Template for the review of the draft regional environmental management plan for the Area of the northern Mid-Atlantic Ridge with a focus on polymetallic sulphide deposits

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General Comments

When preparing the general comments, stakeholders were invited to consider the following:

1) The structure and layout of the draft REMP.
2) The level of detail of the draft REMP, while avoiding being too prescriptive.
3) The goals and objectives in the draft REMP in providing for long-term, effective protection of the marine environment in the Area of the northern Mid-Atlantic Ridge.
4) The management measures and their ability to achieve the goals and objectives in the draft REMP.

GESAMP's stated function is 'to provide authoritative, independent, interdisciplinary scientific advice to organizations and governments to support the protection and sustainable use of the marine environment.' In undertaking this role, GESAMP takes into close consideration the UN Sustainable Development Goals, particularly SDG 14, and is also working to support the UN Decade of Ocean Science. The International Seabed Authority (ISA) is one of the UN organisations that sponsors GESAMP and seeks its advice on scientific matters and how these may relate to management and policy. The 'Decade' challenge for a 'Clean Ocean' is one obvious area that aligns with both GESAMP's role and ISA's function in relation to managing deep sea mining. Within SDG 14, there are several target areas that GESAMP has a role to monitor which also relates to ISA's deep sea mining responsibilities. These include prevention and reduction of marine pollution of all kinds; sustainable management and protection of marine ecosystems to avoid significant adverse impacts; increasing scientific knowledge, developing research capacity and transferring marine technology; and enhancing the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS. It is within this contextual framework and areas of engagement between GESAMP and ISA that GESAMP offers the following comments and suggestions on the draft REMP.

GESAMP acknowledges the ISA Legal and Technical Commission team for the hard work that has gone into the Regional and Environmental Management Plan to date and for the two detailed workshops held in Poland and Portugal that drove this process, along with a further virtual workshop. GESAMP also notes with appreciation the positive and open decision made by the Commission to release the draft REMP for stakeholder consultation, and that the Commission will consider the comments received through stakeholder consultation during its next meeting.

Generally, GESAMP is concerned that the level of detail and clarification falls somewhat short of what would normally be expected from a REMP of this nature, particularly one that addresses such large and difficult areas to access and monitor, away from normal visual oversight. Furthermore, GESAMP feels there should be more

clarification on who is responsible for which activities and how these activities themselves (be they data collection, assignment of areas/sites needing protection, observations of potential and real impacts, adaptive management measures as required etc.) would be monitored and quality assessed and by whom..

GESAMP makes reference to its defined advisory role to all of the UN agencies on the design and execution of marine assessments (including environmental monitoring plans) and its function to provide cross-coordinated advice and assistance to the UN agencies. Consequently, GESAMP feels it appropriate to draw attention to its conclusion that the level of detail and clarification falls somewhat short of what would normally be expected from a REMP of this nature, particularly one that addresses such large and difficult areas to access and monitor, while being away from normal visual oversight. GESAMP would also wish to offer the advice that it would seem appropriate and in the interests of openness and transparency if there could be more clarification on who is responsible for which activities and how these activities themselves (be they data collection, assignment of areas/sites needing protection, observations of potential and real impacts, adaptive management measures as required etc.) would be monitored and quality assessed and by whom. Additionally, if it is intended that an independent body or bodies would undertake verification and quality assessment of various expected or required activities, it would provide clarity if the REMP were to confirm the use of such an independent body. It will be important to know who will monitor, oversee and report back to the Legal and Technical Commission (LTC) and to ISA as a whole on such critically important aspects as ecosystem survey results as well as on overall compliance.

GESAMP has an overarching concern about data collection in the context of the sheer enormity and cost of the task. GESAMP is concerned about the speed with which it can be gathered versus the pressure for contracting and activities to start. There is a further concern relating to the current lack of infrastructure for data collection and research for depths beyond 3000m (especially within the complex terrain of the Mid Atlantic Ridge) and the excessive cost of obtaining regionally relevant data in such environments. This situation is exacerbated by the current economic crisis and also the aftermath of COVID which has left a lot of science research infrastructure in "catch-up" mode worldwide. On the other hand, contractors have been collecting data as required under exploration contracts over the past 15 years, Although ISA has been developing a data template for contractors, it is unclear to GESAMP as to what data have been submitted by the contractors to ISA to date. Inconsistent access to data and storage of data would inevitably lead to a lack of confidence in what is being collected. Also, GESAMP notes the challenges involved in developing a "regional" environmental management plan when most of the contractors' research and data is focused on a few small sites of mineral interest.

GESAMP also notes that much of the language throughout the REMP document tends toward the 'voluntary' rather than 'obligatory'. It is felt that phraseology along the lines of 'XXX shall' would be more appropriate for such a Management Plan as well as being consistent with the norm for such agreements and plans, rather than the use of wording such as 'XXX may'. Otherwise, there is no implication of any legal or contractual obligation. It seems unusual that the REMP would employ such 'weaker' language when the Regulations themselves tend to use the more obligatory wording, 'shall' (e.g. Regulation 34(5) in the PMN prospecting and exploration regulations says *"5. Pursuant to article 145 of the Convention and paragraph 2 of this regulation, each contractor shall take necessary measures to prevent, reduce and control pollution and other hazards to the marine environment arising from its activities in the Area as far as reasonably possible, applying a precautionary approach and best environmental practices"*. GESAMP wonders why the wording in the REMP does not reflect them same level of stipulation and commitment?

GESAMP suggests some clarity on the sequence of events in the context of proposed sites for mining activities, exploration of those sites and then exploitation of those sites in line with the requirements for a REMP and/or an EIA. For example, does a REMP need to have been formally approved before a Plan of Work from a Contractor can be agreed and adopted? This concern reflects the obvious fact that no-one truly knows what the impacts and deleterious effects of mining may turn out to be as it has not been tried-and-tested as yet. Most of these ecosystems have taken millions of years to evolve and are very slow-forming as both habitat types and biocenosis areas. Any impacts could wipe out entire, unique ecological communities and such an action would

be irreversible and effectively represent a form of extinction for very localised endemic communities such as are found around vent systems. In this context, GESAMP would also like to draw attention to the biodiversity associated with seamounts and ridges, which is generally high, of indeterminate distribution and connectivity and mostly poorly explored. A true precautionary approach will require proponents of potentially harmful activities to prove that impacts will be limited or of very low probability and the instigator to be held directly responsible if there are subsequent unexpected impacts i.e., the onus is on the potential impactor to prove no or reasonable impact and not on those who would question the impact of activities. It would be useful to capture that sentiment somewhere but maybe the Regulations will be covering that?

There is no mention in the REMP of existing protected areas, such as OSPAR protected areas and Portuguese marine protected areas located specifically in the Mid-Atlantic Ridge, or areas recognized by the CBD as "ecologically or biologically significant areas", and no reference to other users of the sea in the area whose activities need to be taken into account. Likewise, there is no mention of important feeding ground or migratory pathways for marine megafauna including whales, turtles and seabirds. Even a general reference to these would be advisable.

In light of the thorough review given to this REMP by the GESAMP Members and the comments both general and specific, GESAMP would like to make the following suggestions and recommendations for ISA to consider:

A. In view of these detailed remarks provided by GESAMP and the suggested areas that need addressing, GESAMP would like to suggest that ISA consider convening some form of workshop to address these as well as any other comments received. GESAMP would be more than willing to contribute to such a discussion.

B. GESAMP would also be interested to know more about how the ISA DeepData is harmonized with and aligns to other well-established databases such as such as the Ocean Biodiversity Information System (OBIS), GEBCO (for bathymetry) and World Ocean Database for physical oceanographic data.

Specific Comments

Page	Line	Comment
4	11-14	All prospecting and much exploration activities are little different to those used in normal oceanographic research that does not require any permitting. In this context, GESAMP understands that it may be excessive to require an EIA for such activities and the ISA regulations for prospecting and exploration do not therefore generally require any EIA for these activities. However, exploration can involve for example "…the use and testing of recovery systems and equipment processing facilities and transportation systems…" (Regulation 1(3)(b of the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area and related matters' - Document ISBA/19/C/7 as amended by document ISBA/20/C/23). These activities do have the potential for environmental impacts. GESAMP notes that Regulation 18(b) of the above regulations can require an assessment of the potential environmental impact of exploration activities set out in any environmental rules, regulations and procedures established by the ISA and wonders if ISA has established such rules, regulations and procedures for prospecting and exploration activities for polymetallic nodules, polymetallic sulphides or cobalt crusts?
5	73-75	*'This REMP contains references to measures applicable to the exploitation phase for which the Draft Regulations on Exploitation of Mineral*

		Resources in the Area are still under negotiation, therefore, these measures will need to be aligned once the draft regulations become adopted.' GESAMP understands that, for a detailed REMP to be supported by the appropriate data and knowledge, some exploration would need to take place (see comment above relating to REMP p. 4, lines 11-14). Nevertheless, GESAMP would be interested to know if it might be possible for the REMP to apply to any new applications for mining **exploration** as well as the extraction processes (i.e., exploration licences requested after the REMP has been approved as opposed to exploration contracts already previously issued)?
5	82-85	GESAMP urges that maintaining, at the very least, this Principle 15 is absolutely essential to avoid any undesired and unrestorable damage.
6	98	In the 'Overarching Goals', the REMP refers to 'Enable the Conservation of representative habitats and vulnerable marine ecosystems'. GESAMP felt that this is somewhat misleading as a goal and could be misconstrued as worded. 'Conserving representative habitats 'could, in fact, allow for the loss of most of them. GESAMP compares this in many ways to 'conserving the last tiger in the zoo'.
6	102-109	These Overarching goals refer to access to and sharing of data, cooperative research, cooperation among contractors, States and other stakeholders. GESAMP welcomes this statement and would be pleased to collaborate with ISA and the Legal and Technical Commission in any manner that can promote these three sub-items to ensure equitable and accessible data sharing related to the protection and management of the marine environment in the Area and to promote encouraging cooperation. GESAMP would advise that all such data should meet the guiding principles of FAIR (Findable, Accessible, Interoperable and Reusable). GESAMP has some concerns about the accessibility to data, particularly that collected by contractors during the exploratory phase, noting the critical importance that such data are and will be necessary for both baseline assessment and long-term monitoring
7	127	Definition of *'Comprehensive set(s) of scientific data'*. How has this been defined for an area? Especially a complex area with a diverse range of habitats and environments.
8	144	An appropriate risk assessment should be carried out in advance of any activities in these areas of active hydrothermal vents and their precipitation regime. Even if vents are no longer hydrothermal active they still represent a unique and poorly understood ecosystem.
8	166-176	There are many more groupings for habitat types than the four mentioned here, even at a broad scale. These should be mapped and defined. Furthermore, this section notes that *'Distinguishing between active and inactive sulphide habitat can be challenging, but is essential, because active and inactive habitats support quite different biological communities, with potentially different resilience and recovery potential'*. This is a key point and supports other critical concerns regarding data collection, infrastructure and cost. Such data capture at the depths under consideration

		is very costly as well as time-consuming and requires elaborate techniques and equipment which are generally in high demand and short supply.
8	177-179	It would be useful to have more information on how the estimate of known to unknown sites has been calculated and what the margin of error is on the number quoted?
8	182-189	*'The complex geomorphology and high heterogeneity of habitats make it challenging to identify a representative network of sites or areas that can capture the full range of biodiversity and environmental gradients across the region.'* This is, indeed, a main concern for GESAMP. How would this be defined i.e., what is required as a comprehensive data set to allow the area to be described? Individual cruises will only collect data on a relatively small spatial scale and effects of extraction at multiple sites will provide cumulative impacts. In order to truly and reliably arrive at a representative set of sites or areas, a much larger and more detailed study of the region would be necessary. As a basic premise for the precautionary approach, there are some essential baselines for data capture that should be adopted here, not least of which is the geographical coverage, but also the necessary parameters to be measured and how frequently. Also, in line with the precautionary approach, if such a representative network of sites/areas are currently difficult to identify, then it would not seem appropriate to allow contract areas to go into production before this has been completed. One major concern would be whether active vent systems are to be commercially exploited or be put at risk of impact from adjacent activities without first studying their community structure and interaction as well as their diversity? Will the chemical and biological inventory that is to be carried out (according to this text) be made available and accessible? This is an essential requirement both for assigning 'sensitive' areas and for monitoring overall.
9	195	GESAMP draws attention to the fact that, that although the surface extent of PMS deposits can be determined, no one has yet been able to assess /measure the amount of deposit that exists under the surface, the depth and amount that this deposit will influence the depth etc. of extraction, which needs to be factored into the assessment of any potential impact and its volume or extent.
9	220	GESAMP notes that there is an essential need for a level of ground-truthing when modelling habitats. This needs to be identified along with the responsible parties
9-10	205-258	Overarching comment on this section: Clearly the Operational Objectives are an attempt to address the Regional Specific Goals and Objectives. This represents a massive area of work which would, of course, be welcomed in order to collect and collate adequate information and understanding of what are, in fact, complex and poorly understood ecosystems and communities with various equally

		unknown interactions and connectivities. However, GESAMP finds it difficult to comprehend how this would be done and by whom as well as 'when' this would happen? Is this something that has to be done before any 'on-the-ground' commercial/industrial extraction can take place? Logically, this should be the case, as it is clearly impossible to meet any of the environmental goals specified under the Regional Goals and Objectives until such detailed studies are undertaken and a monitoring programme built around them. GESAMP has concerns regarding who would undertake this work?'. Undoubtedly, it would be both costly and time-consuming and it should have some form of independent quality control through an independent quality assessment and verification of any such work. This also relates to any monitoring and how the information from such would feed back into an adaptive management approach? It is appreciated that some of the answers to these questions may lie outside of the remit of this REMP (e.g., within the actual Regulations). If that is the case, the REMP should refer to the appropriate descriptive clarifications within the sections of other documents to which the regulations relate/govern. Furthermore, the text for Operational Objectives (248-258) seems to be more platitudinous in the impression they create rather than providing specific objectives with a clear intent and activities to deliver that intent. Once again, this section begs the question "who would undertake monitoring of compliance to ensure these happen?". It is hard to see how potentially harmful environmental impacts can be avoided until there is sufficient knowledge about the specific 'environment' in the active mining area and adjacent. Who defines the level of 'minimising' harmful environmental impacts? It is, of course possible that all this is all covered in some separate detailed document as mentioned previously. If so, that should be referenced here.
10	233 - 236	*a) Compile, analyze and synthesize data and information, in collaboration with different contractors and the scientific community regarding the benthic and pelagic ecosystems as well as an [on?] food web and energy pathways, and thereby enhancing the understanding of ecosystem structure and functioning at a regional level;* This and a number of other sections raise the question again about data access. It will be exceedingly difficult to define a baseline for monitoring and just as difficult to undertake the monitoring without open and free access to basic environmental data and geographic distribution. GESAMP would urge ISA to ensure that such access is available.
10	237	This is a key point; the monitoring data that is collected should influence future monitoring and associated management requirements
10	244	*a) Promote the development of mining technologies that can help effectively address the potential environmental risks to the MAR systems, which may be posed by exploitation of polymetallic sulphides.*

		The meaning of 'promote' here is a little ambiguous and could be misconstrued. We would suggest amending the wording to read 'explore and encourage the specific development of clean mining technologies…'
10	251	*a) Avoid harmful environmental impacts on active vent sites with significant megafauna communities, including loss of vent communities in areas around a potential mine site.* The report recognizes that inactive vents support different communities than active vents. Therefore, there should be some mention of how these communities will be protected, as they are a part of the overall ecosystem, or some amendment to the wording to include inactive vent sites also.
10	261-262	*'This REMP recognizes that contractors have security of tenure over contract areas, and any management measures prescribed in the context of this plan will need to take this into account.'* This could be interpreted as meaning that any management measures that actually recommended closing down a commercial/industrial operation due to the damage it may be inflicting would be unenforceable? This would presumably depend on the wording and details of the contractual agreement between ISA and the contractor. It would be wise to adopt a policy that 'security of tenure' provisions do not prevent proper sanctions against contractors for poor compliance or other malfeasance.
11	272-275	The REMP states that it does not include ABMTs identified through the application of network criteria, such as representativity and connectivity, based on a regional analysis. From a scientific perspective it would appear vital that this is done. Individual representative sites are not truly representative unless connectivity is considered and may not be sustainable habitats or ecosystems without that connectivity.
11	276-278	*'It is noted that thresholds are needed for describing the occurrence of vulnerable ecosystem features in the application of the criteria for ABMTs, and for evaluating and controlling the impacts of mining activities'*. It would be important to identify how those thresholds will be set and by whom. GESAMP understands that, at one of the preparatory workshops, there was a suggestion to use the similar or same methods for describing thresholds as the FAO uses for fisheries thresholds such as those used for the identification of Vulnerable Marine Ecosystems during bottom trawling.
11	298-302	This definition of how the AINP's would be zoned is a welcome one. It does further raise the question of what information is needed to effect this zoning process, how these data would be collected, who would be responsible for that data collection and who would decide on the actual extent/coverage of the various zones?
11	300	*'..and possibly other zones where activities compatible to the management purpose of AINPs can be allowed, when scientific information on the spatial scale of transportation of fine particles from mining plumes becomes available;'* Understanding the nature, magnitude and behavior of the plumes is crucial to addressing and managing any impacts, especially in the mining of polymetallic sulphides. Management and avoidance or mitigation measures

		for impacts also need to take into account any dewatering of the collected ore.
11	303	*'ISA secretariat should promote and facilitate collaborative monitoring and scientific research efforts in the AINPs, within the context of ISA's mandate on marine scientific research, in particular the ISA Action Plan in support of the UN Decade of Ocean Science for Sustainable Development'*. This is an excellent sentiment but GESAMP is of the opinion that it could be more specifically worded to say 'ISA will promote…' so that there is a clearer sense that this is an activity that will be pursued rather than one that might be considered.
11	Footnote	*Monitoring referred to in this paragraph describes the collection and analysis of environmental data for understanding the marine environment at a large scale and beyond the geographical boundaries of contract areas, therefore does not form part of the obligation relating to monitoring the likely effects of Contractors' programmes of activities.* Once again, this raises the question regarding who will monitor the likely and actual effect of the Contractor's programmes of activities. It also tends to suggest that such collaborative monitoring should NOT address monitoring the likely effects of Contractor's activities. Again, this may be made clearer in an overarching document. It is noted (as per Para 10.) that the Draft Regulations on Exploitation of Mineral Resources in the Area are still under negotiation, therefore, and that these measures will need to be aligned once the draft regulations become adopted. Perhaps this is more clearly defined in the Regulations which must be the definitive set of directives for these processes?
12	320	*Contractors operating in the vicinity of a SINP will be required to provide sufficient information and data that there would be no direct or indirect impacts on the SINP, including negative impacts on any subsurface fluid flow to active vent features, before any proposed exploitation activities can be approved;* GESAMP understands that contractors will want to act responsibly as it would not be in their interests to do otherwise. Nevertheless, who will determine what data are actually needed? We assume most of the data will come from the environmental baseline and any EIA. If that is the case, then clearly both of these need to be conducted to a high and defined standard with built-in procedures for assurance and quality assessment.
12	316-337	General Comments on section B on Sites In Need of Protection (SINPs): . GESAMP advises strongly on the need to emphasis here the intent to use a defined responsible and impartial body to check this work as a means of quality assessment and ensuring its veracity. If this is defined elsewhere (e.g. in regulations) then it would be appropriate to provide a reference to this for clarification. Additionally, we note the frequent use throughout this document of the word 'may' rather than a more specific requirement of 'should' (i.e., suggesting 'voluntary' rather than 'obligatory'). This then leaves the contractors in a position of choice and ambivalence as to A. whether they need to do it and thus B. will they even bother to do it. Also, it is not clear (within this document at least) as to how the AINPs and the SINPs relate to the designation of 'Areas of Particular Environmental Interest'. GESAMP's

		understanding is that the latter (APEI) are areas where no prospecting, exploration or exploitation can (should?) take place. Perhaps this is defined clearly elsewhere e.g., in the draft Regulations?
13	374-375	*'Contractors planning to undertake exploitation activities in the S/A Precaution should apply a precautionary approach until their status are assessed'* This reads as somewhat contradictory. If there is a designated or recognised S/A Precaution for an area then a precautionary approach would almost certainly negate all exploitation activities until confirmed or otherwise. How would the means and extent of any such exploitation be defined within this scenario? Under such a precautionary approach (which has been already identified as one of the overarching guiding principles for development and implementation of this REMP) approval of any activities in an S/A Precaution area should only realistically be confirmed once a detailed EIA has been carried out and quality assessed. Otherwise, the precautionary approach is clearly not being followed.
13	383-387	*'Apply a range of mitigation measures, as appropriate, to all major impacts from exploitation activities';* As a part of the Management Measures for sound environmental management of exploration and exploitation activities, this suggests that major impacts would be dealt with by mitigation measures. However, the first approach should be to try to avoid impacts before considering mitigation measures. GESAMP maintains that any activities should always aim to avoid reaching the point of mitigation if the Management Measures are realistically and effectively employing the precautionary approach. *'Develop multiple thresholds, which can enable timely detection of where impacts are approaching serious harm'.* This would seem to suggest that activities can carry on until impacts are 'approaching serious harm' (as defined by some sort of threshold). This is incompatible with a proper precautionary approach and may well allow a situation to become irreversibly and continuously 'seriously harmful'.
13	391-398	This section refers to various acceptable levels of potentially toxic contaminants, particulates, noise, light, etc. impacting on biota in the SINPs and AINPs listed in Annex I and II. GESAMP maintains that this is a contradiction in terms, as there should not be 'acceptable' levels of impact within SINPs and AINPs. If the intention is not to allow impacts but rather to set acceptable levels of contaminants etc. that may reach the SINPs and AINPs, then there should be some indication of who would be responsible for defining what is acceptable? This is not clarified here. GESAMP was also unsure as to what 'acceptable deviation from baseline information on habitats before an action is taken'. It may mean, for example, acceptable changes in a level of contaminants (include light and noise) but, once again, it would be important to identify a responsible and impartial body who would set such 'acceptable' levels.
14	402-404	*'On active vent sites with significant megafauna communities, contractors should ensure active mining plume management as well as monitoring of*

		hydrothermal flows to avoid interruption or disruption to hydrothermal flows upon which vent communities rely'. This would seem to confirm that contractors would be allowed to work on active vent sites supporting significant megafauna communities. GESAMP finds this inference to be worrying and would urge clarification. Furthermore, how are 'megafauna' defined? In ecological circles this is usually defined quite simply as 'animals that are large enough to be seen with the naked eye'. Is there a definition perhaps in the Regulations? If not then a simple, short definition in this REMP would be useful guidance.
14	412	*'…actively manage the return-water plumes and the impact of the removal of any sediment overlying the mineral resources (over burden) and its deposition…'* Has the ISA defined anywhere what they mean by 'actively managed' or is this to be determined by individual contractors? It would be advisable to clarify this to ensure such management would be effective.
14	421	*'The release of returned water plume (particles, contaminants, and altered water chemistry)'* There needs to be recognition that this has potential to impact on the sediment ecosystem that the released water is being delivered to and therefore some form of 'active management' and monitoring is necessary
14	424-425	*'Apply thresholds for the impacts of mining plume (particles and toxic contaminants) on SINPs'.* As noted previously, GESAMP's concern here relate to who will identify these thresholds and ensure they are applied?
14	428	*Apply an adaptive management approach in undertaking activities in their contract area;* GESAMP notes that there is no definition of who will apply this approach or what the approach would be here in this REMP. It is possible that the mechanism for Adaptive Management may be defined elsewhere but the responsibility for undertaking these management actions is not defined here and should be.
14	432	*Control light on the seabed and from vessels that can attract birds and disrupt their behavior;* This seems to be overly limited in its extent. Consider amending here to read: *'Control light from activities on the seabed and from surface vessels and platforms that can interfere with or disrupt the behavior of marine organisms.'*
14	437-438	*Avoid the introduction of invasive species from vessels that can lead to loss of ecosystem function and biodiversity;*

		Also, this needs to be more encompassing. Consider amending here to read: *'….of non-native species from vessels, platforms and associated mining equipment… .'* Furthermore, would there be any requirement for mining equipment, vessels and/or platforms to be cleaned of any fouling organisms before moving into a new area, where they might then introduce non-native species? GESAMP would urge that this should be a consideration.
14	439-442	*'Monitor direct and indirect impacts of mining, including impacts on subsurface hydrological flow changes, impacts of overburden removal and on key habitats outside contract areas, and potential long-term impacts on biological communities,* ***in order to minimize such impacts;'*** Consider amending here to read: *'….with the aim of identifying and then taking measures to minimise such impacts;'* (the act of monitoring itself will not minimize the impacts).
13-15	399-447	General Overall Comment on section: At the Scale of Contract Areas: The language here alternates between 'will' and 'should'. Some of the latter language suggests 'voluntary' rather than 'obligatory' requirements on the contractors as noted in previous comments. For example… *'a) On active vent sites with significant megafauna communities, contractors* ***should*** *ensure active mining plume management as well as monitoring of hydrothermal flows to avoid interruption or disruption to hydrothermal flows upon which vent communities rely* *e) To control exploitation activity to remain within impact thresholds, contractors* ***should*** *apply the established thresholds and, where relevant, identify relevant environmental thresholds, e.g., for impact of particulates in plumes;* *f) To ensure no increase in ambient particulate flux in the pelagic environment, contractors* ***should*** *control the generation of plumes arising from extraction and redeposition of waste material'* Ideally, this should be amended to read 'Shall' or 'Must', both of which words have a clearer sense of obligation. Otherwise, this is not truly a 'management' requirement within the contract area and places no onus on the contractors other than suggesting an optimistic expectation.
15	451-452	GESAMP advises that this section should define the timescale on which monitoring must take place to ensure inclusion of temporal changes.
15	448-488	General comments on Section on Implementation Strategy: As noted by GESAMP in previous comments, the entire section seems to focus throughout more on the 'voluntary' phraseology rather than 'obligatory' with the consistent use of the word 'can' or 'may' rather than 'shall' or 'must'. For example, *'Oceanographic models* ***can*** *be developed at the regional scale through collaboration'*. Or '*Resilience and recovery: Monitoring and research* ***may*** *focus on the abundance or health of indicator species and community trait profiles*,…'. This undermines the

		value of these requirements as they are not, in fact, requirements but more suggestions or allowable activities.
16	494	*'Habitat models may be developed for the identification of representative habitats'.* These models will need to be tested as is always the case with such models. In this context, ground-truthing of models will be essential.
16	496	*'Experimental studies and research **may** be conducted to address important data gaps for designing buffer zones, such as data on hydrodynamic patterns and geophysical characteristic of vents fields, which are necessary for understanding the footprint around which to design buffer zones'.* As noted above and as another example, this should read "shall" be conducted or it would need to be reworded to indicate that robust data will be required to define the buffer zones and depth zonation
16	514	GESAMP advises on the need to define tipping points in this line.
16	522	*'Thresholds should be identified through a phased approach',* This reference to a 'phased' approach is a little unclear and requires better definition and clarification
16	536	*'…and intercalibration studies to ensure coherence within DeepData'.,* Intercalibration is good but GESAMP advises that ISA needs to set data standards for collection, analysis and reporting. This is a key point. There is evidence that DeepData is not compatible with other existing and well-recognised databases - see comment below.
16	505-566	Same comment on this entire section on use of 'voluntary' language instead of 'obligatory' language.
17	564-567	*In order to effectively facilitate the implementation of this REMP, the ISA secretariat will develop an information-sharing mechanism to compile relevant scientific and technical information in support of its implementation, where appropriate in connection with the ISA DeepData database, in collaboration with contractors and other relevant stakeholders.* GESAMP would be interested to know more about how this information-sharing mechanisms might work as well as how this planned to be undertaken in collaboration with ISA, contractors and other stakeholders? There are a number of existing examples of such arrangements including the FAO EAF Nansen Programme as well as many of the Large Marine Ecosystem Programmes and Projects around the world (e.g., Benguela Current Commission, the ASCLME -SAPPHIRE project, etc.). Other examples that include industry specifically are the various IMO Global projects on Ballast Water, Biofouling and Energy Efficiency. It would be helpful if ISA could expand on its intentions relating to the mechanism that would be adopted. Also, please note the previous comment about the need

		for the DeepData base to be calibrated to interact with other major global databases.
17	567-575	*Review of the progress in the implementation of the REMP* GESAMP considers that some further reference here to an adaptive management approach and an adaptive management mechanism would be appropriate to respond as necessary inside each 5-year review window. This is mentioned in para *49. i) Apply an adaptive management approach in undertaking activities in their contract area;* but it seems appropriate that there should be some reference to who will do this and what the mechanism would be (this is possibly defined elsewhere in other overarching documentation?).
Annexes	617-620	*Annex IV. Scientific criteria applied for the identification and description of ABMTs in the northern Mid-Atlantic Ridge based on criteria developed by other competent international organisations* This should include the consideration of sites or habitats which constitute a time-sequence of scientific monitoring and for which there is already existing historical background/baseline data. This also applies to the AINPs.