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CCS in the Marine Subsoil

**Marine ecology and geology and the
design of an emerging legal framework**

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The Leibniz Institute of Marine Sciences

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Overview

- I. The general perspective: the United Nations Convention on the Law of the Sea
- II. London Convention and Protocol
- III. The OSPAR Convention
- IV. The Helsinki Convention
- V. Summary / Concluding Remarks

I. UNCLOS: Rights of Coastal States to Regulate and Authorize

- Territorial Sea (+)
- Continental shelf (+), via control over artificial islands, installations and drillings (Art. 80 and 60, Art. 81),
- not because of sovereign rights over exploration and exploitation of natural resources (Art. 77 para. 1 and 4).

I. UNCLOS: Environmental Obligation of Members

- 192 ... States have the obligation to protect and preserve the marine environment.
- 194 all sources of pollution – Art. 1
- Article 207 - Pollution from land-based sources
- Article 208 - Pollution from seabed activities subject to national jurisdiction

II.1 CCS and the London System

- London Convention, 1972, 81 Parties
- London Protocol, 1996, 31 Parties
- Coverage
 - Convention: sea; Protocol: explicitly includes seabed
 - Activities excluded:
 - Disposal of wastes or other matter directly arising from, or related to the exploration, exploitation and associated off-shore processing of sea-bed mineral resources, LC Art. III.1.c / LP Art. 1.4.3.

II.2 CCS and the London System

- Structure
 - Activities: Dumping
 - Substances:
 - LC – prohibition/restriction regarding defined substances (Annex I-III)
 - Industrial waste? Annex I para. 11
 - LP – general prohibition rule – exceptions
 - Originally clearly did not cover CO₂
 - Exceptions

II.3 Substances

- LC: prohibition of dumping of certain defined substances
- LP: general prohibition, some specific substances allowed

II.4 London Protocol Amendment

Annex 1, 1.8 inserted:

Carbon dioxide streams from carbon dioxide capture processes for sequestration may be considered for *dumping*.

Annex 1, 4 inserted:

Carbon dioxide streams referred to in paragraph 1.8 may only be considered for dumping, if:

- .1 disposal is into a **sub-seabed geological formation**; and
- .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 wastes or other matter are added** for the purpose of disposing of those wastes or other matter.

II.5 London Protocol Amendment

- **Carbon dioxide streams:** wording takes note of the fact, that sequestration does not result in pure CO₂
- **sub-seabed geological formation:** no disposal into water column
- ... **consist overwhelmingly of carbon dioxide:**
 - minimization required
 - But stream may contain certain associated substances
- **no wastes or other matter added**
- CO₂ streams *considered* for dumping – requires a **permit**, Art. 4.1.2 according to Annex II

II.6 Protocol Amendment – Guidelines

Existing

*GUIDELINES FOR THE ASSESSMENT OF WASTES OR
OTHER MATTER THAT MAY BE CONSIDERED FOR
DUMPING*

complemented by:

*Specific Guidelines for the Assessment of Carbon Dioxide
Streams for Disposal into Sub-seabed Geological Formations*

II.7 Exceptions under the Convention and the Protocol

- LC III.1.b / LP 1.4.2:
- Normal operations of vessels, aircraft, platforms or other man-made structures ...
 - Understood to cover EOR-technologies
- Placement of matter for a purpose other than mere disposal thereof ...
 - Understood to cover research activities

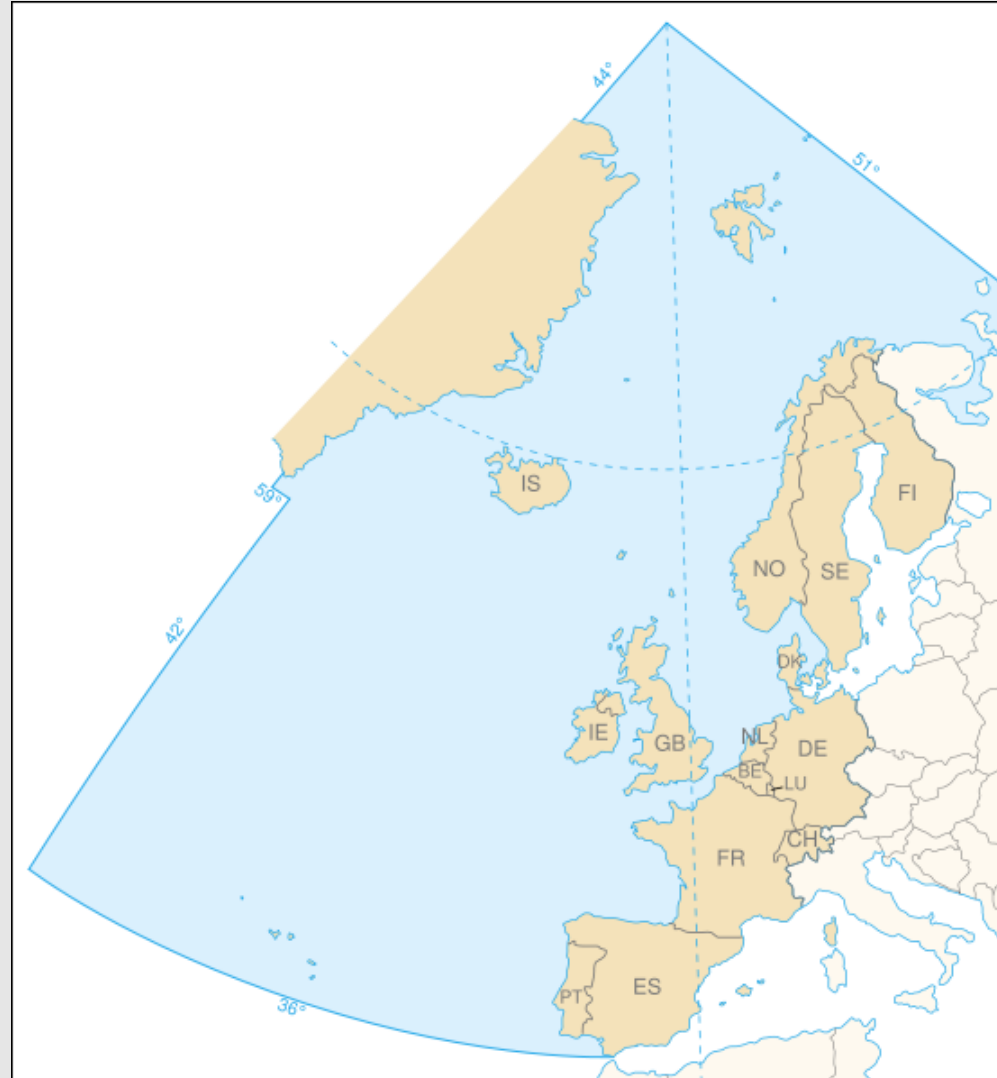
II.8 What about the situation under the Convention

- 51 member States not parties to the Protocol
- Coverage: sea, not explicitly seabed
- Are CO₂-streams „industrial waste“ under Annex I para. 11, and therefore may not be dumped?

III.1 OSPAR

- Regional instrument for the protection of the marine environment - North-east Atlantic
- Addresses pollution:
 - from land-based sources
 - Might cover storage via pipeline
 - by dumping or incineration
 - Art. 4 + Annex II
 - from offshore sources
 - Art. 5 + Annex III
 - Offshore sources – related to „exploration, appraisal, exploitation of liquid or gaseous hydrocarbons

III.2 OSPAR



UBA International Workshop - CO₂ Storage and the Marine Environment
Stoll, International law on the protection of the marine environment

III.3 OSPAR-Convention Rule-Exception

- **Rule:** No pollution from
 - land-based sources
 - dumping or incineration
 - off-shore sources
- **Exceptions** in Annexes I, II, III
- Originally, exceptions did not cover CCS

III.4 OSPAR 2007 Amendments

- Amended annexes II and III (dumping + offshore sources, Annex II Art. 3 .2 lit. F and similar: Annex III, Art. 3.3)
 - carbon dioxide streams from carbon dioxide capture processes for storage, provided:
 - i. disposal is into a **sub-soil geological formation**;
 - ii. the streams consist **overwhelmingly** of carbon dioxide. They may contain incidental associated substances derived from the source material and the capture, transport and storage processes used;
 - iii. **no wastes** or other matter are added for the purpose of disposing of those wastes or other matter;
 - iv. they are intended to be **retained** in these formations **permanently** and will not lead to significant adverse consequences for the marine environment, human health and other legitimate uses of the maritime area.

III. 5 OSPAR Guidelines

- OSPAR Decision 2007/2 on the Storage of Carbon Dioxide Streams in Geological Formations
- OSPAR Guidelines for Risk Assessment and Management of Storage of CO₂ Streams in Geological Formations
 - Framework for Risk Assessment and Management of Storage of CO₂ Streams in Geological Formations (FRAM) (Annex 1 to the guidelines)

III. 6 OSPAR Decision on Prohibition on release in the Water Column

- OSPAR Decision 2007/1 to Prohibit the Storage of Carbon Dioxide Streams in the Water Column or on the Sea-bed

III.7 OSPAR Exceptions

- Exceptions, Art. 1 lit. g
 - **normal operations** of vessels or aircraft or offshore installations
 - Includes EOR technologies
 - placement of matter **for a purpose other than the mere disposal** thereof, provided that, if the placement is for a purpose other than that for which the matter was originally designed or constructed, it is in accordance with the relevant provisions of the Convention;
 - Includes research activities

IV Helsinki Convention

- regional agreement for the Baltic Sea
- Addresses pollution from land-based sources as well as dumping
- Literally, storage by land-based devices appear permissible
- Dumping clearly prohibited
- In view of the vulnerability of the Baltic Sea environment, CCS activities should not take place
- A clarification might be useful

V. Summary (1)

- Storage in the **water column** and on the seabed prohibited (LP, OSPAR, also UNCLOS ??).
- **Research** activities excluded from rules, addressed by UNCLOS
- **EOR** technologies largely exempted from rules of LC, LP and OSPAR. However, subject to licensing procedures concerning platforms / activities.
- Storage in subsoil geological formation of CO₂ by way of **dumping/offshore installation**
 - permissible under LP, OSPAR
 - but not under LC and the Helsinki Convention
 - subject to a number of substantial requirements
 - and on the basis of a
 - licensing procedure including a
 - **comprehensive assessment**

V. Summary (2)

- Storage in subsoil geological formations via **pipeline**
 - feasibility questionable
 - addressed by OSPAR and Helsinki, subject to licensing
- Storage in subsoil geological formations of CO₂ produced at platform immediately after production of oil/gas and stored in a place different from the one used for production (Sleipner)
 - exempt from LC / LP, addressed by OSPAR – offshore sources
- Use of machinery situated on the seabed ... (Snohvit project)

Concluding remarks

- Need for a
 - more comprehensive and harmonized framework of rules
 - applicable in the same manner to different technologies (EOR, Offshore installations, etc.)
- More precise standards for
 - maximum allowable leakage
 - additional substances in CO₂-stream
 - substances allowed
 - Maximum concentration