

Institut für Bergbaukunde I (BBK I)  
Institute of Mining Engineering I

Univ.-Prof. Dr.-Ing. Dipl.-Wirt.Ing.  
Per Nicolai Martens

Wüllnerstraße 2  
52062 Aachen

**EMR** | Energy- & Mineral Resources Group  
Geology Chair & Geological Institute

Prof. Peter A. Kukla, Ph.D.

Wüllnerstraße 2  
52062 Aachen

BBK1 & EMR Geological Institute, Wüllnerstr. 2, 52062 Aachen

Report to Stakeholders (ISBA/Cons/2015/2)  
International Seabed Authority  
14-20 Port Royal Street  
Kingston  
Jamaica

Date: 29.05.2015

## **Submission to the discussion paper “Developing a Regulatory Framework for Mineral Exploitation in the Area”**

Dear Madam/Sir,

in the name of the “Institute of Mining Engineering I” (BBK1) and the “Energy & Mineral Resources Group” (EMR) of RWTH Aachen University in Germany, we would like to make a contribution to the development of a regulatory framework for mineral exploitation in the Area.

Our institutes are part of the “Blue Mining” project (Breakthrough Solutions for the Sustainable Exploration and Extraction of Deep Sea Mineral Resources) which receives funding from the European Commission since 2014 (project details see <http://www.bluemining.eu/>). The consortium consists of 19 large industry and research organizations with experiences in various maritime subjects. During the project period of 4 years until 2018, the “Blue Mining” project will address all aspects of the value chain in maritime mining, from resource exploration and appraisal to mining including feasible and sustainable exploitation technologies to the legal and regulatory framework.

Amongst others we are involved in the following tasks which are in line with the activities of the ISA:

- Sustainable economic evaluation (public domain)
- Fiscal incentives to stimulate sustainable economic evaluation (public domain)
- Development of two blueprint feasibility studies (extinct seafloor massive sulfide deposit, seafloor manganese nodules deposit)

Please find attached a report on possible fiscal incentives (e.g. sustainability-dependent royalties, taxes, depreciation, etc.) to stimulate a more sustainable economic evaluation of deep sea mineral resources/projects. Application of the developed fiscal incentives on the

two cases (SMS project, SMnN project) to evaluate the effects on the economic evaluation of deep sea mineral resources will be addressed in a later publication, expected to be released end of 2016.

We would be delighted about the prospect of a future cooperation with your organization and look forward to your response.

Sincerely,

Dr. Ludger Rattmann (BBK1) – Rattmann@bbk1.rwth-aachen.de

Sebastian Ernst Volkmann, M. Sc.

<http://www.bbk1.rwth-aachen.de/en/home>

Prof. Peter Kukla, PhD (EMR) – Peter.Kukla@emr.rwth-aachen.de

Mirjam Rahn, M. Sc.

<http://www.emr.rwth-aachen.de/>



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**Breakthrough Solutions for the Sustainable Exploration and Extraction  
 of Deep Sea Mineral Resources**

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**Project partners:**

- 1 - UNR - Uniresearch b.v. - NL
- 2 - AW - Aker Wirth GmbH - DE
- 3 - DI - Dredging International NV - BE
- 4 - BGR - Federal Institute for Geosciences and Natural Resources - DE
- 5 - GEOMAR - Helmholtz Centre for Ocean Research Kiel - DE
- 6 - IMS - IMS Ingenieurgesellschaft mbH - DE
- 7 - MARIN - Stichting Maritime Research Instituut Nederland - NL
- 8 - NERC - Natural Environment Research Council - UK
- 9 - NTNU - Norges Teknisk-naturvitenskapelige Universitet NTNU (Norwegian University of Science and Technology) - NO
- 10 - RWTH - RWTH Aachen University Energy and Minerals Research Group - DE
- 11 - TUBAF - Technical University Bergakademie Freiberg - DE
- 12 - DUT - Technical University of Delft - NL
- 13 - FFCUL - University of Lisbon - PT
- 14 - SOTON - University of Southampton - UK
- 15 - SEAEU – SEA Europe ASBL - BE
- 16 - IHC - IHC Mining B.V. - NL
- 17 - 2H - 2H Offshore Ltd - UK
- 18 - TNO - Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek TNO - NL
- 19 - MTI - MTI Holland B.V. – NL

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## Executive summary

This deliverable D3.51 is a concept version of D3.52 which is due at the end of the project. This deliverable will progress together with and will gain insight from the rest of the project, therefore the ideas presented in this deliverable are preliminary results.

A fiscal system was first anticipated in the “United Nations Law of the Sea Treaty” (UNCLOS) in 1982 and in the “Agreement relations to implementation of Part XI” from the United Nations. Later, the International Seabed Authority published in the Technical Study No. 11 “financial compensations for environmental damages”. As stated by the International Seabed Authority (ISA, 2013) there is a need of a fair fiscal system for marine mining with low administrative work and high economic value. In this report, earlier concepts have been taken to a next level of viable financial management.

Fiscal incentives are an important method to foster a sustainable behaviour in the new field of deep sea mining. The Blue Mining Consortium proposes a proactive approach to foster sustainable practices instead of repairing damages to the environment after mining. This can be accomplished with sustainability dependent royalties, tax breaks, depreciation for environmental investments, a preferential treatment plan and a penalty catalogue.

It is recommended, to further investigate incentives which are suitable and will serve the purpose. They need to prove their validity after an extensive economic analysis. The Consortium proposes that the International Seabed Authority (ISA) should consider regulating the assignments of fiscal incentives and provides an independent consultant for validation of calculations of Contractors. Tax professionals should evaluate the proposed fiscal incentives and develop a framework for taxation of SMnN and eSMS in the designated areas. Furthermore, the impacts of tax for the Contractor have to be studied. As stated by the International Seabed Authority (ISA, 2013) a fair fiscal system is in need for marine mining with low administrative work and high economic value.

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## 1 Introduction

This deliverable D3.51 is a concept version of D3.52 which is due at the end of the project. This deliverable will progress together with and will gain insight from the rest of the project, therefore the ideas presented in this deliverable are preliminary results.

The development of an appropriate deep-sea mining legislation is still in its early stages. The International Seabed Authority (ISA or the Authority), being responsible for international waters, recently set up a work plan to develop a mining (exploitation) code by 2016. “The ISA faces the challenge of developing an exploitation framework that ensures that Polymetallic Nodule exploitation will both: a) be for the benefit of “mankind as a whole” (including future generations); and b) foster commercially viable and sustainable exploitation (including reasonable economic returns) of the Area’s mineral resources” (ISA, 2013). The establishment of an equitable fiscal regime (royalties, taxes, tax breaks, etc.) is an indispensable part of the mining legislation. The fiscal regime on the one hand regulates that the State should be compensated financially for the loss of finite resources by deep sea mining. On the other hand, provision of certain incentives such as tax breaks may be considered appropriate to encourage investment in sustainable mining and the development of new and environmentally friendly technology.

The aim of fiscal incentives is to encourage investments for environment protection and responsible handling of resources and environment. With this deliverable the Consortium wants to make recommendations of (possible) fiscal incentives to stimulate a sustainable economic evaluation of deep sea mineral resources/projects. These incentives should be applied on measured values; whereas the indicators acquired in Deliverable D.3.41 refer to target values for planning purposes. These fiscal incentives could also contribute to the fiscal regimes which are under development within the frame of the preparation of a deep sea mining legislations by ISA and its Member States.

## 2 Models for fiscal incentives

### 2.1 Sustainability- dependent royalties

In the mining sector, royalties are taxes which are applied independently from profits. They are payable to the government or to the property owners for the right to remove minerals from their land. The royalties are defined either by the national mining legislation or by contract negotiations (Otto et al., 2006)

Otto et al 2006 defines a royalty as follows:

- “The law creating the tax calls that tax a royalty.
- The intent of the tax is to make a payment to the owner of the mineral as compensation for transferring to the taxpayer the ownership of that mineral or the right to sell that mineral.
- The intent of the tax is to charge the producer of the mineral for the right to mine the minerals produced.
- The tax is special to mines and is not imposed on other industries.”

The following types of royalties are applied globally:

- Unit-based royalties
- Value-based royalties (as valorem royalties)
- Profit-based and income-based royalties
- Hybrid system

For the reporting standard of deep sea mining of SMnN<sup>1</sup> and eSMS<sup>2</sup>, the Consortium suggests to include a sustainability dependent royalty. The goal is to increase resource utilisation (cf. D3.41) and to encourage sustainable behaviours during mining of SMnN and eSMS. Abundance of SMnN highly varies over a short distance. Therefore, the quality of a field, defined by grade and abundance changes rapidly. Standing for itself, a field might not have the suitable economic value to be mined, but, taking surrounding high quality fields into account the overall average quality of such a cluster could be adequate for economic mining. Considering the environmental impact of the mine site, it would not be sustainable to ignore less valuable fields, which may already be affected by surrounding mining activities, in order to only mine the surrounding fields of high-grade and high-abundance. Mining only the economic exclusive parts of a deposit may compromise deep-sea mining for future generations. Therefore, the Consortium suggests mining a deposit as complete as possible. Two proposals for a more sustainable tax regime are suggested:

- Royalties based on quality
- Royalties based on the affected area or measured resource

**Royalties based on quality:** In case of SMnN mining, royalties could be calculated depending on the quality of a field of predefined size. Higher taxes for fields of high economic value would make mining of less valuable fields more attractive for the Contractor, while simultaneously improving resource utilization. Royalties are calculated on a year basis per fields mined and resource recovered. Table 2-1 shows a simplified model of a classification system in order to determine the quality of a deposit field, starting with the best class and decreasing with ongoing numbering of the classes. With these quality classes the tax rate and royalty rate can be determined and set individually for each deposit field. How classes are divided and assigned for a block or field has to be developed at a later stage.

<sup>1</sup> SMnN: Seafloor Manganese Nodules

<sup>2</sup> eSMS: extinct Seafloor Massive Sulphides

Table 2-1 Classification system for SMnN qualities

	Grade [ $\text{Ni}_{\text{eq}}$ ]	Abundance [ $\text{kg}/\text{m}^2$ ]	Tax rate [%]
<b>Class 1</b>	$< g_2$	$< a_2$	$r_1 (< r_2)$
<b>Class 2</b>	$g_2-g_3$	$a_2-a_3$	$r_2 (< r_3)$
<b>Class 3</b>	$g_3-g_n$	$a_3-a_n$	$r_3 (< r_n)$
<b>Class n</b>	$> g_n$	$> a_n$	$r_n$

A quality based royalty requires high administrative involvement for the Authority in exploration, mine planning and operational business. This is also the major disadvantage of this approach. According to ISA Technical Study No. 11 a ‘whole of the deposit’ mining plan is required that includes a comprehensive resource and reserve assessment of the proposed mining area and the adoption of a sequential mining plan in order to maximize resource utilization. Also, reporting standards from ISA for international waters do not exist for SMnN, yet. To identify a resource and reserve of SMnN, an adequate grade and abundance has to be set. This needs to be done by the Contractor<sup>3</sup> and should be approved by the ISA. For the assessment of a deposit and especially the quality of a mining field an independent qualified institution is needed. Therefore, the Consortium suggests that the Authority should evaluate the quality and determine the classification and consequently decide the royalty rate.

#### Proposed procedure:

- Comprehensive resource and reserve assessment of the proposed mining area by a qualified institution.
- Division of the deposit into equal or unequal blocks of predefined size. This included defining the quality of each mining field by the qualified institution.
- A ‘whole of the deposit’ mining plan is required and should be provided to the ISA.
- The Contractor has to report the amount of tons recovered out of each mining field.
- Royalties are calculated on a year basis per fields mined and resource recovered.
- **For Example:** Field no. 1 = 0.8 Mt (Quality Class II, rate: 5%), field no. 2 = 0.2 Mt (Quality Class I, rate: 10%),  
**Tax rate** =  $(0.8 \text{ Mt} \times 5\% + 0.2 \text{ Mt} \times 10\%) / (1 \text{ Mt}) = 6\%$  on the revenue of the annual production.

The Consortium is aware that this approach may not be practical since it necessitates a sufficient accuracy of prediction in case of grade distribution. However, abundance seems to be more predictable. Therefore, royalties could be based on the abundance within a mining field. In case of eSMS mining, defining royalties on a block scale quality model seems to be less practical since it necessitates a sufficient accuracy of prediction. To increase the accuracy, the averaged abundance of several tens of blocks could be taken into account.

**Royalties based on the affected area or measured resource:** eSMS mining is local and site-specific. On the contrary, SMnN mining is predicted to disturb a vast area of seabed per single operation. In case of Blue Mining an area of 177 km<sup>2</sup> has to be mined per year to satisfy an annual production of two million dry tonnes. However, the area which is affected by mining activities is probably bigger than the mineable area itself, considering that the area is traversed, used for equipment or stockpiles and may be affected by re-sedimentation of plumes as a consequence of deep-sea mining. Fields of low economic value may be already disturbed by mining activities and should be exploited in order to improve resource utilization (cf. D3.41).

Besides the quality based approach, the Consortium proposes to grant a mining licence against a one-off payment depending on the size of the affected area for each mine site. In contrast to a quality based approach, this approach requires less administrative effort. The royalty per tonne of resource recovered decreases, whether on volume or metal-equivalent basis, by maximizing resource utilization. Paying a one-off payment motivates the Contractor to utilize the deposit more effectively. Same effect would have a one-off payment depending on the measured resource

<sup>3</sup> The groups granted a contract by the International Seabed Authority for the exploration and exploitation of mineral deep-sea resources in the Area.

per deposit, which seems to be more applicable for eSMS mining since it is local and site specific. In order to put this into practice, the affected size and the resource have to be assessed and approved by the Authority. To keep the administrative effort as low as possible the affected area could be set adequate to the mine site, if the affected area is less or almost equal.

#### Further royalties could be:

- Lower royalty rates for a minimum conflict situation: e.g. Waiver of ecologically valuable parts in the license territory and use of environmentally friendly methods during extraction
- Calculation royalty rates based on the current market price: e.g. 10% of the market price

## 2.2 Tax breaks

Taxation in land based mining is common and usually done by royalties (payment to government for the right to exploit deposits) and taxation implemented in the country's tax system (ISA, 2013). A fiscal system was first anticipated in the "United Nations Law of the Sea Treaty" (UNCLOS) from 1982 under Article 136 and the "Agreement relation to implementation of Part XI" (AGXI) (United Nations, 1982, 1994). Section 8 concentrates on developing a framework for financial terms of contracts between the mining companies and the Authority.

"These principles (in paraphrase) include:

1. Payments to the Authority shall be fair both to the Contractor and to the Authority and shall provide adequate means of determining compliance by the Contractor with such system.
2. Rates of payments under the system shall be within the range of those prevailing in respect of land-based mining of the same or similar minerals.
3. The system should not be complicated and should not impose major administrative costs on the Authority or on a Contractor.
4. Consideration should be given to the adoption of a royalty system or a combination of a royalty and profit-sharing system.
5. If alternative systems are decided upon, the Contractor has the right to choose the system applicable to its contract. Any subsequent change in choice between alternative systems, however, shall be made by agreement between the Authority and the Contractor.
6. Provision for an annual fixed fee shall be payable from the date of commencement of commercial production. This fee shall be established by the Council and may be credited against other payments due under the system.
7. The system of payments may be revised periodically in the light of changing circumstances. Any changes shall be applied in a non-discriminatory manner. Such changes may apply to existing contracts only at the election of the Contractor." (ISA, 2013)

The following taxation systems are currently being applied or recommended for land based extractive industries to balance economic and environmental perspectives which, the Consortium believes can be used as reference points to define the ideal fiscal system for deep-sea mining.

### 2.2.1 Direct taxation

**Tax breaks for the best-possible resource utilization:** In order to foster sustainable mining, a single deposit should be mined completely instead of "cherry picking" the best fields (SMnN) or blocks (eSMS). Mining economic less valuable fields/blocks (parts of a deposit with a lower grade and abundance) should be more attractive for the Contractor. Following concepts could be implemented into law, either individually or in combination:

**Tax deductible allowance:**

- For all development expenditure incurred in or before the first year of production, recoverable in equal amounts over a period of three years.
- For Exploration and appraisal surveys
- For pre-production exploration expenditure incurred in or before the year of production, and allowable in the first year of production
- For restoring the environment to the satisfaction of the government

(International Monetary Fund, 2012; Moyo, 1997)

**Tax relief/capital allowance** for project capital expenditures related to environmental investments: a certain percentage of the capital asset's cost is allowed as capital allowance during the accounting period in which it was purchased. This amount is greater than the depreciation charge on the asset during that period. (International Council of Mining & Metals, 2009)

**Income tax base reduction** by allowing environment protection related costs to be deductible. (National Development Strategy for Guyana, 1996)

**Tax credit scheme:** Enables the mine developer to spend a certain percentage of the value of gross sales on less environmentally impacting projects and invest in clean technology and pollution control facilities; such developer then will receive a tax credit when paying company income tax, i.e. the amount expended is considered as tax paid. (Hancock, 2002; Kosonen & Nicodème, 2009; Patterson III, 2000)

**Research and Development Tax credit:** An extended period/indefinite period to allow a developer who invests in less environmentally impacting projects to carry the losses forward

**Tax holiday** of a certain percentage on taxable income for a defined number of years and for less environmentally impacting projects.

### 2.2.2 Indirect taxation

Exemption or reduction of customs duties, excise taxes and value added tax in respect of mining equipment and machinery with decreased impact on the environment (Kosonen & Nicodème, 2009; KPMG International, 2013; Patterson III, 2000).

### 2.3 Direct subsidies

- Targeted subsidies/grants/bank guarantees/assistance with financing/tax free financing from the hosting country to encourage sustainable mining. (Beder, 2001; Kosonen & Nicodème, 2009; Patterson III, 2000)
- The hosting country provides infrastructure at the costs of environmental funds or a discounted cash flow return.

### 2.4 Depreciation

By common definition, depreciation is the loss of value of an asset over its economic life. In most of the countries the tax burden can be reduced by deducting the depreciable amount from the basic tax (Wellmer et al., 2008). Larger investments into protective measures for the environment at an early project stage are often avoided, in favour of compensative measures at later project stages. The tax allowance in form of accelerated depreciation could be an appropriate measure to foster early investments into environmental precaution and protection. Following is suggested:

- Environmental necessary investments need to be defined by an Environmental Impact Assessment (EIA) and should be part of the mining permit.
- Depreciation type, period and rate should be dependent on, inter alia, the type, amount and earliness of the expenditure. This could be based on indicators developed in deliverable D3.41:
  - Higher depreciation rates for early investments, cf. indicator ‘Earliness of Expenditures’ ( $EE_{E/S}$ )
  - Higher depreciation rates for high-burden investments, cf. indicator ‘Stress Index’ ( $SI_{E/S}$ )
- Accelerated depreciation allowances for voluntary expenditures on environmental precaution and protection as well as for voluntary social expenditures.
- Accelerated depreciation allowances or/and higher depreciation rates if for example:
  - Data is made available for public research
  - The vessel supports environmental research (dependent on accommodation, ship time, etc.)
  - Active environmental research is done
  - Expenditures are made at early (pre-production) project stages, etc.
- Straight-line depreciation should be the standard depreciation allowance for the regular case.

In the following, straight-line depreciation is compared to accelerated depreciation. The straight-line depreciation is the simplest and most often used method. The salvage value is deducted from the asset and divided by the number of years of the depreciation period. The depreciation of an asset is spread evenly over the useful life (Eisele, 2002). Accelerated depreciation refers to any depreciation method, which allows greater deductions in early years. Most common accelerated-depreciation methods are the sum-of-year (SYD) method and double-declining-balance method (DDB) (Investopedia, 2015).

**Example:** Due to beneficial environmental protection activities, e.g. environmental research, a mining company is authorised by the Authority to apply accelerate depreciation instead of straight-line depreciation on 100% of the mining-crawler acquisition value of maybe US\$ 5,000,000, US\$ 500,000 salvage value, and 10 years useful life. The straight-line depreciation rate would be 1/10, i.e. 10% per year, not considering salvage value. The depreciable amount would be US\$ 450,000, i.e.  $(5-0.5)/10 = 0.45$  million US\$. Assuming a tax rate of 50% and a discount rate of 20%, the sum of present values of the tax savings retrieved amounts to US\$ 943,306 as shown in

Table 2-2. The geometrical-degressive depreciation method (hereinafter referred to ‘declining balanced depreciation (DB)’) has been applied for accelerated depreciation. The depreciation rate that would allow exactly for full depreciation by the end of the period can be calculated as follows: (Eisele, 2002)

$$\text{DB depreciation rate} = \left( 1 - \sqrt[\text{useful life}]{\frac{\text{salvage value}}{\text{aquisition value}}} \right) = 21\%$$

Using this method, it would deduct 21% of US\$ 5,000,000 (US\$ 1,028,359) in year 1, 21% of US\$ 3.971,641 (US\$ 5,000,000 minus US\$ 1,028,359) in year 2 (US\$ 816,854) and so on as shown in

Table 2-2. The total undiscounted tax saving is the same for the straight-line method (US\$ 2,250,000). Compared to the straight-line method, the declining balance depreciation provides a higher tax benefit with regard to the sum of present values (US\$ 1,247,006) because it provides more tax benefits in earlier years.

Table 2-2: Present values for the straight-line method and the declining balance depreciation

Year	Straight-line depreciation				Declining balance depreciation			
	Depreciation amount	Year-end book value	Nominal tax saving	PV	Depreciation amount	Year-end book value	Nominal tax saving	PV
0		5,000,000				5,000,000		
1	450,000	4,550,000	225,000	187,500.00	1,028,359	3,971,641	514,179.41	428,482.84
2	450,000	4,100,000	225,000	156,250.00	816,854	3,154,787	408,427.23	283,630.02
3	450,000	3,650,000	225,000	130,208.33	648,851	2,505,936	324,425.28	187,746.11
4	450,000	3,200,000	225,000	108,506.94	515,400	1,990,536	257,700.16	124,276.70
5	450,000	2,750,000	225,000	90,422.45	409,397	1,581,139	204,698.51	82,263.74
6	450,000	2,300,000	225,000	75,352.04	325,196	1,255,943	162,597.81	54,453.68
7	450,000	1,850,000	225,000	62,793.37	258,312	997,631	129,156.03	36,045.08
8	450,000	1,400,000	225,000	52,327.81	205,185	792,447	102,592.28	23,859.69
9	450,000	950,000	225,000	43,606.51	162,984	629,463	81,491.95	15,793.68
10	450,000	<b>500,000</b>	225,000	36,338.76	129,463	<b>500,000</b>	64,731.35	10,454.47
<b>SUM</b>	<b>4,500,000</b>		<b>2,250,000</b>	<b>943,306</b>	<b>4,500,000</b>		<b>2,250,000</b>	<b>1,247,006</b>

## 2.5 Preferential treatment

An additional possibility for incentives is to grant a preferential treatment for Contractors. The operator has to demonstrate a responsible and sustainable practice and can consequently obtain a preferred status for later decisions.

Examples of sustainable and responsible operations could be:

- Waiver of ecologically valuable parts of the licensed territory
- Use of environmentally less impacting methods of extraction
- A high level of investments in research and development for environmentally friendly technologies
- Voluntary social security contributions
- High resource utilization (see royalties)
- Early investments of social or environmental nature

There are two options where the preferential treatments can be granted. The first option is a preferential treatment provided by the ISA. The Authority gives preferential treatment for further exploration or issues exploitation licenses and sets up joint-ventures with the Enterprise. Another option is a privileged treatment from the hosting country of the Contractor, with subsidies and grants.

The details and assessment of what kind of technology is sustainable and environmentally friendly, how to define an ecologically valuable part of the licence area and so on are not yet clear and need to be discussed in the future.

## 2.6 Penalty catalogue

To foster a sustainable responsible behaviour the Consortium recommends formulating and implementing a comprehensive penalty catalogue.

In Article 18, Annex III of the United Nations Convention on the Law of the Sea possible punishments of Contractors are already suggested (United Nations, 1982). Article 18 stipulates that the rights of a Contractor “may be suspended or terminated” in the following two cases:

- “a) if, in spite of warnings by the Authority, the Contractor has conducted his activities in such a way as to result in serious, persistent and wilful violations of the fundamental terms of the contract, Part XI and the rules, regulations and procedures of the Authority; or

(b) if the Contractor has failed to comply with a final binding decision of the dispute settlement body applicable to him. “ (United Nations, 1982)

In our opinion the following violations should be added at some level to the penalty catalogue (this list does not claim to be complete):

- a. Water contamination
- b. Soil contamination
- c. High land consumption due to inefficient and non-sustainable exploitation
- d. Low resource utilisation
- e. Infringements of contract and license agreements
- f. Ecological destruction by
  - Vibration
  - Light
  - Concussion
  - Plumes
  - Violation of environment protection zones

Possible sanctions against the Contractor could be:

- Financial penalties measured on the seriousness of the offence
- Higher taxes and royalties for a defined period of time or for the full duration of the contract
- Withdraw the license for individual fields

As a possibility of the last resort, the ISA may consider a total and permanent withdrawal of all licenses and permanent ban of the Contractor from any activities in the Area.

### 3 Conclusion and Recommendations

Fiscal incentives are an important method to foster a sustainable behaviour in the new field of deep sea mining. Therefore, the Consortium proposes a proactive approach to foster sustainable practices instead of repairing damages to the environment after mining. This can be achieved with tools such as sustainability dependent royalties, tax breaks, depreciation for environmental investments, a preferential treatment plan and a penalty catalogue. The mining permit should only be granted by the Authority if all requirements have been met by the Contractor. Requirements necessitate an Environmental and Social Impact Assessment (EIA, SIA). The suggested incentives should be applied on the total amount of mined ore; while the indicators proposed in Deliverable D.3.41 refer to the planned amounts.

The taxation systems the Consortium proposed are only possibilities and not all of them will be suitable or will serve our purposes. In a next step they will need to be assessed by an extensive economic analysis. Tax professionals should evaluate the proposed fiscal incentives and develop a framework for taxation of SMnN and eSMS in the Area. Furthermore, the impacts of taxation for the Contractor and the ISA have to be studied.

The International Seabed Authority is requested to develop a fair fiscal system for marine mining with little administrative work and high economic value. Clear agreements must be made between the Contractor and the ISA. A Competent Person has to be assigned by the Authority to review the Contractors actions and verify whether the Contractors comply with the required specifications.



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[http://cordis.europa.eu/fp7/cooperation/home\\_en.html](http://cordis.europa.eu/fp7/cooperation/home_en.html)

<http://ec.europa.eu>

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