Template for the review of the draft standards and guidelines associated with the draft regulations on exploitation of mineral resources in the Area

TEMPLATE FOR COMMENTS

Document reviewed	
Title of the draft being reviewed:	Draft Guidelines for the establishment of baseline environmental data
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General Comments

Strategic Sampling

We believe there is a need to improve the overall sampling strategy section This is the most important section/component, as it determines the success of all following measurements. At present the requirements involve a mix of things, without as much coherence as there should be.

It would be valuable to determine a few key points:

- How do we design and constrain pelagic sampling, where water moves around in 4 dimensions? Should we consider stratified random sampling like in the benthic environment. What degree of depth resolution is required? What features should be assessed? Do model-based approaches need to be used to define sampling. This is important for describing the baseline and assessing change;
- How do we integrate benthic and pelagic sampling to develop integrated understanding? These two systems are coupled, especially close to the seabed but they are given very different treatment here;
- Many changes will occur in the benthic boundary layer, this is not well assessed from global-scale models and may need separate investigation; and,
- Particularly for pelagic samples, they are often big and difficult to define in space (e.g., large zooplankton net trawls) particularly when trying to make replicated samples (the water has moved between replicates) and may make spatially-resolved generalizations difficult to make.

Time and Costs

For the benefit of Contractors, we recommend at the outset of the document noting that all these procedures are highly labour intensive and involve the commitment of large dedicated and experienced teams. Biological sampling for monitoring mining activities is intensive and requires more than a couple of people supporting mining operations.

It would also be helpful for the guideline to include an indication of the time and rough estimated costs required for the different sampling activities and for processing the samples on board, including workforce required to work up samples and generate useful information for each sample. Many contractor managers are unaware of the commitment that needs to be made in ship time to gaining environmental data, especially that suitable for monitoring mining impacts. We expect that the greater emphasis and detail in this document regarding measuring temporal variability (which was greatly needed) and the amount of time this will take will also come as a surprise to some contractors.

It may be helpful to summarize this in a table for each section.

Data Collection and Depth of Discharge Plume

This is a well detailed document with lots of good advice on best practice that should be achieved by contractors in their baseline studies. However, it is difficult to address the sampling depth frequencies in the water column, without a better understanding of the depth of the discharge plume. Until depth of the discharge plume is clearly defined contractors will be forced to sample at all potential release depths as stated in paragraph 120 "If the depth of the discharge plume is still to be determined at the time of the baseline studies, all potential release depths should be characterized". Lack of depth requirements for the discharge plume will come at a cost to contractors and poses a great deal of uncertainty concerning the spatial (vertical and horizontal) extent of deep-seabed mining impacts to the marine environment. We recommend the ISA, through public consultation, come to a decision on this matter and then revisit the baseline and monitoring sampling depth frequency requirements.

Specific Comments

Page	Line	Comment
1	Background para. 2	Recommend using Paragraph 5, Page 4 wording as it is better and includes exploration and exploitation activities. Additionally, we recommend including that baseline data is also important for assessing test mining before exploitation commences.
4	64	At the end of para. 1 add "Baseline studies should be comprehensive to show due diligence and care for the environment. While only a subset of the information may be suitable and necessary to monitor mining activities and the recovery of ecosystems, a full set of data is required in order to make a convincing case in an EIA as to what will need to be monitored once exploitation activities commence."
4	93	Recommend replacing "Area" with "Marine Environment" or "impact zone" so that the water column is included.

		"Area" is legally defined as "the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction." (UNCLOS, article 1(1)(1)) Much of the environmental impacts of DSM will be in the water column and the ISA is legally required to protect all areas of the marine environment from harmful effects of DSM. (UNCLOS, articles 145, 192). Limiting baselines to the seabed and subsoil would not be in accordance with UNCLOS.
5	108	Replace: "identify" with "determine"
5	120-124	This statement misses out a key component of baseline assessment. The purpose of baseline data acquisition (according to ISBA/25/LTC/6/Rev.1) is to "To set up the environmental baseline in the exploration area as required under the relevant regulations, the contractor, utilizing the best available technology...shall collect data for the purpose of establishing baseline conditions... that characterize the environments likely to be impacted by exploration and possible test-mining or testing of mining components activities." As such, the baseline assessment needs to be broader than just the IRZ and PRZ. It needs to cover adjacent environments (e.g., seamounts) that could be impacted by mining within the contract area. Additionally, the finalized design of the IRZ and PRZ network should be done once the baseline has been established. While it is good to have a plan at the start, this should be revised once baseline information is obtained. It is likely that there are environmental reasons why some sites are not the best monitoring sites (e.g., unusual / outliers / difficult to sample etc.).
5	129	Replace: "should be mapped" with "should be mapped throughout the water column"
5-6	139-143	This paragraph does not provide any guidance, it is just a statement (except the last sentence, which is specific to one case).
6	152	Add ", slopes, crests, and" after "hills". It is not just large-scale physiographic units that may be important
6	156-157	Replace: "based on a ship-based bathymetry and seafloor acoustic" with "based on 1) ship-based swath bathymetry at the coarse scale and 2) seafloor acoustics"
7	167-169	It is preferable to add the term "consecutive" instead of "different" years for the project with an estimated duration of less than 5 years and add the term "non-consecutive" instead of different years of project of more than 5 years.
7	179-184	We are happy with the depth range of the high resolution of water column sampling listed here, but it would need to be expanded if the dewatering plume is not covered by these depth ranges. - this is described in para. 120 and recommend using the language provided in this paragraph - "If the depth of the discharge plume is still to be

		determined at the time of the baseline studies, all potential release depths should be characterized."
7	185-187	Scaling required in sediment sampling may not need to be as fine, as it would be better to put more effort in greater spatial sampling intensity than deep into the sediment.
8	207	Regarding "pseudo-samples" suggest putting a few examples here so it is clear what pseudo-sample/replication may look like, so contractors can avoid it.
8	243	Delete "l" in "macrofaunal"
9	250	At end of this paragraph perhaps - Collaboration and exchange of data will also allow contractors to validate whether their data meet international standards and if improvements could be made to their sampling methods, sample handling procedures and analyses. This is covered in paragraph 28 but the wording of 28 could be better.
9	266	Replace "oligotrophic" with "biogeographic" - oligotrophic only refers to nutrient poor areas
9	268-269	Regarding "comparison of observations to model results" Recommend greater elaboration on this and describing the type of models or referencing the section that covers that topic. We can see contractors asking, 'which models?' oceanographic models? ecosystem models? Additionally, it would be helpful to reference EIA Standard (E)(13), which requires Contractor to "refer to the evidence base for such information and how it has been used to assess the impacts" when models are used in the EIA/EIS.
9	274	Regarding "other laboratories" Contractors laboratories? contractors and scientific laboratories? This text needs an ISA contractor focus.
9	275-280	Para. 32 - This needs simpler contractor facing language. May be helpful to provide an example workflow.
10	293	Similar to para. 35, calibration information should be made available alongside the data.
10	293-294	Insert "the time of" after "possible to"
10	296	Regarding "these Guidelines concerns the minimum requirements." Since Guidelines are non-binding, shouldn't there be a Standard that describes the requirements for sampling and analysis?
10	297-298	Replace "in here will increase the quality and" with "in this document and the additional documents cited will increase the quality of baseline studies and"
10	300	Regarding "appropriate long-term preservation standards" Where can the contractor find these standards?

10	318	Regarding “established metadata standards.” Where can the contractor find these standards?
10	323	Regarding “should also be provided” To whom? Data centres and data managers, the ISA, in EIA?
11	327-332	Para. 48 may need to be crafted to be intelligible to ISA contractors. There will probably need to be a Guideline solely on Data Management procedures.
11	346	Replace “The sea-water parameters that discrete water” with ‘These are sea-water parameters that define discrete water”
11	351	Insert “marine organism” before “populations”
11	358-360	We propose to expand this term to encompass the main values measured in the light field pertinent to midwater fauna that use bioluminescence to feed, hide and reproduce. There is serious concern that sediment particles from the dewatering plume will affect fauna from using bioluminescence, which will reduce mating and/or feeding success.
12	366	Replace “from collocated devices” to “on the same sampling device and at the same time”
12	392	Regarding “Physiographic unit” What defines a 'physiographic unit' and ‘physiographic zone’ (line 412) will need an explanation
12	303-394	It is preferable to add the term “consecutive” before “years” to be able to identify the variability with each year passing.
12	406	Replace “up to 600/800 – 1000/1600m (depending on the model)” with “at depths down to 1600m depending on the specification of the ADCP instrument used”
13	441	Insert “while the ship is maintaining its course and speed” after “line back”
18	625	Regarding “Any models should be validated and accepted by the ocean modelling community.” Recommend adding reference to model validation requirements in EIA Standard (E)(13) and other applicable documents.
19	669	Regarding “Data and metadata should be provided to the ISA as outlined in section III.E” The section referenced here does not have enough information for contractors to be certain that Data and metadata provided to the ISA will be presented in the correct format. This section references metadata standards and data preservation standards (see earlier

		comments) without a clear direction as to what those standards are. More information or references to existing documents is needed in this section.
20	708	Add at the end "Oxygen (or the lack of it) also influences the distributions of pelagic organisms, especially in the upper 1,500m of the water column and may be important in relation to discharge plumes."
22	823	Replace "from collocated devices" to "on the same sampling device and at the same time"
35	1376	At the end add "(e.g., Chirp system)"
39	1537	The pelagic sampling section should include some text about the variety of pelagic organisms that will need to be studied including microorganisms, gelatinous zooplankton taxa, seabed organisms that swim up into the water column, larvae of benthic and pelagic organisms, fish, crustaceans etc.
39	1538	Regarding "pelagic realm" Changes in the pelagic realm will also be influenced by oxygen levels and Oxygen Minimum Zones, especially at depths shallower than 1,500m. Also, this is covered in part, but not comprehensively in section D below. Greater appreciation of gelatinous zooplankton is required, as well microorganisms and larvae.
39	1547	Replace "1,000m to 10 m above the seafloor" with "and then every 1000m to 10m above the seafloor." More detailed sampling will be required at depths where discharge plumes may be released - see para. 120
40	1552	insert "ROVs and" before "AUVs"
40	1559-1565	Even with the softest of touch downs boxcores can cause disturbance. Additionally, in 5000m of water even a small deviation in wire angle (owing to surface water and deeper currents interacting with the wire) could cause the corer to land anywhere within 100s-1000s meter radius of the ship. The relation of the box corer to seafloor heterogeneity will not be known, without an improvement in sampling technology -TV or sonar/bathymetry guided corers. It may be better to emphasize larger volume sediment samplers using ROVs.
40	1564 & 1567	Replace "regarding" with "regarded". insert "the sample' after "sieve"
40	1570-1571	insert "and rarefaction curves" after "(Jumars, 1981)"

		The asymptote of the rarefaction curves will help to determine whether the area is under sampled and the number of samples necessary to capture the total number of species (species richness) in the area
40	1574-1575	Insert “and development of rarefaction curves” after “power analysis”
41	1604	Regarding “Zooplankton” Zooplankton analysis should also include specific data on benthopelagic zooplankton and micronekton living within 100m of the seafloor
41	1720	Recommend deleting “using specialist annotation software”
41	1724	Regarding Image Analysis - It may be necessary to advise that the same images are analyzed by at least 3 different operators in the laboratory owing to variations in human perception during the analysis of seabed images.
44	1754	replace “wet” with “cold”
45	1759	Regarding “formaldehyde as a fixative should be carefully considered.” There is ambiguity which needs to be clarified with re-wording.
45	1761	May need to explain “residues”
46	1834	Insert “and Indian Ocean” after “CCFZ”
50	1972	It will be necessary to study different taxa and different size classes of the benthic community as they are likely to have different reproductive biology and therefore different connectivity characteristics. Additionally, given the rarity of the species (abundance of any species <5% of total abundance) it may be problematic to use any species as a proxy, as rare species may be functionally important as an aggregate.
52	2061-2062	Regarding “benthic chamber measurements made at ache site” This may need qualifying as core tubes from the same multicorer drop for meiofauna are not considered replicates, but different chambers on the same lander deployment might be deemed 'replicates'
55	2196	Replace “or cnidarians” with “and cnidarians (or similar gelatinous zooplankton)” It will be important to study both crustacean zooplankton and gelatinous zooplankton taxa
55	2203	This section may require further thought about the inclusion of best practice in satellite tracking tags of whales, sharks, turtles and surface nekton which might pass through a mine site.
55	2216	Note: Seabird survey methods may have to be modified for mid ocean oligotrophic areas.
Additional rows can be added to this table by selecting “Table” followed by “insert” and “rows below”		

Comments should be sent by e-mail to ola@isa.org.jm