

# **Future of Deep Sea Mineral Resources: Environmental Issues**

**PRESENTATION FOR THE  
INTERNATIONAL CONFERENCE ON THE LEGAL, SCIENTIFIC AND ECONOMIC ASPECTS OF  
DEEP SEABED MINING  
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## **ABSTRACT**

**Early in the second phase (1992-1994) of the UN Secretary-General's informal consultations on outstanding issues relating to the deep seabed mining provisions of the UN Law of the Sea Convention (LOSC) culminating in the Agreement relating to the Implementation of LOSC Part XI, "environmental considerations" were removed from the original list of "nine issues representing areas of difficulty," because "it was no longer considered to be a controversial issue in the context of deep seabed mining." (UN Doc A/48/950, para 9; 9 June 1994.)**

**This presentation examines the reasons given for this conclusion then and contrasts them with the environmental issues now facing the International Seabed Authority as it develops exploitation regulations.**

# Part One – How did the ISA get here?



# The "nine issues representing areas of difficulty"

*NB: In original order (1991 Information Note):*

- (a) the Enterprise
- (b) **transfer of technology**
- (c) cost to States Parties
- (d) production limitation
- (e) compensation fund
- (f) financial terms for commercial operations
- (g) decision-making
- (h) **environmental considerations** and
- (i) the Review Conference

# The Original Environmental Concerns

“Some impact on the marine environment as a consequence of any activity on the seabed [is] inevitable” BUT

“the concern is in respect of any effect from such activities on the living or non-living components of the marine environment and associated ecosystems beyond that which is negligible or which has been assessed and judged to be acceptable

[i.e., “do not cause unacceptable defined changes to the marine environment”] in accordance with relevant rules and regulations for this purpose” [and]

“in accordance with the standards to be established”... “on the basis of data and information gathered at each stage of such activities”.

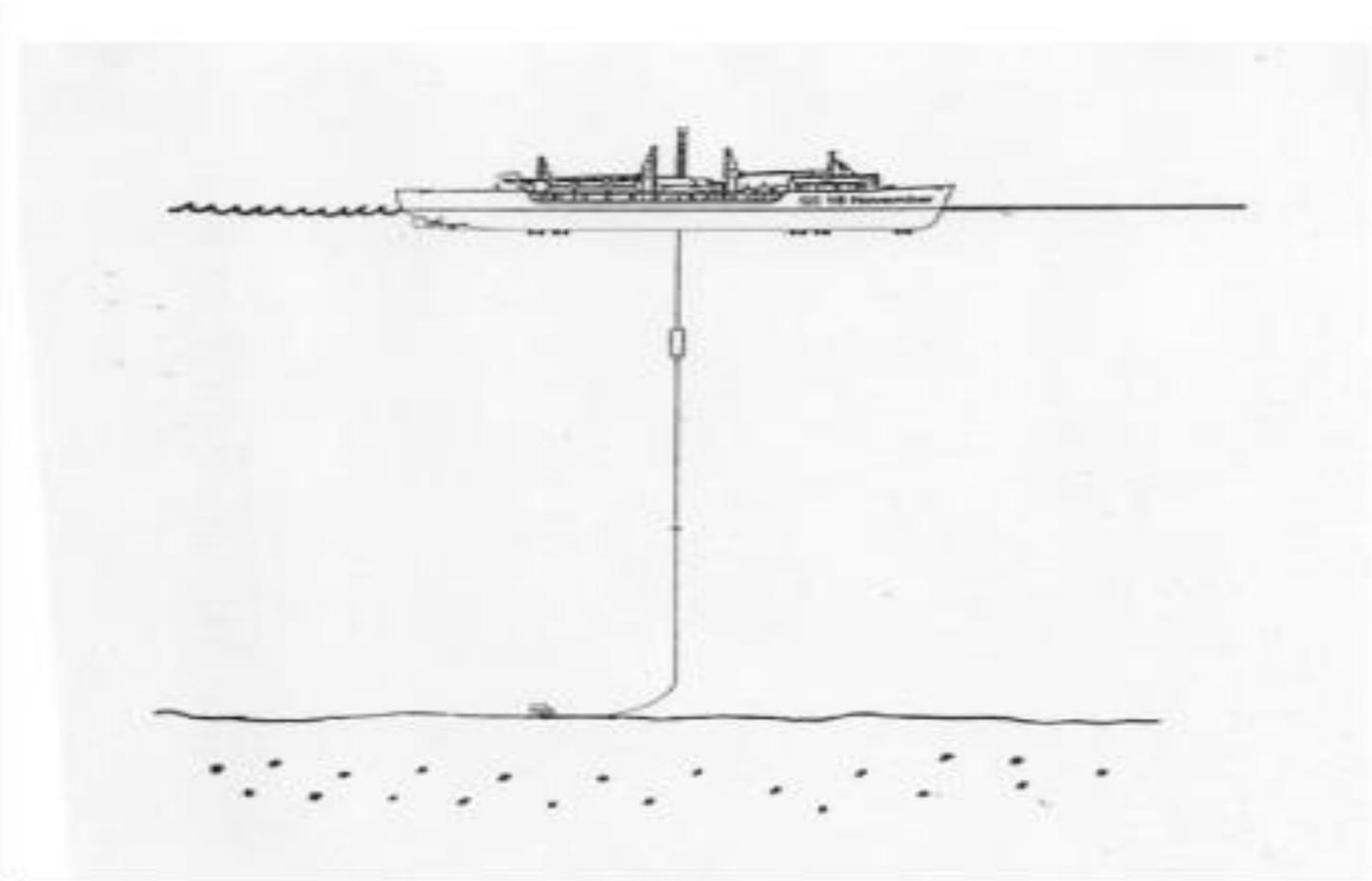
## **Elements Assuaging Concerns**

- **“Environmental aspects of deep seabed mining require continuous study at every stage of the activities”**
- **Prep Com developing “comprehensive set of rules concerning the environment”**
- **[Rules] “shall be reviewed and updated on a continuing basis in order to incorporate the latest results of research in the deep seabed and the experience derived from deep seabed mining when that takes place”**
- **“No insurmountable obstacles in the progress being made ”**
- **“Not a controversial issue and qualitatively different from the other eight”**
- **Prep Com 10 finished environmental regulations in August 1992.**

## Part One: Conclusions

- **Environment not considered as an issue preventing *industrialized countries* from adopting the LOSC**
- **Environmental considerations are adequately addressed in Prep Com's draft nodule Regulations *based on the existing Part XI and Part XII* of the LOSC, such that the *environmental provisions in Part XI did not require further work.***
- ***Exploration* – focus of the draft Regulations - expected to be the principal activity in the Area for the foreseeable future.**
- ***Exploitation not expected until well into the 21<sup>st</sup> century.***

Part Two: where should the ISA be going, from the perspective of 25 years later – on environmental issues?



## Part XI: Article 145 - Protection of the marine environment

- *Necessary measures shall be taken in accordance with this Convention with respect to activities in the Area to **ensure effective protection for the marine environment** [not just seabed, also water column, includes outside the Area] from harmful effects which **may [precautionary]** arise from such activities. To this end the Authority shall adopt appropriate rules, regulations and procedures for inter alia:*
  - *(a) the **prevention, reduction and control** [NOTE SEQUENCE] of pollution [defined in Article 1] and other hazards [not defined, but include at least listed activities below] to the **marine environment, including the coastline**, [emphasis added: i.e, beyond the Area] and of **interference with the ecological balance of the marine environment**, [visionary] particular attention being paid to the need for protection from harmful effects of such activities as drilling, dredging, excavation, disposal of waste, construction and operation or maintenance of installations, pipelines and other devices related to such activities;*
  - *(b) the **protection and conservation** of the **natural resources** [not just mineral resources] of the Area and the **prevention of damage to the flora and fauna of the marine environment**.*

# MAJOR MISSING ENVIRONMENTAL ISSUES

*No attempt to define, reduce to regulatory form and implement the protection and/or achievement of environmental elements set out in Article 145:*

- **a) the specific extension of the Convention's concept of the marine environment to "the coastline" with regard to the effects of activities in the Area - i.e., well beyond the definition of the Area set out in Article 1 of the Convention**
- **b) "the ecological balance of the marine environment"**
- **c) "interference" with the aforesaid "ecological balance"**
- **d) "the natural resources of the Area"**
- **e) "protection and preservation of the aforesaid "natural resources"**
- **f) "the flora and fauna of the marine environment"**
- **g) "prevention of damage" to the aforesaid "flora and fauna".**

## **ENVIRONMENTAL ISSUES**

**\*\*\*Permanent removal of solid (overall) and (probably) the particular solid substrate, e.g., nodules and crusts, for which seabed certain organisms & communities are probably specialized**

**Changes in upper sediment layers (nodules) (e.g., removal, compaction, mixing)**

**Sedimentation (bottom, surface, mid-water)**

**Noise/Vibration**

**Light (both too much & too little)**

**Operational & accidental (leaks, spills) discharges, effects of corrosion**

**Vessel traffic between miner and coast**

**Disturbance of surface & mid-water marine communities, including of migratory routes, especially if mining vessel on location for many months**

**\*\*\*Slow and different regeneration of especially sessile biological communities; remediation potential probably unlikely –**

## REMOVAL OF HARD SUBSTRATE

***In 1978, experimental dredging to recover manganese nodules was carried out in the Clarion-Clipperton Zone. The dredging removed the upper 4.5-cm layer of sediment and left behind a track approximately 1.5 m wide. In 2004, a team of researchers returned to the area, where the original disturbance is still clearly visible more than 20 years later.***

*Photo: Ifremer, Nodinaut 2004, Nautille*

*Text: Grid-Arendal, Marine Newsletter 1, January 2014.*



## THE (neglected?) ROLE OF TECHNOLOGY

- **Technology** - **essential driver** in LOSC: e.g., Chapter XIV (ISA in Arts. 273, 274, note, e.g., Art. 274(b) on technical documentation), Art. 144 (Part XI), Annex III Art. 13 (1)(b) and (14) – financial incentives (Art. 5 deleted by IA) IA sections I (i) & 5 (c )
- **NB: #2 of 9 issues in Informal Negotiations** (# 8: environment)
- IA sections I (i) & 5 (c ) highlight *technology for protection and preservation of the marine environment*
- Environmental Issues for deep-sea mining are broadly similar to those associated with other commercial activities exploiting marine resources (including ocean space as such, an overlooked resource), e.g., oil & gas, fishing, shipping, offshore renewable energy generation, sand & gravel extraction, dredging, wet diamond mining, tourism ...

# TECHNOLOGY CAN HELP PROTECT THE MARINE ENVIRONMENT

LOSC requires, e.g.:

- ***Prevention, Reduction & Control*** of harmful effects – **in that order**
- ***Monitoring*** marine technology developments on marine environmental protection (MEP) relevant to activities in the Area
- ***Transfer*** to ISA of data (other than equipment design data) necessary for ISA to develop MEP rules, regulations & procedures (includes oceanographic, hydrographic and environmental baseline data)

LOSC suggests (i.e., “may”) consideration of **“financial incentives”** to contractors for certain purposes, which could – and arguably should - include technology development for MEP, **especially for prevention**

## EXAMPLES OF TECHNOLOGY & RESEARCH NEEDS

- Mitigate the loss of substrate
- Enhance natural recolonization of the seabed
- Develop methods to minimize effects of direct disturbance of the sea floor and of material carried in, and deposited from, the operational plume.
- How to support recolonization *after* mining *during* mining process?
- Nodule ecosystem characterization: focused on *obligate* nodule communities on nodules and in the surrounding sediment, especially including microbes
- Possible mitigation techniques during mining:
  - Nodule replacement? Is “hard” enough? Similar or “neutral” surface composition?
  - “zebra” mining? How wide? How long? Straight or curved?
  - Collected sediment dilution and/or dispersal by mining tool?
  - Sediment compaction minimization by mining tool?

# CONCLUSIONS

- Grasp the nettle of Article 145 on the marine environment
- Engage other international marine fora in addressing this issue
- Foster development and transfer of technology for prevention, reduction and control of harmful effects
- Release all baseline environmental data submitted to ISA

*Environmentally responsible deep sea mining is feasible, but needs correctly targeted research, technology, monitoring and adaptive management*

There is plenty of opportunity in the sea –  
*but only if*  
our activities (not the sea's) are managed correctly

- Land: 29%
- Sea: 71%

THANK YOU

(blue planet image courtesy BBC)

