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Deep sea-bed mining and the protection of the marine environment

André Nollkaemper

The article examines the PrepCom Draft Regulations on Protection and Preservation of the Marine Environment from Activities in the Area. The draft regulations have to seek a balance between the interests of exploitation of resources and the protection of the environment, and they have to cope with great scientific uncertainty. Nonetheless, as the draft regulations follow in a number of aspects recent developments in international environmental law, they go some way towards securing the environmental interests of the deep sea-bed environment. Some elements, such as the liability regime, are in their present form not satisfactory and would benefit from some amendments.

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In March 1990, the Preparatory Commission for the 1982 Law of the Sea Convention (LOS Convention) started its discussion of the Draft Regulations on Protection and Preservation of the Marine Environment from Activities in the Area.¹ These draft regulations have been published as Part VIII of the Draft Regulations on Prospecting, Exploration and Exploitation of Polymetallic Nodules in the Area, and consequently its 27 articles number from Article 104 to Article 128, while Articles 1 and 2 (scope of the regulations and use of terms) are intended to form part of Part I of the Mining Code. The first reading of the draft regulations took place at the spring meeting of the eighth annual session of Special Commission Three (SCN 3) of PrepCom in March 1990, and is expected to continue through the second meeting of 1990 and the first meeting of 1991. In view of the first discussion of the draft regulations, the issue will remain on the agenda for some time to come.

This article will examine the contents of the draft regulations. It should be noted that the draft regulations are still of a very preliminary character and that it is unlikely that they will be adopted in their present form. Nonetheless, the basic issues they address are more or less set and it is those issues that will be addressed here.

Background to the draft regulations

The establishment of regulations for the effective protection of the marine environment against harmful effects from activities in the Area meets explicit requirements contained in the 1982 LOS Convention. Article 209 provides in general terms that international rules, regulations and procedures shall be established in accordance with Part XI to prevent, reduce and control pollution of the marine environment from activities in the Area. Article 145 of the LOS Convention provides more specifically that the Authority shall adopt appropriate rules, regulations and procedures with respect to activities in the Area to ensure effective protection for the marine environment from harmful effects which may arise from such activities. Article 17(1)(ix) of Annex III to the LOS Convention imposes a similar obligation on the Authority. These rules, regulations and procedures shall be adopted and provisionally applied by the executive organ of the Authority, the Council, pending approval

¹LOS/PCN/SCN 3/WP 6/Add 5 of 8 February 1990.

by the Assembly (Article 162(2)(o)), on recommendation of the Legal and Technical Committee (Article 165(2)(f)).

As the Authority and its organs cannot act until the Convention has come into force, it has been left to PrepCom to prepare draft rules, regulations and procedures as necessary to enable the Authority to commence its functions.²

Underlying dilemmas

The negotiators of the draft regulations will have to cope with two dilemmas: they have to find a balance between the interests of the development of resources and those of environmental protection and they have to decide how preventive the regulations should be while scientific uncertainty remains as to the effects of deep sea-bed mining.

The first dilemma is that the rules have to find a balance between on the one hand the need to preserve and protect the marine environment, and on the other hand the development of the resources of the international sea-bed area.³ Much energy has already been invested in paving the way for exploitation of deep sea-bed resources, not only within PrepCom, but also by States which have a strong interest in deep sea-bed mining but have preferred to stay outside PrepCom. Of course there are major disagreements, but on the whole all States share the conviction that deep sea-bed mining ultimately is desirable, albeit on different financial, economic and technical conditions. The move to maximize the possibilities for mining has a momentum of its own and it may be difficult to balance it with the interests of the environment.

It has been suggested in SNC 3 that this dilemma might cause a conflict of interest within the Authority. The Authority is partly dependent on revenue from economic activities in the area (Article 171 of the LOS Convention). As the Authority is also responsible for drawing up and enforcing environmental standards which could restrain exploitation, it could be biased in favour of a permissive regulatory regime.⁴

The second dilemma is how stringent preventive rules should be in the absence of scientific certainty. In spite of numerous studies, there are still great gaps in our knowledge about the effects of deep sea-bed mining. It is thought that while in the exploratory stage the impacts will be relatively limited, in the development stage the fragile ecosystem and the wide diversity of life forms⁵ supported by the deep sea-bed benthic environment will be threatened by destruction of benthos on the sea-bed in and near the collector track, by the benthic plume which is raised by the collector's action on the sea-floor and which may be moved kilometres away, and by the plume caused by surface discharges of sea-floor sediment.⁶ Nonetheless, the conclusion that it is almost impossible to predict accurately the effects of large-scale deep ocean mining operations still seems valid.⁷ In addition to the 'normal' effects of mining, there is always the danger of calamities. Here as well, much depends on the nature of the technology applied during deep sea-bed mining – different methods of deep sea-bed mining have different adverse effects.⁸

As long as the effects are not entirely clear, it is difficult to know which regulatory measures are required. Much depends on the outcomes of present and future research. In any case, the draft regulations will have to reflect a decision on the degree of precaution required.

²Resolution I of the Third UN Conference on the Law of the Sea, Annex I of the Final Act, par 5(g), *International Legal Materials*, Vol 21, 1982, p 1253.

³See the remarks by the Special Representative of the Secretary-General for the Law of the Sea, Mr Satya Nandan in SCN 3, Doc LOS/PCN/L 79 of 20 March 1990, par 10.

⁴LOS/PCN/L 79, par 19.

⁵See, with further references, J.P. Clark and M.R. Neutra, 'Mining manganese nodules: potential economic and environmental effects', *Resources Policy*, Vol 9, 1983, No 2, pp 99–109, at pp 105–106.

⁶In addition, there are potential impacts of offshore processing, from transfer of nodules from mining ships to carriers and to ports and from offshore waste disposal; see E.D. Brown, 'Pollution from seabed mining', *Environmental Policy and Law*, Vol 10, 1983, pp 122–134, at p 123.

⁷Clark and Neutra, *op cit*, Ref 5, p 108.

⁸See Virginia A. Pruitt, 'Unilateral deep seabed mining and environmental standards: a risky venture', *Brooklyn Journal of International Law*, Vol VIII, No 2, 1982, pp 345–363, at p 351, note 33. An example is provided in the conclusion in a recent study submitted to PrepCom on the viability of deep sea-bed mining that, in order to recover manganese nodules profitably, future deep sea-bed mining might need to make use of nuclear energy – obviously a technique with major consequences in case of calamities (LOS/PCN/L 80, par 10).

Contents of the draft regulations

The rules for the protection of the marine environment are an integral part of the regulations on prospecting, exploration and exploitation. To ensure protection and preservation of the marine environment from activities in the Area, the draft regulations contain a number of norms and mechanisms, which can for present purposes be divided in five categories:

- a standard of acceptability for activities in the Area;
- additional protective measures to be taken in respect of individual applications;
- procedures which should ensure that decisions on applications are based upon adequate information;
- mechanisms which should ensure that the environmental provisions are complied with;
- provisions which should ensure that if damage to the environment nevertheless occurs appropriate compensation is paid.

Standard of acceptability

The standard of acceptability for activities in the Area is contained in Article 105 of the draft regulations.⁹ This is one of the places where the draft regulations draw directly upon the 1988 Antarctic Minerals Convention (Article 4).¹⁰ According to Article 153 of the LOS Convention and Articles 2 and 3 of Annex III, mining activities may take place only after they have been approved by the Authority. Article 105 adds a number of environmental conditions to the considerations which the Authority has to take into account when deciding upon an application. These conditions fall in two categories.

First, activities in the Area shall take place only if they do not cause serious harm to the environment (Article 105(1)). This obligation is in particular addressed to the Authority, which has to approve activities in the Area. The same obligation is explicitly directed towards the contractors and the Enterprise in Article 116(1), providing that the contractors¹¹ shall ensure the avoidance of serious harm to the marine environment.¹² From Article 117 and 121 of the draft regulations it can be deduced that sponsoring States also have to ensure that no serious harm is caused by activities sponsored by them.

A crucial question is how stringent this standard of acceptability is. The question of where the threshold between permitted and prohibited uses lies is of course a recurring theme in international environmental law. It is self-evident that not every measure of pollution or damage can be prohibited. As was noted by the then Special Rapporteur for the International Law Commission, Quentin-Baxter, in the present world it is not possible to prohibit useful activities that might give rise to (transboundary) loss or injury, nor to allow such activities to proceed without regard to their effect upon conditions or life in other countries,¹³ or, as can be added, upon the environment. What is required is an adequate level of prohibition.

To indicate the threshold of tolerable pollution, harm or damage, different terms have been used. In spite of some terminological confusion, a trend in the threshold of tolerable harm can be deduced from practice. There is some support for the statement that the threshold of serious harm, used in the Trail Smelter Arbitration,¹⁴ adopted by a

⁹All subsequent references are to the draft regulations, unless indicated otherwise.

¹⁰*International Legal Materials*, Vol 27, 1988, p 868.

¹¹The draft regulations only use the term 'contractors' in this context. However, the regulations are in Article 126 made applicable *mutatis mutandis* to the activities of the Enterprise. This paper will follow the same approach and only refer to contractors, with the understanding that the remarks also apply to the Enterprise.

¹²The obligation of Article 116 is somewhat unclear as a result of the less stringent par 2: 'Each contractor shall endeavour to minimize pollution to the fullest possible extent'.

¹³*Yearbook ILC 1985 Vol II (Part One)*, United Nations, New York, 1987, p 98, para 5.

¹⁴*Reports of International Arbitral Awards*, Vol III, United Nations, p 1965.

great number of writers, and restated in a number of international instruments, is no longer applicable. In the opinion of Meng Qing-Nan, 'serious' has been replaced by the term 'substantial': '... the "seriousness" of the injury may not be an indispensable component of the obligation not to pollute other states under general international law, but "substantiveness" is'.¹⁵ Sachariew notes that in the 1970s the term used to describe the threshold of tolerable environmental harm has developed from 'serious harm' to 'significant harm'.¹⁶ Significant harm – which corresponds to the concept of 'appreciable harm', as that has been developed in the work of the International Law Commission on Non-Navigational Uses of International Watercourses and Liability for Injurious Consequences of Acts not Prohibited by International Law – is harm which is more than minor, but not necessarily serious.¹⁷ It seems thus widely recognized that the use of the term significant or appreciable lowers the threshold of tolerance. In this respect, the draft regulations would not reflect the 'state-of-the-art', but clearly, there is hardly any consensus on the concepts used.¹⁸ All concepts used to delineate the amount of permitted pollution involve a certain degree of subjectivity and none are clearly established;¹⁹ all depend on the definition given to the concept in specific cases.

It is important therefore that the draft regulations define in more or less concrete terms 'serious harm'. Here as well, the draft regulations follow the 1988 Antarctic Minerals Convention (Article 1(15)). Article 2(2) of the draft regulations provides as follows:

serious harm to the marine environment means any effect from activities in the Area on the living or non-living components of the marine environment and associated ecosystems beyond that what is negligible or which has been assessed and judged to be acceptable by the Authority pursuant to these regulations and the relevant rules and regulations adopted by the Authority and which represent:

- (a) significant adverse changes in the living and non-living components and atmospheric marine environment;
- (b) significant adverse changes in the ecosystem diversity, productivity and stability of the biological communities within the environment; or
- (c) loss of scientific or economic values which is unreasonable in relation to the benefit derived from the activity in question.

¹⁵Meng Qing-Nan, *Land-based Marine Pollution*, Graham & Trotman/Martinus Nijhoff, London/Dordrecht/Boston, 1987, p 68.

¹⁶K. Sachariew, 'The definition of thresholds of tolerance for transboundary environmental injury under international law: development and present status', *Netherlands International Law Review*, Vol XXXVII, No 2, 1990 (forthcoming).

¹⁷Fourth Report of Special Rapporteur McCaffrey, Doc A/CN.4/412/Add.2, p 6. McCaffrey uses the term 'substantial', apparently in the meaning of 'serious'; Sachariew, *ibid*, text accompanying notes 27–30.

¹⁸See the discussion on the use of the concepts in the ILC, eg *Yearbook ILC*, 1985, Vol II (Part One), p 94, para 43 and the Report of the ILC on its 40th Session (1988), GAOR 43rd Session Supplement No 10 (A/43/10), pp 61–62, para 151.

¹⁹J. Sette-Camara, 'Pollution of international rivers', *Recueil des Cours*, Vol 186, pp 121–217, at pp 153–154.

²⁰LOS/PCN/L 79, par 18.

²¹LOS/PCN/L 79, par 26.

These standards have to be elaborated further by the Council (Article 105(3)). For some delegations in the March 1990 session of SCN 3, the concept of acceptable harm was unacceptable as long as there are no criteria that would be used to determine when exactly acceptable becomes unacceptable.²⁰ In the present text, the choice has apparently been made not to include specific standards in the draft regulations. Dissatisfaction elicited a number of suggestions during the discussion in PrepCom. Examples are requirements that the creation of sediment plumes in surface waters (upper 300 metres of the water column) must be avoided and that no waste water should be introduced in the upper water column of 1000 metres, where vertical plankton movement takes place.²¹

The second set of standards of acceptability is contained in Article 105(2), which specifies the conditions which have to be fulfilled before activities in the Area are allowed to take place. These conditions are:

- the technology and procedures have to be available to provide for safe activities and compliance with Article 105(1);

- there must be sufficient capacity to monitor the environment so as to identify adverse effects; and
- there has to be sufficient capacity to respond effectively to accidents.

In particular, the first of these conditions is important. If we assume that availability of the technology implies that it will be used, the norm provides a stringent alternative for the more commonly used prescription to use the best (available) technology. If no technology is available that can guarantee that Article 105(1) is complied with, no activity may proceed.²²

Additional protective measures

The standards of acceptability of Article 105 are reflected in Article 111, which sets forth the provisions to be included in the contract, once a plan of work has been approved according to Article 153(3) of the LOS Convention. Article 111 stipulates that each contract shall contain provisions for the protection and preservation of the marine environment from activities in the Area and gives a number of examples of such provisions. *Inter alia*, such a contract shall include requirements to avoid serious harm to the marine environment, a contingency plan, and requirements to use where practicable the best available technology for the protection and preservation of the marine environment wherever such activities would cause serious harm to it. The latter requirement seems to be at odds both with Article 196(1) of the LOS Convention – which requires taking all necessary measures to prevent, reduce and control pollution of the marine environment under the parties' jurisdiction and control and from which it has been deduced that, given a choice of certain sea-bed devices, a State might be under a duty to require the use of the technology posing the least threat to the environment²³ – and with the requirement of Article 105(2) just referred to.²⁴ This is in any case true for the condition of 'where practicable'.

Apart from including the requirements mentioned in Article 111 in the contract, the draft regulations do provide few clues as to what specific preventive measures may be adopted by the Council. The major exception is that it may decide that certain areas shall be excluded from exploitation. The exclusion or disapproval of areas is already provided for in Article 162(2)(x) of the LOS Convention and Article 6(3)(b) of Annex III to the Convention. These provisions are repeated in Articles 106 and 110(5) of the draft regulations – upon receiving recommendation of the Legal and Technical Commission, the Council shall exclude areas for exploitation by contractors in cases where substantial evidence indicated the risk of serious harm to the marine environment. The relationship between these two articles is not quite clear. The suggestion appears to be that the exclusion of areas on the basis of Article 106 is not necessarily linked to the consideration of plans of work. Its main purport may then be that certain sensitive areas of the deep sea-bed, which has been established as being ecologically very valuable, may be excluded for exploitation, irrespective of applications for approval of plans of work. It seems, however, unlikely that there will be substantial evidence indicating the risk of serious harm in cases where no exploration is considered.

The exclusion of parts of the application areas for exploration is the maximum protective action which the Council can take. The draft

²²Cf Lee A. Kimball, *Protection of the Marine Environment: Minerals Development in the International Seabed Area*, unpublished paper, June 1990, p 6.

²³Brown, *op cit*, Ref 6, p 126.

²⁴Kimball, *op cit*, Ref 22, p 6.

regulations do not explicitly provide for other measures to be taken or for standards to be applied in case harm is to be expected, but the exclusion of areas is considered to be too strong an action. An analysis of international agreements and national legislation concerning the exploitation of off-shore resources would indicate useful possibilities which might be adjusted to the specific characteristics of deep sea-bed mining.

Collection of adequate information

As noted, one of the major problems of the regulatory system is the lack of sufficient and adequate data. The availability of sufficient data on the consequences of activities will determine the extent to which adequate decisions can be made concerning the harm expected on the basis of a plan of work. The draft regulations contain two methods of solving the problem of the assessment of expected harm.

On a general level, such data are to be provided by a monitoring programme. Article 124 provides that Council shall, upon recommendation of the Legal and Technical Commission, approve the establishment of a monitoring programme to observe, measure, evaluate and analyse the risks of effects of pollution of the marine environment resulting from activities in the Area.

More important is the system of environmental impact assessment that has been included in the draft regulations in order to assess the harm that will be caused by individual mining activities. The LOS Convention already provides for environmental impact assessment in Article 206. This provision is, however, loaded with vague terms: when states have reasonable grounds for believing that activities may cause substantial pollution or significant and harmful effects to the marine environment, they shall, as far as practicable, etc. Since 1982 environmental impact assessment has been more and more accepted and applied in international environmental law as a valuable means of promoting the integration of environmental considerations into the decision-making process for certain activities, thereby helping to prevent potential adverse impacts. Indicative of this trend are the Goals and Principles of Environmental Impact Assessment adopted by the Governing Council of UNEP.²⁵ These Goals and Principles clearly go beyond the general requirement of Article 206.

The draft regulations elaborate and specify Article 206 of the LOS Convention and thereby reflect the widespread acceptance of the instrument. Article 108 provides for two stages of environmental impact assessment: for proposed exploration activities an environmental report has to be drawn up (Article 108(1)), while for exploitation activities an environmental impact statement shall be prepared (Article 108(3)). In contrast to the environmental report, the required contents of the environmental impact statement have been indicated in some detail in Article 109, although these requirements have also been described as 'inadequate'.²⁶ *Inter alia*, they have to contain data on the environmental baseline against which the likely effects of the proposed activities are to be assessed, as well as an assessment of the effects on the marine environment. The statement has to be submitted to the Legal and Technical Commission, which makes its report and recommendation to the Council (Article 110(3)).

The system concerning the relationship between on the one hand the

²⁵Decision 14/25, UNEP/GC 14/26, Annex I, p 57.

²⁶Kimball, *op cit*, Ref 22, p 9.

submission of data on the consequences of activities and on the other the decisions on applications is not quite satisfactory. The Legal and Technical Commission has to decide whether the exploration or exploitation can reasonably be expected to result in serious harm to the environment. Likewise, as noted above, areas shall not be approved for exploitation in cases where substantial evidence indicates the risk of serious harm to the marine environment (Article 110(5)). Thus, activities in the Area may proceed unless it has been proved that serious harm will occur.

The draft regulations at this point do not follow the trends in international environmental law, as they are not based on the precautionary principle. This principle requires States to reduce or prevent pollution, even in the absence of sufficient scientific evidence to provide a causal link between activities and adverse environmental effects.²⁷ Originally, the principle stemmed from instruments concerning land-based marine pollution, in particular into the North Sea region,²⁸ and it can be considered as an emerging principle of international law.²⁹ In 1989 the Governing Council of UNEP recommended that governments adopt the principle of precautionary action as the basis of their policy with regard to the prevention and elimination of marine pollution. Also, the approach of the 1988 Antarctic Minerals Convention reflects the precautionary principle, as all exploration and exploitation activities are prohibited unless adequate information is available to determine that the proposed activities will not cause serious harm (Article 4(1)). In view of the scientific uncertainty, deep sea-bed mining activities seem pre-eminently suited to an application of the precautionary principle.

Supervision

The introduction of preventive norms does not in itself ensure protection of the environment of the Area. To overcome inadequate implementation, the draft regulations contain a number of supervisory rules, which draw partly on procedures widely used in international environmental agreements, and partly can be considered as innovative. These supervisory mechanisms are double layered: supervision has to be exercised both by the sponsoring States and by the Authority.

The supervision by sponsoring States is provided for in Article 121, based on Article 139 and Article 4 of Annex III of the LOS Convention. Sponsoring States have the responsibility to ensure within their legal systems that a contractor sponsored by them shall carry out activities in the Area in conformity with the rules on the protection of the marine environment. This entails in any case the adoption of laws and regulations which are appropriate for securing compliance. This follows anyway from Article 122(4), which excludes liability of the State in such a case. Of course, the requirement of adopting adequate legislation has already been laid down in Article 209 of the LOS Convention and follows moreover from the due diligence obligations of any contracting State under Article 194 of the LOS Convention. In addition, Article 117 provides that sponsoring States have the obligation to inspect the activities of its contractor in the Area in order to ensure compliance with the rules and regulations of the Authority and the conditions of the contract. This obligation in this context presumably is confined to provisions concerning the protection of the marine environment.

In order to assist the Authority to supervise compliance with the

²⁷Aline F.M. De Bièvre, 'Changes in maritime pollution legislation', paper presented at the European Environmental Law in the 1990s Conference, London, 1988, p 4.

²⁸See in particular the Declaration of the Second North Sea Ministerial Conference, London, 1987, par XVI 1 and PARCOM Recommendation 89/1 of 22 June 1989, adopted by the contracting parties to the Paris Convention on the Prevention of Marine Pollution from Land-based Sources, 11th Annual Report, Annex 5.

²⁹See L. Gündling, 'The status in international law of the principle of precautionary action', in D. Freestone and T. IJlstra, eds, *The North Sea: Perspectives on Regional Environmental Co-operation*, Graham & Trotman, London, 1990, pp 23-30, at pp 27-30.

environmental rules, contractors will be required to submit an annual report on the effects of their activities in the Area on the marine environment (Article 113) and on incidents causing serious harm (Article 114). Strangely enough, the draft regulations do not explicitly provide for a review and/or discussion of the submitted reports, which obviously is an essential element of any supervisory system. Apart from this, practice has proved that the mere submission of information by States or their citizens to international organs is not sufficient.³⁰ For one thing, data are often unreliable. Also, even if data are available, the international body should have the possibility to secure compliance.

To solve the problem of the lack of sufficient data, the proposed regulations add a system of international inspection (Article 115), already envisaged in Article 162(2)(z) of the LOS Convention. Article 115 enables the Authority to send inspectors on board vessels and installations used by the contractor. The international inspection co-exists with inspection by the sponsoring State, envisaged in Article 117. Consequently, the inspection will require some form of cooperation between the Authority and States; Article 115(5) provides that both inspections shall be compatible and reinforce each other.

To solve possible problems of non-compliance, Article 120 empowers the Council to take measures in cases of default of contractors who have not taken the action required by the terms and conditions of its contract. The Council may take such reasonable measures as are necessary to prevent and contain, minimize or repair harm to the environment. In addition, Article 123 empowers the Council to take penalties. It distinguishes penalties of different severity, including monetary penalties, suspension and termination. The article repeats in almost identical wording Article 18 of Annex III to the LOS Convention, and adds little to what will be possible under the LOS Convention anyhow. Nonetheless, in discussions in SCN 3 in March 1990, the provision was the subject of some criticism because it was thought either to leave too much power to the Authority or to be insufficiently stringent. As with the inspection procedures, the provision on penalties in itself seems adequate; everything depends on the way they are applied in practice.

Liability

Rules on liability and compensation for environmental harm have proved to be the most difficult issue to settle in international environmental law. States have clearly been reluctant to accept responsibility for damage resulting from activities under their jurisdiction or control to the environment of other States or areas beyond national jurisdiction.³¹ In numerous conventions the issue of liability has been discussed, and in most cases it has been deferred. It is true that Article 235 of the LOS Convention provides that States shall be liable in accordance with international law for damage to the marine environment, but it recognizes at the same time that this law is not clear and adds that states are required to cooperate in implementing and developing international law relating to responsibility in order to ensure prompt and adequate compensation in respect to all damage caused by pollution to the marine environment. The provisions of the draft regulations on liability – Articles 116, 117, 121 and 122 – thus have to overcome a number of serious problems before liability can be established. Six such problems will be touched upon here. In solving these problems, the draft

³⁰See André Nollkaemper, 'Toezichthoudende Mechanismen in het Internationale Milieurecht (Supervisory Mechanisms in International Environmental Law)', in P. van Buuren *et al.*, *Milieurecht in Stelling (Environmental Law in Action)*, Tjeenk Willink, Zwolle, 1990, pp 181–190.

³¹Henry C. Burmeister, 'Liability from Antarctic Mineral Resource Activities', *Virginia Journal of International Law*, Vol 29, 1989, No 2, pp 621–657, at p 622.

regulations can find support in the provisions of the Antarctic Minerals Convention, which in the view of Burmeister '... ultimately set a high standard which any future liability conventions dealing with the consequences of other human activities will find hard to ignore'.³²

Liability for what damage?

The question of what damage may be compensated is the first complication in the determination of liability. As a rule, international law has not assigned any legal consequences to harm caused to the environment, unless such harm affects States or their nationals. The hard core issue has always been harm to the environment itself. It is precisely such harm, not entailing harm to a State, person or property, which may be caused to the deep sea-bed environment. Article 235 of the LOS Convention contemplates the possibility of State responsibility for damage to the environment unconnected with the interests of other States. According to the article, States are responsible for fulfilling their obligations concerning the protection of the marine environment. As these obligations in the LOS Convention (in particular Articles 192 and 194(1)) are concerned with the protection of the environment as such, Article 235 in principle also covers environmental pollution when no State has suffered loss.³³

The draft articles elaborate upon this approach, as Articles 122(2)(b) and (c) – providing for liability for loss or damage to property of a third party or loss of life or personal injury of a third party arising directly out of damage to the environment and for reimbursement of costs made in response action – are preceded by Article 122(2)(a): a contractor shall be liable for serious harm to the environment arising from its activities in the Area. The approach follows the Antarctic Minerals Convention, which also recognizes that the Antarctic environment itself has a value which can be compensated, beyond the costs of reparation and economic costs resulting from environmental damage (Article 8(2)(a)). The fact that the necessity of compensation for environmental damage is recognized is of major importance; as noted by Wolfrum: 'without accepting the notion of environmental damage, all international attempts for an improved system of the protection of the environment are bound to remain incomplete'.³⁴

Assessment of damage

A recurring problem with many forms of pollution is that it is difficult to assess in exact terms the amount of pollution or damage caused by a specific activity. This may be so because there is insufficient knowledge of the state of the environment before or after the activity, the fact that there may be other causes of damage, etc. If it is not possible to measure harm and the consequent compensation, it is difficult to give a meaningful content to the concept of liability.³⁵

To solve this problem, monitoring and environmental impact assessment, discussed above, may provide part of the required data on the state of the environment before the activity takes place. The situation afterwards may then be compared to the pre-existing situation. Article 107 of the draft regulations adds an innovative method to assess damage. This article, which draws directly on the US regulations issued pursuant to the 1980 Deep Seabed Hard Mineral Resources Act,³⁶ provides that the Council shall, at the time of approving the plan of work, set aside parts of the areas covered by the plan of work to be used

³²Burmeister, *ibid*, p 657. Nonetheless, in this case also not all problems could be solved and an additional protocol is envisaged (Article 8(7)).

³³See Alan Boyle, 'Marine pollution under the Law of the Sea Convention', *American Journal of International Law*, Vol 79, 1985, pp 349–372, at pp 366–367.

³⁴R. Wolfrum, 'The unfinished task: CRAMRA and the question of liability', *International Challenges*, Vol 10, No 1, 1990, pp 27–31, at p 30.

³⁵Sixth Report on International Liability for Injurious Consequences arising out of Acts not Prohibited by International Law, A/CN.4/428/Add 1 of 30 March 1990, par 78.

³⁶*Ocean and Policy News*, October/November 1987, p 9.

exclusively as impact reference zones and preservation reference zones. Impact reference zones are areas to be used for assessing the effect of each contractor's activities on the marine environment. They are designated so as to be representative of the environmental characteristics of the site and located in the site where mining is going to take place. A preservation reference zone has been defined as an area in which no mining shall occur to ensure that representative and stable biota are not affected by mining activities so to assess any changes in the flora and fauna of the marine environment.³⁷ The introduction of these two types of zones should make it possible to establish with a relatively high degree of certainty what the specific effects of mining activities on the environment have been. This might be considered an advantage when compared to other forms of pollution, such as marine pollution from land-based sources, where it is often difficult to assess the damage.

Valuation of damage

The crux of the matter is how damage to the environment is going to be valued. Indemnification for physical harm which cannot be expressed in economic terms remains highly problematical, as harm to objects which have no economic value and in respect of which reinstatement measures (the costs of which could be determined and compensated for) are not possible, cannot be properly valued in money. This issue is also relevant with respect to the monetary penalties envisaged in Article 123(2), which have to be 'proportionate to the seriousness of the violation'.

In the Antarctic Minerals Convention, the question of how damage to the environment is to be measured is left open. The draft regulations do not go beyond this: they do not provide an indication of how damage is to be valued. There are no settled precedents in international environmental law for a solution to this problem. Some points of contact might be found in the work of the International Law Commission on State Responsibility – in particular concerning non-material injuries and punitive damages³⁸ – and on Liability for Injurious Consequences Arising out of Acts not Prohibited by International Law.³⁹

Who is liable?

It is not disputed that the primary liability should rest with the operator. Article 122(2) provides that the contractor shall be liable for serious harm to the environment, damage to property of a third party and reimbursement of reasonable costs relating to response action. The contractor is not liable if he has, in the opinion of the Council, taken adequate action. In addition, the contractor has the normal defences: there is no or only partial liability in the case of natural disasters or armed conflict (Article 122(3)), or if the contractor proves that damage has totally or in part been caused by an international or grossly negligent act or omission of the party seeking redress (Article 122(6)).

There are various cases possible in which a contractor will not fully be required or able to pay compensation. In those cases, the issue of the residual liability arises. There are two possibilities here. The first is the establishment of a fund, which might be used in order to ensure that liabilities which are not discharged are met. The draft regulations do not provide for such a fund, although a footnote to Article 122 does envisage the establishment of such a fund in connection with Article 122(8). Indeed, in SCN 3 the suggestion has been made that such a fund

³⁷Articles 2(3) and 2(4).

³⁸See the Second Report on State Responsibility by Special Rapporteur Ruiz, A/CN.4/425 of 9 June 1989, Chapters I and III and the proposal for Article 10 on satisfaction and guarantees of non-repetition (A/CN.4/425/Add.1 of 2 June 1989, p. 25).

³⁹See the Sixth Report by Special Rapporteur Barboza, A/CN.4/428 of 15 March 1990, in particular Articles 9 and 24(a).

should be established as a second tier in the liability structure, supplementing the first tier of the liability of the contractor.⁴⁰ Presumably, such a fund would have to be supported by deep sea-bed mining companies.⁴¹

The second possibility is a residual liability of States. From Article 122(4) it can *a contrario* be deduced that a sponsoring State may be liable for damage caused by any failure of a contractor sponsored by it to comply with its obligations, if that State party has not adopted laws and measures and has not taken administrative measures which are, within the framework of its legal system, reasonably appropriate for securing compliance by persons under its jurisdiction. This liability can serve two purposes: the enforcement of the sponsoring State's obligations and the provision of an additional debtor in case the operator is not capable of meeting its financial obligation.

Strict or fault liability

The draft regulations do not take a clear stand on the question of whether contractors and States are liable only if they have failed to meet standards or due diligence, or whether liability should be imposed strictly, on proof of cause alone.⁴²

As for the contractor, Article 122(2) apparently chooses fault liability. The contractor is not liable if he has, in the opinion of the Council, taken adequate action. Also Article 122(4) on liability of States, which follows Article 139 of the LOS Convention, is much broader than the provisions of the Antarctic Minerals Convention. While the latter impose liability in case of a breach of a State's obligation under the LOS Convention, presumably without the need to show fault on the part of the State,⁴³ the draft regulations provide for a due diligence liability. Although this standard might still reflect the state-of-the-art, an argument could be made that the draft regulations should follow the Antarctic Minerals Convention, as well as other developments in international environmental law. In any case, strict liability is thought to be appropriate in the case of so-called ultra-hazardous activities.⁴⁴ There is a strong argument that for activities in the Area, in view of the great risks they pose, a strict liability regime is required.⁴⁵ In addition, the International Law Commission (ILC) draft articles on Liability for Injurious Consequences arising out of Acts not Prohibited by International Law aim to establish strict liability in some cases of 'normal' pollution and would thereby greatly enhance the scope of application of strict liability.⁴⁶ Deep sea-bed mining could fall under one of both approaches, and the draft regulations could benefit from some amendments in this respect.

Who is the plaintiff?

The final question is, who, in the event of serious damage, is going to charge the contractor or the State? The prime responsibility here would seem to lie with the Authority. Article 122(2)(a) provides that, in the event of serious damage, the Council will establish whether or not adequate action has been taken and, if not, the contractor shall pay compensation to the Authority. In contrast to the construction of Article 8(10) of the Antarctic Minerals Convention, the draft regulations do not, however, require States to ensure that the Authority has the right to appear as a party in national courts to pursue liability claims.⁴⁷

⁴⁰LOS/PCN/L 79, par 48.

⁴¹See Barbara Kwiatkowska, 'States' responsibility for pollution damage resulting from the exploration for and the exploitation of seabed mineral resources', *Polish Yearbook of International Law*, Vol X, 1980, Ossolineum, Warsaw, 1981, pp 157-176, at p 174.

⁴²See in general Alan Boyle, 'State responsibility and international liability for injurious consequences of acts not prohibited by international law: a necessary condition?', *International and Comparative Law Quarterly*, Vol 39, 1990, pp 1-25, at pp 14-16.

⁴³Burmeister, *op cit*, Ref 32, p 649. Of course, much depends on whether the primary obligations have been defined in qualified or absolute terms. See Boyle, *ibid*, p 15.

⁴⁴Burmeister, *op cit*, Ref 32, p 652; Günther Handl, 'State liability for accidental transnational environmental damage by private persons', *American Journal of International Law*, Vol 74, 1980, pp 525-565, at pp 552-553.

⁴⁵Cf Kwiatkowska, *op cit*, Ref 41, p 164.

⁴⁶A/CN.4/428, paras 3-14; see also Boyle, *op cit*, Ref 42, p 23.

⁴⁷See for a proposal in this direction Kwiatkowska, *op cit*, Ref 41, p 172.

In addition, other States parties may play a role here. A problem is that, in the case of purely environmental damage, there would not be a single affected State directly injured through either its territory, property, nationals or the property of its nationals. It would, however, be possible to construct it as harm to a collective interest as defined in a multilateral treaty, under the terms of Article 5(2)(f) of part II of the ILC draft articles on State Responsibility. States are in that case injured:

If the right infringed by the act of the State arose from a multilateral treaty . . . if it is established that the right has been expressly stipulated in that treaty for the protection of the collective interests of the States party thereto.⁴⁸

The commentary to this provision explicitly refers to the concept of the common heritage of mankind as accepted in respect to the mineral resources of the sea-bed beyond national jurisdiction as an example of a collective interest which has been recognized as being able to be infringed by any single State party. In their present form, the draft regulations do not contain a comparable construction. An explicit provision in this regard could significantly strengthen the liability regime.

Evaluation

The Draft Regulations on Protection and Preservation of the Marine Environment from Activities in the Area clearly have a provisional character. However, at this stage of the work, some conclusions may be drawn.

In a great number of places the draft regulations obviously draw on the relevant articles of the LOS Convention. In some places, they do little more than reiterate what will become binding and be possible under the LOS Convention. At other places, the draft regulations are influenced by national legislation on deep sea-bed mining (in particular that of the USA, eg the concept of reference zones) or international environmental agreements (in particular the Antarctic Minerals Convention, eg the definition of serious harm and the inclusion of environmental harm in the liability regime). At these places, the regulations go beyond what would have been possible at the time of conclusion of the LOS Convention. In these respects, the draft regulations go a long way towards securing the environmental interests of the deep-seabed environment.

Nonetheless, in their present form the draft regulations are not quite perfect. They contain a number of unsatisfactory provisions, such as the tension between Articles 105(2) and 111 concerning the application of the best available technology, the lack of procedures for review of reports, the implicit rejection of the precautionary approach and the incomplete provisions on liability (such as lack of a provision on funds and rejection of strict liability).

While some of the points discussed above are mainly a matter of drafting, other issues may be more difficult to settle. The balance that the deep sea-bed regulations have to seek between the actual exploitation of resources and the protection of the environment against a background of scientific uncertainty may be difficult to find. That the first draft does not yet reflect this balance in all aspects is hardly surprising.

⁴⁸*Yearbook ILC*, 1985, Vol II (Part Two), p 25. The commentary adds that, since at present the recognition of collective interest is limited the application of subparagraph (f) is limited to expressing stipulations in multilateral treaties.