Pilot Mining Tests: Legal and Regulatory Issues

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Background

- Technology advancing – faster than the legal regime?
- Choice of technology is decisive for reducing impacts of DSM
- PMTs are a logical next step in technological development
- Current regulation of PMT is inadequate
- PMT is clear exercise of precautionary approach
- PMT is essential for adaptive management
- Environmental protection is most effective when it interfaces well with technical activities
Issue 1: Obligation to Conduct PMTs

• Fundamental issue – know origins of obligations and intended functions to ensure effective regulation

• Explicit Obligation:
  • Exploration: tests are foreseeable activities, but not specifically required
  • Application for Exploitation: prerequisite for exploitation?, “results of tests conducted” in feasibility study or EIA (need clarity in draft)
  • Exploitation: Standard clauses, “production tests” during development phase, “production tests”, “capacity tests” as “development obligations”
  • Extent of obligation defined in individual plan of work / contract
Issues 1: Obligation to Conduct PMTs

- Implicit Obligation:
  - Exploration: Best Available Techniques (BAT), Best Environmental Practices (BEP) – as far as reasonably possible
  - Exploitation application: “evidence of BAT”
  - Definition BAT (Dr. Env. Regs.): “latest stage of development”, “state of the art processes... facilities...methods of operation...”
  - Linked to BEP duty to continually update environmental protection standards in line with technological development (Dr. Env. Regs.)
  - In practice: dynamic nature of BAT/BEP requires on-going testing

**DISCUSSION:**

*Is there a legal obligation to conduct pilot mining tests?*

*How can pilot mining be used to determine Best Available Techniques (BAT)?*
Issue 2: Definition of “Scale” in UNCLOS

- Scale determines what PMT entails in a given stage of DSM: activities, environmental duties, performance requirements
- Scale ≈ scope of testing
- UNCLOS provisions for “small-, medium- and large-scale” technologies
  - Engineering transition between equipment/plants (components of production) and systems (capable of full production) – not size
- Scale here refers to technology – not area of affected seabed
  - Engineering-oriented, not ecosystem-oriented
- Scale describes the state and process of technological development
  - Necessary for defining BAT, “state of the art” for identifying appropriate sites
Scale and Technical Readiness Levels

• Problem: Need objective criteria for scale to regulate PMTs. TRLs?
• Standardized TRLs used in different industries where tech development is central
  • Space, offshore oil and gas, sub-sea systems, FP7 Blue Mining
• Are TRLs suitable for DSM? Advantages:
  • emphasize continuity between phases, reduce fragmentation
  • span the entire tech development process, coherent regulation
  • supports standardization, creation of “objective criteria”
  • support the determination of BAT – relevant at all scales
  • help pinpoint opportunities for better environmental protection
# Technical Readiness Levels

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Unproven Concept (Basic R &amp; D, paper concept)</td>
</tr>
<tr>
<td>1</td>
<td>Proven Concept (Proof of concept as a paper study or R &amp; D experiments)</td>
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<tr>
<td>2</td>
<td>Validated Concept (Experimental proof of concept using physical model tests)</td>
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<tr>
<td>3</td>
<td>Prototype Tested (Component function, performance and reliability tested)</td>
</tr>
<tr>
<td>4</td>
<td>Environment Tested <em>(Pre-production system environment tested)</em></td>
</tr>
<tr>
<td>5</td>
<td>System Tested <em>(Production system interface environment tested)</em></td>
</tr>
<tr>
<td>6</td>
<td>System Installed <em>(Production system installed and tested)</em></td>
</tr>
<tr>
<td>7</td>
<td>Field Proven <em>(Production system field proven)</em></td>
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TRLs and UNCLOS Stages of DSM

DISCUSSION:
What is meant by “scale” in the DSM regime?
Is an international standard for Technical Readiness Levels (TRLs) useful for regulation?
Issue 3: Challenges of EIA for PMTs

• Two functions of mining tests
  • Demonstrate technical and operational capability of contractor
  • Enable contractors and ISA to make environmental and economic projections about commercial production

• Testing context:
  • Least understanding of ecosystem dynamics, consequences of impacts
  • Least understanding of equipment and process
  • No prior opportunity to test mitigation/risk/emergency measures

• PMT≠ a single test. Refers to an iterative process over a specific period of time.
Issue 3: Challenges of EIA for PMTs

• Specific problem for PMT: EIA under draft Exploitation Regs concerns impacts of commercial production, not impacts of development phase → PMT needs specific EIA procedures

• Purpose of EIA not just to prevent harm to the marine environment
  • Also iterative to support technical innovation, find correct development path
  • Provides essential inputs for SEA, site-specific EIAs, adaptive management

• But: EIA needs clear feedback loops for adaptive decision-making, and consistent, comparable assessment and monitoring methodologies

• TRL approach helps target EIA concerns at each step in PMT
  • TRL 5: technical alternatives, BAT, should tech be “up-scaled”?  
  • TRL 6: sites for installations, reference zones, site-specific mitigation
  • TRL 7: entire process chain at commercial scale, prior to production, review of knowledge integration from previous stages, test risk management
TRLs and Potential EIA Stages for PMT

**DISCUSSION:**

Can TRLs be used to structure a multi-phase EIA obligation?

What specific EIA obligations should apply to PMT?
Issue 4: Use of PMT Information by ISA

• Currently no clear mechanism how PMT results are to be used by ISA
• Single-stage application for exploitation license in Draft Exploitation Regs
  • neglects two phases of exploitation: development and commercial production
  • approves production before development has even started
• Involves huge assumptions based on inadequate information:
  • Results from testing during exploration are wrong scale, but at right location
  • Testing at right scale cannot legally be conducted at right location prior to approval of
    exploitation application, results therefore obtained under different conditions
• Is this a well-founded decision-making process?
• Controlled, highly regulated PMT in development phase – at commercial
  scale – would greatly improve knowledge base for decision-making on
  future DSM
Issue 4: Use of PMT Information by ISA

• UNCLOS originally provided for “production authorization” after development (interim period) – different purpose, interesting procedure

• Could create a two-stage application process for exploitation
  1. Decision to allow commercial-scale PMT on basis of small-scale PMT during exploration
  2. Decision on production based on successful conclusion of PMT, after real observation of technology at correct site and scale and monitoring of impacts

• Advantages:
  • Would give ISA tool to disapprove of different mining practices – not just mining sites
  • Would compel good early EIAs, pursuit of least harmful technology
  • Could reverse the burden of proof in the second application stage – applicant must show PMT was not harmful in order to receive production authorization
  • Provides additional mechanism to support adaptive management

• Legal basis: Authority can take any measure in Part XI at any time to ensure compliance and exercise control (Art. 153 (4) and (5))
Synthesis: TRLs, EIA and Production Authorization

DISCUSSION:
How can the ISA make better use of PMT information in decision-making?
Should exploitation require a two-stage application process?
Thank you for your feedback!

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