of article 6.2 on the export of carbon dioxide streams for disposal in sub-seabed geological formations for the purpose of sequestration – separating out the permitting responsibilities and standards from Specific Guidelines. The revised CO₂ Specific Guidelines were finalized and adopted on 2 November 2012 (LC 34/15, annex 8) [6]. The Guidance on the implementation of article 6.2 on the export of carbon dioxide streams for disposal in sub-seabed geological formations for the purpose of sequestration was adopted in October 2013 (LC 35/15, annex 6) [7].

2. Transboundary aspects of the revised CO₂ Specific Guidelines

The CO₂ Specific Guidelines provide the assessments and considerations required in issuing a permit [3]. These include CO₂ stream characterization, site selection and characterisation, environmental impact assessment, risk assessment, monitoring, mitigation and remediation plans, and risk management. Their role is to ensure allowed activities are undertaken with minimum impact on the marine environment.

The revised CO₂ Specific Guidelines are adapted to allow for transboundary CCS activities [6]. They are confirmed to apply also when the 2009 export amendment comes into force.

Given the earlier view on subsurface movement transboundary not being an export and therefore not prohibited, they provide a definition of transboundary movement subsurface and confirm and clarify this view in a footnote to section 1.10 as follows:

“Transboundary movement of CO₂ streams after injection is defined as movement of CO₂ streams across a national boundary within a transboundary sub-seabed geological formation after the CO₂ streams have been injected. The transboundary sub-seabed geological formations may extend into the jurisdiction of another state or into the high seas. Transboundary movement of CO₂ streams after injection is not export in the sense of article 6, of the London Protocol (see resolution LP.3(4), adopted on 30 October 2009, Recital 12). “ [6]

They also confirm that where the sub-seabed geological formations could be used by more than one country or where there is potential for transboundary movement sub-surface, then the responsibility for implementation of these Specific Guidelines is that of the Contracting Party where injection occurs. That Contracting Party is also required to cooperate with other relevant Contracting Parties, other States and other relevant entities to ensure adequate sharing of information in regards to the characterization of the geological formation, ie capacity and injectivity, storage integrity, potential migration and leakage pathways, etc.

This means that permits can now be issued under the London Protocol for transboundary storage by London Protocol Parties.

3. Guidance on Export

The other transboundary aspect to be resolved is the development of guidance to determine the responsibilities of Parties in the case of export of CO₂, in particular if exported to a country that is not a party to the London Protocol. A working group on this (led by Canada) reached a conclusion at the 2013 meeting with a new document “Guidance on the Implementation of Article 6.2 on the Export of CO₂ Streams for Disposal in Sub-seabed Geological Formations for the purpose of Sequestration” [7]. This sets out the responsibilities of Parties and the requirements of the

agreements and arrangements which must be entered into by Parties who wish to undertake export of CO₂, including if to non-Parties, so as to ensure that the standard of requirements of the London Protocol on permitting CO₂ geological storage are maintained.

Allocation of permitting responsibilities between exporting and receiving countries must be confirmed in advance of export, and notified to the IMO. A Contracting Party is responsible for the issuance of a permit for where a CO₂ stream is loaded onto a vessel in its territory and also where a vessel flying its flag loads a CO₂ stream in the territory of a non-Contracting Party for export to another country. *“Depending on the facts of a given export scenario, there could be several countries involved, and therefore the agreement or arrangement would need to reflect the appropriate permitting responsibilities of each”* [7]. With exports to non-Contracting Parties, it is the full responsibility of the Contracting Party to ensure *“that the provisions of the agreement or arrangement must at a minimum be equivalent to those contained in the Protocol – including those relating to the issuing of permits and permit condition”* [7]. This is the means of ensuring the same level of environmental protection is provided for a non-Party storing a Party’s CO₂.

The exporting country is recognized as best placed to characterize the CO₂ stream. The receiving country is recognized as best placed to select and characterize the storage site, and to assess the potential environmental effects, to verify compliance and field monitoring, and risk management arrangements, and to share that data with the exporting country.

In the case of a breach of an agreement or arrangement by a non-Contracting Party, the Contracting Party should *“engage in consultations to rectify”* [7]. In the case of a *“significant ongoing breach”* the Contracting Party is required to terminate the export [7].

This new Guidance was adopted at the Annual Meeting on 18 October 2013, for use when the export amendment comes into force.

4. Implications

For CCS activities wishing to include a transboundary element, these results have significant implications. For storage beneath the sea-bed, use of a storage formation which crosses a transnational boundary is now possible. However, to export to use another countries sub-seabed storage is still prohibited unless not for storage eg for CO₂ enhanced oil recovery.

5. Future developments

However there is one significant remaining transboundary aspect to be resolved. The export amendment adopted in 2009 to allow export of CO₂ for geological storage requires two thirds of Parties to ratify before it comes into force. This currently means 29 countries need to ratify it. To date just two have (Norway and UK). Emphasis and concern on the rate of this ratification was expressed by Mr. Koji Sekimizu, the IMO Secretary-General in his opening speech to the 2013 annual meeting of the London Convention and London Protocol (held at the International Maritime Organisation in London from 14-18 October 2013(LC35 and LP8)) [8].

“The London Protocol currently is also the only global framework to regulate carbon capture and sequestration in sub-seabed geological formations..... However, it remains a serious concern that, to date, only two of the 43 London Protocol Parties have accepted the 2009 amendment, which is a long way from satisfying the entry-into-force requirements. The importance of securing its entry into force cannot be over-emphasized, if the threat of acidification of the oceans from climate change is to be minimized.”
[8]

It is understood by the authors' informal enquiries that just four further countries are working on their ratification at the moment, so at this rate it will take many years to come into force, and in the meantime London Protocol countries cannot export their CO₂ to another country for storage in the marine environment.

5. Marine Geoengineering

In terms of marine geoengineering, the Parties of the London Convention and London Protocol (LC/LP) have expressed significant concerns about ocean fertilization and other activities with the potential to cause harm to the marine environment.

In 2007, prompted by an interest by a private company in using ocean fertilization to generate carbon credits, and after consideration by the LC Scientific Group a statement of concern was issued: *"knowledge about the effectiveness and potential environmental impacts of ocean iron fertilization currently was insufficient to justify large-scale operations"* *"The Scientific Groups of the London Convention and Protocol noted with concern the potential for large-scale ocean iron fertilization to have negative impacts on the marine environment and human health."* [9].

This was followed in 2008 by an Ocean Fertilisation Resolution: *"given the present state of knowledge, ocean fertilization activities other than legitimate scientific research should not be allowed"* [10].

Thereby prohibiting commercial large-scale ocean fertilization activities but allowing such activities for research purposes only. In 2010 a resolution adopted the 'Assessment Framework for Scientific Research Involving Ocean Fertilization' to assist parties in decision-making and permitting (LC-LP.2(2010) [11]. This assessment framework provides the usual requirements of problem formulation, site selection and description, exposure assessment, effects assessment, risk characterization, risk management, and also a decision making step to determine whether the proposed activity is legitimate scientific research. Work continued on this issue at the subsequent meetings.

Concern around this issue intensified in 2012, because of a commercial ocean fertilization activity of Canada's west coast, undertaken without knowledge or authorisation by the Government of Canada. This led to another statement of concern at the 2012 annual meeting: *"The Parties... express grave concern regarding the deliberate ocean fertilization activity that was recently reported to have been carried out in July of 2012 in waters off the Canadian west coast. This activity,involved the deliberate introduction into surface waters of 100 metric tonnes of iron sulfate. The Parties recognize the actions of the Government of Canada in investigating this incident"* [12]. At this meeting, it was considered to expand their scope to regulation of all marine geo-engineering activities.

In the 2013 annual meeting, following a proposal from Australia, Nigeria and South Korea, the Protocol to the London Convention formalized its regulation of ocean fertilization and in addition allowed for the London Protocol to consider, include and regulate other marine geoengineering activities in the future. It did this by adoption of a series of amendments [13] which acted in the following ways. They created a definition of marine geoengineering in Article 1 (Definitions). They created a new Article 6bis which prohibits placement of matter for marine geoengineering activities listed in a new Annex 4 unless Annex 4 allows them and they are permitted under conditions in a new Annex 5. The new Annex 4 created currently lists just one activity, ocean fertilization, with a definition and prohibiting all such activities unless for scientific research. A new Annex 5 provides an assessment framework for issuing permits for activities in Annex 4, supplementary to that issued for ocean fertilization in 2010, but in a more standard format of permit conditions. In addition, draft guidance was produced on procedures to consider new activities in Annex 4, using assessment by the Scientific Group of the London Protocol.

The conclusion all of this is that ocean fertilization is now prohibited, except for ocean fertilization for research purposes only, and requires that the assessment framework and permitting conditions are to be followed.

6. Conclusions

With these recent developments, sub-seabed transboundary CO₂ geological storage is now possible under the London Protocol, but not yet the export of CO₂ for geological storage. Guidance on responsibilities is in place for when the CO₂ export amendment is ratified and comes into force. The slow rate in this ratification will cause a significant problem for any CCS projects in a country which is a Party to the London Protocol seeking to export their CO₂ for geological sub-seabed storage and potentially for storage developers seeking to import CO₂. The exception is if the exporting country is not a Party to the London Protocol, or if the CO₂ is for enhanced oil recovery in which case it is for a purpose other than disposal.

For marine geoengineering, an even more significant development has taken place. The London Protocol has decided that such activities in the marine environment fall under its scope and one such activity, ocean fertilization, is prohibited except for research purposes.

The precautionary principle is applied for both technologies. A ‘strong’ version for CCS with the burden of proof falling on the operator, and an ‘extreme’ version for ocean fertilization with explicit prohibition except for research.

The different results for CCS and marine geoengineering in the London Protocol, the purpose of which is protection of the marine environment demonstrate the need for good scientific and technical evidence-base to support assessments, decision-making and regulatory progress on new climate change mitigation technologies, and the differences in such knowledge being available for the two technologies.

References

- [1] Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (London Convention 1972). www.imo.org
- [2] Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (London Convention 1972). London Protocol (1996) – protocol thereto. www.imo.org
- [3] Specific Guidelines for the Assessment of Carbon Dioxide for Disposal into Sub-seabed Geological Formations. LC 29/17 2007
- [4] Dixon T, Greaves A, Thomson J, Christophersen O, Vivian C. International Marine Regulation of CO₂ Geological Storage. Developments and Implications of London and OSPAR. GHGT-9. Energy Procedia 1 (2009) 4503-4510.
- [5] On the Amendment of Article 6 of the London Protocol [CO₂ export amendment]. Resolution LP.3(4). 2009
- [6] 2012 Specific Guidelines for the Assessment of Carbon Dioxide for Disposal into Sub-seabed Geological Formations. LP.7. LC 34/15, Annex 8. 2012 [aka Revised CO₂ Specific Guidelines or Revised CO₂ Sequestration Guidelines]
- [7] Guidance on the Implementation of Article 6.2 on the Export of CO₂ Streams for Disposal in Sub-seabed Geological Formations for the Purpose of Sequestration. LC 35/15 Annex 6. 2013
- [8] Sekimizu K. Address of the IMO Secretary-General at the opening of the thirty-fifth meeting of Contracting Parties to the London Convention and the eighth meeting of Contracting Parties to the London Protocol . London, 14 October 2013. <http://www.imo.org/MediaCentre/SecretaryGeneral/Secretary-GeneralsSpeechesToMeetings/Pages/LC35LP8.aspx>
- [9] Scientific Group of the London Convention. Iron Fertilization of the Oceans to Sequester CO₂. LC/SG 30/14 pp9-11. 2007.
- [10] Resolution LC-LP.1 (2008) on the Regulation of Ocean Fertilization. LC 30/16. Annex 6. 2008
- [11] Assessment Framework for Scientific Research Involving Ocean Fertilization. LC 32/15. Annex 6. 2010
- [12] Statement of Concern Regarding the Iron Fertilization on Ocean Waters West of Canada. LP 7. LC 34/15, Annex 7. 2012
- [13] Resolution LP.4(8) on the Amendment to the London Protocol to Regulate the Placement of Matter for Ocean Fertilization and Other Marine Geoengineering Activities LP.8. LC 35/15. Annex 4. Annex 5. 2013