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Report of the Secretary-General of the International Seabed Authority under article 166, paragraph 4, of the United Nations Convention on the Law of the Sea

I. Introduction

1. The present report of the Secretary-General of the International Seabed Authority is submitted to the Assembly of the Authority under article 166, paragraph 4, of the 1982 United Nations Convention on the Law of the Sea. While providing the usual account of the work of the Authority over the past 12 months, it also contains a review of the 2005-2007 programme of work and a presentation of the proposed programme of work for 2008-2010.

II. Membership of the Authority

2. In accordance with article 156, paragraph 2, of the Convention, all States parties to the Convention are ipso facto members of the Authority. Since the twelfth session of the Authority (Belarus, Lesotho, Moldova, Montenegro, Morocco and Niue) have become members of the Authority. As at 31 May 2007, there were 155 members of the Authority (154 States and the European Community).

3. The Authority is the organization through which States parties to the Convention shall, in accordance with part XI of the Convention, organize and control activities in the Area, particularly with a view to administering the resources of the Area. This is to be done in accordance with the regime for deep seabed mining established in Part XI of the Convention and in the Agreement relating to the implementation of part XI of the United Nations Convention on the Law of the Sea adopted by the General Assembly of the United Nations under the terms of its resolution 48/263 of 28 July 1994. As provided by resolution 48/263 and the Agreement itself, the provisions of the Agreement and part XI of the Convention are to be interpreted and applied together as a single instrument. In the event of any inconsistency between the Agreement and part XI, the provisions of the Agreement prevail. In addition, the Authority has a number of other, specific, responsibilities,



such as the responsibility to distribute to States Parties to the Convention payments or contributions in kind derived from exploitation of the resources of the continental shelf beyond 200 nautical miles pursuant to article 82, paragraph 4, of the Convention.

4. As at 1 May 2007, there were 127 parties to the 1994 Agreement. The following 26 members of the Authority that became parties to the Convention prior to the adoption of the 1994 Agreement have not yet become parties to the 1994 Agreement: Angola, Antigua and Barbuda, Bahrain, Bosnia and Herzegovina, Brazil, Cape Verde, Comoros, Democratic Republic of the Congo, Djibouti, Dominica, Egypt, Gambia, Ghana, Guinea-Bissau, Guyana, Iraq, Mali, Marshall Islands, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Sao Tome and Principe, Somalia, Sudan, Uruguay and Yemen. Although members of the Authority which are not parties to the Agreement necessarily participate in the work of the Authority under arrangements based on the Agreement, becoming a party to the Agreement would remove an incongruity that currently exists for those States. For this reason, each year since 1998, at the request of the Assembly, the Secretary-General has circulated a note verbale to all members in this position urging them to consider becoming parties to the 1994 Agreement. In the last such note, circulated on 21 February 2007, attention was drawn to the relevant paragraphs of the report of the Secretary-General for 2006 (ISBA/12/A/2) and to paragraph 3 of General Assembly resolution 61/222 calling upon all States to become parties to both the Convention and the Agreement in order to achieve the goal of universal participation in the two instruments.

5. Membership of the Authority entails participation in the work of the Authority. The Assembly is considered to be the supreme organ of the Authority, to which the other principal organs are accountable as specifically provided for in the Convention. However, a recurrent problem for the Authority is poor attendance at the Assembly. Although there are relatively few meetings of the Assembly, the debate on the annual report of the Secretary-General provides an important opportunity for general statements about the Authority's work. The Assembly also adopts the budget of the Authority and elects the Secretary-General, the members of the Council and the members of the Finance Committee. It is possible that the absence of a quorum (which is a majority of members) at meetings of the Assembly may hamper decision-making within the Authority if this situation continues.

6. This is an important matter for the credibility and legitimacy of the Authority. The Secretary-General has highlighted the problem of poor attendance at the Assembly at every opportunity, most recently in his statement to the General Assembly on 8 December 2006 (see A/61/PV.71, pp. 6 and 7). In its resolution 61/222 of 20 December 2006, the General Assembly urged all States parties to the Convention to attend the sessions of the Authority, and called upon the Authority to continue to pursue all options, including the issue of dates, in order to improve attendance at Kingston and to ensure global participation. This issue is discussed further in paragraph 85 below.

III. Permanent missions to the Authority

7. As at 13 April 2007, Argentina, Belgium, Brazil, Cameroon, Chile, China, Costa Rica, Cuba, France, Gabon, Germany, Haiti, Honduras, Italy, Jamaica,

Mexico, Nigeria, the Republic of Korea, Saint Kitts and Nevis, South Africa, Spain, Trinidad and Tobago and the European Union had established permanent missions to the Authority.

IV. Previous session of the Authority

8. The twelfth session of the Authority was held from 7 to 18 August 2006. Sainivalati S. Navoti (Fiji) was elected President of the Assembly for the twelfth session. Mariusz-Orion Jedrysek (Poland) was elected President of the Council.

9. The work of the Assembly during the twelfth session included the election of one half of the members of the Council for the period from 1 January 2007 to 31 December 2010. A debate was held on the annual report of the Secretary-General and the Assembly adopted the budget of the Authority for the financial period 2007-2008. The Assembly also elected 15 members of the Finance Committee for a five-year term commencing 1 January 2007. The Assembly adopted, on the recommendation of the Finance Committee, a resolution establishing an endowment fund for marine scientific research in the Area (ISBA/12/A/11).

10. The Council continued its consideration of the draft regulations on prospecting and exploration for polymetallic sulphides and cobalt-rich ferromanganese crusts ("cobalt crusts") in the Area. In the light of its discussions and the outcome of a workshop on the technical and economic considerations relating to mining for these resources that had been convened immediately prior to the twelfth session, the Council decided to prepare separate sets of regulations dealing with polymetallic sulphides and cobalt crusts. The Council would consider draft regulations on polymetallic sulphides at the thirteenth session, while the draft regulations on cobalt crusts would be referred to the Legal and Technical Commission for further consideration in 2007.

11. The Council elected 25 members of the Legal and Technical Commission for a five-year term starting on 1 January 2007. In the light of its decision to increase the size of the Legal and Technical Commission to 25 members without prejudice to future elections, the Council requested the Secretary-General to prepare for its consideration a report on the future size and composition of the Legal and Technical Commission and the process for future elections. A note by the Secretary-General has been prepared in response to this request (ISBA/13/C/2). The next election of all members of the Commission will be held in 2011.

V. Protocol on Privileges and Immunities of the Authority

12. The Protocol on Privileges and Immunities of the International Seabed Authority entered into force on 31 May 2003. Since the twelfth session of the Authority, three further members of the Authority (Argentina, Germany and Italy) have become parties to the Protocol. As at 13 June 2007, the following 23 members of the Authority were parties to the Protocol: Argentina, Austria, Cameroon, Chile, Croatia, Czech Republic, Denmark, Egypt, Germany, India, Italy, Jamaica, Mauritius, Netherlands, Nigeria, Norway, Oman, Portugal, Slovakia, Spain, Trinidad and Tobago, United Kingdom of Great Britain and Northern Ireland and Uruguay. The Secretary-General urges other members of the Authority to consider becoming

parties to the Protocol which, inter alia, provides essential protection to representatives of members of the Authority who attend meetings of the Authority or who travel to or from those meetings. It also accords to experts on missions for the Authority such privileges and immunities as are necessary for the independent exercise of their functions during the period of their missions and the time spent on journeys in connection with their missions.

VI. Relations with the United Nations and other bodies

13. The Authority maintained a good working relationship with the Division for Ocean Affairs and the Law of the Sea of the Office of Legal Affairs of the United Nations. Along with other international organizations and bodies concerned with ocean-related activities, the Authority is a participant in the Oceans and Coastal Areas Network (UN-Oceans). The Secretary-General attended the 5th meeting of UN-Oceans, held in Paris in May 2007. The Authority has also participated in the development of the United Nations Atlas of the Oceans, both by contributing data and information relating to the Area to the online databases and by making a small financial contribution of \$5,000 towards the project.

14. In April 2007, the International Tribunal for the Law of the Sea held its second regional workshop on the role of the Tribunal in the settlement of disputes relating to the law of the sea. The workshop was held at the premises of the Authority. The programme of the workshop included an information session on the legal and technical aspects of the work of the Authority.

VII. Secretariat

15. During the period under review, the structure of the secretariat continued to evolve in line with the proposals presented in the programme of work for the period 2005-2007. This included a review of internal administration and updating of job descriptions for administrative staff.

VIII. Budget and finance

A. Budget

16. For the financial period 2007-2008, the Authority adopted a budget of \$11,782,400.

B. Status of contributions

17. In accordance with the Convention and the 1994 Agreement, the administrative expenses of the Authority shall be met by assessed contributions of its members until the Authority has sufficient funds from other sources to meet those expenses. The scale of assessments shall be based on the scale used for the regular budget of the United Nations, adjusted for differences in membership. As at 1 May 2007, 79 per cent of the value of contributions to the 2007 budget due from member States

and the European Community had been received from 34 per cent of the Authority's membership.

18. Contributions outstanding from member States for prior periods (1998-2006) totalled \$384,253. Notices are regularly sent to member States reminding them of the arrears. In accordance with article 184 of the Convention and rule 80 of the rules of procedure of the Assembly, a member of the Authority that is in arrears in the payment of its financial contribution shall have no vote if the amount of its arrears equals or exceeds the amount of financial contribution due from it for the preceding two years. As at 1 May 2007, 54 members of the Authority were in arrears for a period of two years or more. They were: Albania, Argentina, Bahrain, Belize, Benin, Bolivia, Burkina Faso, Cape Verde, Comoros, Cook Islands, Côte d'Ivoire, Cuba, Democratic Republic of the Congo, Djibouti, Dominica, Equatorial Guinea, Gambia, Grenada, Guinea, Guinea-Bissau, Haiti, Honduras, Iraq, Kenya, Luxembourg, Maldives, Mali, Marshall Islands, Mauritania, Micronesia (Federated States of), Mozambique, Nauru, Panama, Papua New Guinea, Paraguay, Saint Lucia, Saint Vincent and the Grenadines, Sao Tome and Principe, Serbia, Seychelles, Sierra Leone, Solomon Islands, Somalia, Suriname, the former Yugoslav Republic of Macedonia, Togo, Tuvalu, Uganda, United Republic of Tanzania, Uruguay, Vanuatu, Yemen, Zambia and Zimbabwe.

19. Also as at 1 May 2007, the balance of the Working Capital Fund stood at the approved level of \$438,000.

C. Voluntary trust fund

20. A voluntary trust fund for the participation of members of the Finance Committee and the Legal and Technical Commission from developing countries was established in 2002, following a request by the Assembly to enhance the participation of members from developing countries in those bodies. Prior to the establishment of the fund, attendance at meetings of the two bodies by members from developing countries had been generally poor, ostensibly for financial reasons. That situation has improved since the fund was established. Provisional terms and conditions for the use of the fund were adopted by the Assembly, on the recommendation of the Finance Committee, in 2003 and amended in 2004 (see ISBA/9/A/9, para. 14, and ISBA/9/A/5-ISBA/9/C/5).

21. The fund is made up of voluntary contributions from members of the Authority and others. Over the life of the fund, contributions totalling \$62,800 have been received from Angola (\$300), Brazil (\$10,000), Indonesia (\$1,000), Namibia (\$1,300), Nigeria (\$5,000), Norway (\$25,000), Oman (\$10,000), Trinidad and Tobago (\$10,000) and Dr. Y. Kazmin (\$200). Furthermore, the Government of Spain has pledged to contribute €15,000 to the fund.

22. In 2003, to supplement the voluntary contributions, the Assembly, on the recommendation of the Finance Committee, authorized an advance of \$75,000 to be paid into the fund from the interest from the fund for application fees paid by former registered pioneer investors (see ISBA/9/A/5-ISBA/9/C/5). At the eleventh session, the Assembly, on the recommendation of the Finance Committee, authorized the Secretary-General to advance a further \$60,000 from the same source (see ISBA/11/A/8). In 2006, however, at the twelfth session, in the light of the existing

balance in the fund, the Finance Committee decided not to recommend any further advances to the fund for 2007.

23. As at 1 May 2007, the balance of the fund stood at \$79,770, including interest income of \$256. The total amount paid out of the fund to date is \$120,166.

D. Endowment Fund

24. In 2006, the Assembly decided to establish the International Seabed Authority Endowment Fund for Marine Scientific Research in the Area (ISBA/12/A/11). The purpose of the Fund is to promote and encourage the conduct of marine scientific research in the Area for the benefit of mankind as a whole, in particular by supporting the participation of qualified scientists and technical personnel from developing countries in marine scientific research programmes and by providing them with opportunities to participate in international technical and scientific cooperation, including through training, technical assistance and scientific cooperation programmes.

25. In accordance with the decision of the Assembly, the initial capital of the Fund consisted of the balance remaining as at 18 August 2006 from the application fees paid by the registered pioneer investors, under resolution II of the Third United Nations Conference on the Law of the Sea, to the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea, pursuant to paragraph 7 (a) of resolution II, together with interest accrued thereon.

26. The Assembly had also requested the Secretary-General to prepare for consideration by the Council and Assembly in 2007 detailed rules and procedures for the administration and utilization of the Fund. Pending the elaboration of such rules and procedures, the Fund is not to be utilized. In accordance with that request, the Secretary-General has prepared draft terms of reference, guidelines and procedures for the use of the Fund (ISBA/13/1). These will be considered by the Finance Committee prior to their submission to the Council and Assembly for approval. The Finance Committee will also receive a report on the status of the Fund.

IX. Library, publications and website

27. The library manages the Authority's specialized collection of reference and research materials focusing on matters relating to the law of the sea, ocean affairs and deep seabed mining. The library serves the needs of members of the Authority, permanent missions and researchers interested in information on the law of the sea and ocean affairs, as well as providing essential reference and research assistance to support the work of the staff of the secretariat. In addition, the library is responsible for the archiving and distribution of the official documents of the Authority and assists with the publications programme.

28. The library facilities include a reading room with access to the collection for reference purposes only and computer terminals for e-mail and Internet access. The specialized research capability of the existing collection continues to improve through an acquisitions programme which is aimed at building upon and

strengthening the library's comprehensive collection of reference materials. During the reporting period, approximately 130 books, various CD-ROMs and over 450 journal issues were acquired. A generous donation of 24 publications was made by the China Ocean Mineral Resources Research and Development Association (COMRA) of the People's Republic of China. Donations were also received from institutions and libraries, including from the Division for Ocean Affairs and the Law of the Sea of the United Nations, the International Tribunal for the Law of the Sea, the United Nations Educational and Scientific Organization, the United Nations Environment Programme, the Food and Agriculture Organization of the United Nations, and the United States Institute of Peace. Over the next three years, the library will conduct an outreach programme through which it will invite relevant academic, research and related institutions to participate in an exchange of their publications for those of the Authority. This should contribute to the further development of the collection. In addition, the content of the library's web page will be further developed to include information on using the catalogue, search guides and information on the collection and services available.

29. During the period under review, in addition to the increasing number of requests for copies of the publications and documents of the Authority, requests were processed for information on a number of subject areas related to the activities of the Authority, including bioprospecting of genetic resources of the deep seabed; the development of technologies for deep seabed mining; bilateral and multilateral maritime delimitation agreements of selected countries; the United Nations Convention on the Law of the Sea, the status of implementation of the provisions on the marine environment and Jamaica's progress in implementing provisions of the Convention; deep seabed mining and the protection of the marine environment; continental shelf limits; and the exploitation of marine resources. Most requests are received electronically. The requests came from individuals and a variety of academic and research institutions, including the Caribbean Maritime Institute; the central library of Mosul University, Iraq; the Commonwealth Secretariat; the Ministry of Foreign Affairs of South Africa; the permanent mission of China to the Authority; the international law programme of Kobe University Graduate School of International Cooperation Studies, Japan; the Law of the Sea Unit, Ministry of External Relations, Cameroon; the National Center of Fisheries Sciences of Boussoura, Guinea; the Ministry of Fisheries and Aquaculture of Guinea; the National Environment and Planning Agency of Jamaica; the National Oceanographic Centre, QinetiQ Environmental Unit, United Kingdom; the Permanent Mission of Jamaica to the United Nations; the United States Department of Commerce; General Counsel for International Law, National Oceanographic and Atmospheric Administration, United States; YBP Library Services, New Hampshire, United States; and the Department of Government of the University of the West Indies.

30. The regular publications of the Authority include an annual compendium of selected decisions and documents of the Authority (published in English, French and Spanish) and a handbook containing details of the membership of the Assembly and the Council, the names and addresses of permanent representatives and the names of the members of the Legal and Technical Commission and the Finance Committee. A complete list of all the current publications issued by the Authority can be found on the Authority's website (www.isa.org.jm).

31. The Authority's website, first developed in 1999, had long outgrown its original architecture by 2006. In that year the Authority undertook a major upgrade of the website in order to provide greater functionality and ease of access to users. The restructured website uses various online interactive techniques to enable the secretariat to provide user-friendly information to member States, members of the Legal and Technical Commission and Finance Committee and academic and scientific researchers on the work of the Authority, including its documentation and sessions, on marine scientific research of relevance to its work and on the development of marine mineral resources of the Area. The website is also the main point of access to the Authority's central data repository.

X. Review of the substantive work programme of the Authority for 2005-2007 and proposed work programme for 2008-2010

32. In his annual report to the tenth session in 2004 (ISBA/A/10/3), the Secretary-General for the first time presented the substantive work programme of the Authority in the form of a three-year programme of work covering the period 2005-2007. In the same report, it was noted that, prior to 2004, the work programme of the Authority had been driven by the need to make progress on matters of an organizational nature or on the implementation of the recommendations of the Preparatory Commission relating to the registered pioneer investors.

33. The substantive functions of the Authority are set out in the Convention and in the 1994 Agreement. Pending the approval of the first plan of work for exploitation the Authority is to concentrate on the eleven areas of work listed in paragraph 5 of section 1 of the annex to the 1994 Agreement. Given the limited resources available to the Authority, the relative priority to be given to each of those areas of work is dependent upon the pace of development of commercial interest in deep seabed mining. Thus, the 2005-2007 programme of work was based on the implementation of subparagraphs (c), (d), (f), (g), (h), (i) and (j) of paragraph 5 of section 1, in particular the following main areas:

(a) The supervisory functions of the Authority with respect to existing contracts for exploration for polymetallic nodules;

(b) The development of an appropriate regulatory framework for the future development of the mineral resources of the Area, particularly hydrothermal polymetallic sulphides and cobalt-rich ferromanganese crusts, including standards for the protection and preservation of the marine environment during their development;

(c) Ongoing assessment of available data relating to prospecting and exploration for polymetallic nodules in the Clarion-Clipperton zone;

(d) The promotion and encouragement of marine scientific research in the Area through, inter alia, an ongoing programme of technical workshops, the dissemination of the results of such research and collaboration with Kaplan, the Chemosynthetic Ecosystem Group and the Seamounts Group;

(e) Information-gathering and the establishment and development of unique databases of scientific and technical information with a view to obtaining a better understanding of the deep ocean environment.

34. It is proposed that the 2008-2010 programme of work will continue to focus on these main areas of work and will build on the progress made during the period 2005-2007. In addition, however, in the light of developments within the marine minerals sector, the Authority will begin to monitor more closely trends and developments relating to deep seabed mining activities, including world metal market conditions and metal prices, trends and prospects (subparagraph (d) of paragraph 5 of section 1 of the annex to the 1994 Agreement).

35. It is notable that in recent years there has been a rapid and significant growth in demand and prices for the metals of commercial interest in polymetallic nodules (copper, nickel, cobalt and manganese). Similar growth has been recorded for the metals of commercial interest in hydrothermal polymetallic sulphides (gold, copper, silver and zinc) and cobalt-rich ferromanganese crusts (cobalt). For example, according to the United States Geological Survey and *Mining Journal*, between 2000 and 2007, the price of copper rose over 400 per cent, the price of cobalt by over 230 per cent, the price of nickel by over 570 per cent, the price of zinc by over 300 per cent and the price of lead by over 200 per cent. One reason for this growth is increased demand for these metals in the developing economies of China, the Russian Federation, India and Brazil. These developments have helped to invigorate the marine minerals sector and to call positive attention to the work of the Authority.

36. In 2006, Nautilus Minerals Inc., which is the first company to commercially explore the ocean floor for high-grade gold-copper-zinc-silver sea floor massive sulphide deposits announced that following a geological targeting programme it had lodged 47 exploration licence applications covering prospective areas of 108,295 km² of the Bismarck Sea in Papua New Guinea. In January 2007, the company announced that it has lodged 18 prospecting license applications within the exclusive economic zone of Tonga and a further two special prospecting licenses within the Fiji exclusive economic zone. The company also succeeded in attracting investment from three major traditional land-based mining companies (Barrick Gold Corporation, Anglo American PLC and Teck Cominco). Its 2007 exploration and development programme at the Solwara 1 project in the territorial waters of Papua New Guinea involves environmental, mining and metallurgical studies using a 141-metre exploration vessel and is described on the company's website (www.nautilusminerals.com) as the "world's largest-ever exploration and development programme for high-grade sea floor massive sulphide systems". At the same time, the company has entered into an agreement with Jan De Nul of Belgium, one of the world's leading international dredging companies, to construct a specialized deep-sea mining vessel. The 191-metre vessel, to be named the *Jules Verne*, is expected to be completed by the end of 2009 to meet Nautilus's target date for commencing mining operations. Although the deposits under exploration in Papua New Guinea waters occur at ocean depths significantly less than the depths of the polymetallic nodule deposits in the Area, the production costs for mining massive sulphide deposits at Solwara 1 (assuming the mining technology can be proven) will help to provide some indication of the possible viability of polymetallic nodule and sulphide resources in the Area.

37. Another exploration company, Neptune Minerals PLC, which is registered in the United Kingdom and listed on the AIM market of the London Stock Exchange, has an active exploration programme for sea floor massive sulphides within the exclusive economic zone of New Zealand. In May 2007 the company was granted exploration licences in the territorial waters of Papua New Guinea (in an area adjacent to that under exploration by Nautilus Minerals Inc.) and a foreign investment permit to explore for and develop sea floor massive sulphides in the exclusive economic zone of the Federated States of Micronesia, focusing on the Yap Arc and Yap Back-Arc structures located north and west of the Yap Island group.

A. Supervisory functions with respect to existing contracts

38. One of the key functions of the Legal and Technical Commission is to review and evaluate the annual reports by contractors. There are presently eight contractors for exploration for polymetallic nodules in the Area. These are Yuzhmorgeologiya (Russian Federation), Interoceanmetal Joint Organization (IOM) (Bulgaria, Cuba, Slovakia, Czech Republic, Poland and Russian Federation), the Government of the Republic of Korea, COMRA (China), Deep Ocean Resources Development Company (DORD) (Japan), Institut français de recherche pour l'exploitation de la mer (IFREMER) (France), the Government of India and the Federal Institute for Geosciences and Natural Resources of Germany. Each contractor is under an obligation to submit an annual activity report by the end of March each year.

39. The objective of the reporting requirement is to establish a mechanism whereby the Commission is properly informed of the contractors' activities so as to be able to exercise its functions under the Convention, particularly those relating to the protection of the marine environment from the harmful effects of activities in the Area. To facilitate reporting, the Commission in 2002 recommended a format and structure for annual reports (ISBA/8/LTC/2, annex), including a standardized contents list (general, exploration work, mining tests and mining technology, training, environmental monitoring and assessment, financial statement, proposed adjustment to the programme of work, conclusions and recommendations) which is based on the standard clauses set out in annex 4 to the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area (ISBA/G/A/18, annex). Additional assistance for contractors in preparing their annual reports appears in the recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for polymetallic nodules in the Area issued by the Commission in 2001 pursuant to regulation 38 of the Regulations (ISBA/7/LTC/1/Rev.1).

40. Although the contents of the annual reports are confidential, any relevant findings and recommendations of the Commission on the annual reports are presented in a report to the Secretary-General including, as appropriate, requests for clarification or further information. The Secretary-General conveys any such requests to the contractors by letter. Comments of a general nature with respect to the evaluation of the annual reports of the contractors may also be included in the report on the work of the Commission that the Chairman of the Commission presents to the Council.

41. The Regulations also provide for periodic review of the implementation of plans of work for exploration at intervals of five years. This is to be achieved

through consultations between contractors and the Secretary-General. As part of the review, the contractor shall indicate its programme of activities for the following five years, making such adjustments to its previous programme of activities as are necessary. The Secretary-General may request the contractor to submit such additional data and information as may be necessary for the purposes of the review. The Secretary-General is required to report on the review to the Commission and the Council.

42. For the seven former registered pioneer investors, 2006 marked the end of the first five-year programme of work since the contracts were issued. This provided an opportunity for the contractors to provide a comprehensive account of the work carried out, the results obtained and the expenditure incurred during the five-year programme. Comprehensive five-year reports were submitted by the Government of India, DORD, the Republic of Korea, IOM, Yuzhmorgeologiya, IFREMER and COMRA. Between August 2006 and May 2007, the Secretary-General met with DORD, the Republic of Korea, IOM, COMRA and the Government of India to discuss their proposed programmes of activities for the next five years. Information on the detailed programmes of work will be submitted to the Legal and Technical Commission and the Council in due course.

B. Regulations on prospecting and exploration for polymetallic sulphides and cobalt-rich ferromanganese crusts

43. The Assembly will recall that in 1998 the delegation of the Russian Federation formally requested the Authority to develop regulations for prospecting and exploration for polymetallic sulphides and cobalt crusts. A workshop on these resources was held in June 2000, and in 2001 a document was placed before the Council (ISBA/7/C/2) summarizing the discussion at the workshop and indicating the considerations to be borne in mind in elaborating regulations. After extensive discussions, the Council decided to ask the Legal and Technical Commission to prepare draft regulations. The Legal and Technical Commission, with assistance from the Secretariat, did a great deal of work on a first draft in 2003 and 2004. During the eleventh session in 2005, the Council completed a first reading of the draft Regulations on Prospecting and Exploration for Polymetallic Sulphides and Cobalt-rich Crusts, prepared by the Secretariat and the Legal and Technical Commission.

44. The Council then asked the Secretariat for clarification of certain points, and the Secretariat submitted two technical information papers to the Council in 2006 (ISBA/12/C/2 and ISBA/12/C/3). At the 106th meeting, on 8 August 2006, the Council was provided with an oral briefing on the technical issues dealt with in those papers. The briefing was given by the Secretariat with the assistance of two technical experts, James Hein and Charles Morgan. In addition, Mr. Morgan presented to the Council a report on the preliminary outcomes of a workshop on the technical and economic considerations relating to mining of polymetallic sulphides and cobalt-rich crusts, held from 31 July to 4 August 2006. At the request of the Council, a summary of the workshop recommendations was issued in the form of a document (ISBA/12/C/7). The delegation of the Russian Federation also submitted a draft proposal relating to the draft regulations (ISBA/12/C/6).

45. Following extensive discussion of the way in which the Council would address the outstanding technical issues with respect to the draft regulations, it was agreed that the Secretariat should attempt to revise the draft regulations further in the light of the outcomes of the technical workshop and the presentations, proposals and discussions in the Council during the twelfth session. In revising the draft, it was agreed that separate sets of regulations would be prepared for polymetallic sulphides and cobalt crusts. In considering the revised draft regulations, the Council recommended that the Legal and Technical Commission should give priority to the regulations relating to polymetallic sulphides, so that the Council could be in a position to give substantive consideration to the regulations for polymetallic sulphides in 2007. In order to expedite this process, it was agreed that a revised draft of the draft sulphides regulations would be circulated to the outgoing members of the Legal and Technical Commission before 31 December 2006 for comment, following which the draft would be made available to member States. The incoming Legal and Technical Commission would then review the draft regulations for cobalt crusts and submit them for consideration by the Council in 2008.

46. In accordance with the Council's request, the Secretariat prepared a set of draft sulphides regulations in October 2006. The draft was circulated to outgoing members of the Legal and Technical Commission, who were asked to submit their comments by 31 December 2006. Comments were received from three members of the Commission. In the light of those comments, the Secretariat has prepared an explanatory note, annexing the revised draft sulphides regulations, for consideration by the Council in 2007 (ISBA/13/C/WP.1).

47. Also in accordance with the Council's request, the Secretariat has prepared revised draft regulations relating to cobalt-rich ferromanganese crusts (ISBA/13/LTC/WP.1). The revised draft is based on document ISBA/10/C/WP.1/Rev.1 with technical adjustments consistent with the recommendations that emerged from the discussions during the 2006 workshop on technical and economic considerations relating to these resources.

48. As noted in paragraph 39 above, in 2001, the Legal and Technical Commission issued recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for polymetallic nodules in the Area. The recommendations were developed from the outcomes of an international workshop held in 1998. Their purpose is to describe the procedures to be followed in the acquisition of baseline data by contractors, including the monitoring to be performed during or after any activities having the potential to cause serious harm to the environment. The recommendations also emphasize the importance of standardized approaches to the reporting and analysis of data.

49. In 2001, the Authority held an international workshop on standardization of environmental data and information. The recommendations of the workshop included the establishment of a common database by the Authority linking contractor and non-contractor databases and its publication on the Internet; the taxonomic standardization of species identification to ensure that species are identified similarly during taxonomic analyses of samples that may have been taken by different contractors, in different locations and at different times; the exchange of seagoing scientists, to enable them to compare and standardize field procedures; and cooperative cruises to allow for the exchange of samples, technologies and protocols. The outcomes of the workshop were considered by the Legal and

Technical Commission at the tenth session in 2004, with a view to issuing a further set of recommendations to contractors relating to the standards to be used for environmental data collection and submission. The Commission considered that, since the proceedings of the workshop were available in the public domain, and in the light of the work being undertaken by contractors, it was premature to issue further recommendations at that time. The Commission would, however, keep the question of standardization of data under review as necessary.

C. Ongoing assessment of available data relating to prospecting and exploration for polymetallic nodules

50. Two of the main features of the 2005-2007 work programme were the development of a central data repository for the Authority and the establishment of a geological model of polymetallic nodule deposits in the Clarion-Clipperton fracture zone.

1. Central data repository

51. The objective of the central data repository is to collect and centralize all public and private data and information on marine mineral resources available to the Authority. This will enable the Authority to reconcile available data and information from different sources using uniform data formats, evaluate those data and draw conclusions from them. Work on the repository commenced in 2000. The work carried out in the developmental phase is described in the report of the Secretary-General to the tenth session (ISBA/10/A/3, paras. 139-141).

52. Although good progress has been made over the past three years in developing the parameters for the repository, its success in the long term will depend upon the acquisition of suitable and appropriate data. A key difficulty is that suitable data in the public domain are sparse. In particular, there is a dearth of data relating to the ecosystems associated with deep seabed mineral resources. Associated problems include the need for a standard taxonomy and the standardization of certain types of environmental and geological data. These problems highlight the need for the Authority to enter into collaborations with scientists and research institutions with a view to informing them of the basic scientific needs of the Authority. Such outreach activities also assist scientists by introducing new areas of research and catalyzing efforts in the areas where standardization is required.

53. During the 2008-2010 work programme, the Secretariat will continue to expand the central data repository by augmenting the data already contained in it, generating products that provide a better indication of the possible resources of the Area and reflect the process underway in the Authority to establish reserves of metals in the mineral resources of the Area. In this regard, the structure of the database will be adjusted to cluster data and information by resource type, i.e., polymetallic nodules, polymetallic sulphides and cobalt-rich ferromanganese crusts. In the case of polymetallic nodules, additional environmental data will be sought from contractors, in particular from their annual reports and their reports on relinquished areas. Efforts will also be made to obtain information on data maintained in their archives. Ultimately, it is intended that the central data repository will have the capacity to provide spatial information and thematic maps utilizing available resource data, data on the bathymetry, seamounts, fracture zones,

ridges, trenches, hydrothermal vent systems, biological and environmental data in areas of commercial interest for each of the three resources in the Area.

54. The task of compiling environmental databases for polymetallic nodules is made somewhat easier by the existence of an extensive knowledge base accumulated over a number of years of prospecting. However, this may be contrasted with the situation for polymetallic sulphides and cobalt crusts, where a critical lack of detailed sampling and surveying means not only that there is presently a very limited understanding of the physical, geochemical and biological conditions at potential sites for exploration, but there is a very poor background database to begin with. It is expected that it will take time to establish meaningful environmental databases for these resources and that cooperation with relevant international marine research institutions will be essential. During the 2008-2010 period, the Secretariat proposes to begin creating biological databases for polymetallic sulphides and cobalt crusts for regions of commercial interest utilizing available public domain data and through collaborations. In particular it is proposed to convene a meeting with the ChEss project¹ and the InterRidge Group² to examine potential collaboration with these two organizations to obtain some of the data and information required to establish or add to the databases. The databases will, to the extent possible, include information on species occurrence and genetic resources augmented with other relevant environmental data as appropriate.

2. Geological model of the Clarion-Clipperton zone

55. The objectives of the project to establish a geological model of the Clarion-Clipperton zone are to develop a model of the polymetallic nodule deposits in the zone and an associated prospector's guide that will attempt to reduce the uncertainty associated with resource assessment for these deposits. The background to the project is described in the report of the Secretary-General to the tenth session (ISBA/10/A/3, paras. 116-122). The parameters of the project and a three- to four-year work programme were elaborated at a workshop held at Nadi, Fiji, in May 2003. Work on the project commenced shortly thereafter. This involved the compilation of available data and the use of consultants to assist the Secretariat in developing and testing the various components of the model, including proxy datasets and mathematical algorithms to generate predictions of nodule abundance and grade for any location within the zone.

56. At the twelfth session in 2006, the Legal and Technical Commission was provided with an update of progress with the geological model. The Commission was informed that work with regard to resource evaluation of polymetallic nodule resources had been completed. The results of the use of chlorophyll as a proxy for nodule abundance were encouraging. In addition, preliminary reports from consultants on bathymetry, tectonics and volcanism, carbonate compensation depth and the oxygen minimum zone had been received.

57. A midterm meeting on the geological model was convened at the East-West Centre in Hawaii, United States, in October 2006. It was found that, owing to a

¹ ChEss is a global study of the distribution, abundance and diversity of species in deep-water hydrothermal vents, cold seeps and other chemosynthetic ecosystems for the Census of Marine Life initiative and is directed from the National Oceanography Centre, Southampton, United Kingdom.

² See <http://interridge.whoi.edu/>.

delay in assimilating data from different sources, there had been a slight delay in completing some of the tasks associated with the project, in particular with regard to the proxy sediment type. It was decided to convene a joint workshop exclusively to address the question of the proxy sediment type, to be attended by consultants from France, the Republic of Korea, COMRA and IOM. Notwithstanding the delay in the project, it was agreed that all work products would be submitted for peer review by September 2007. A final draft of the model, reflecting the suggestions from peer reviewers and internal reviews, will be available by the end of 2007. It is proposed to present the final outputs of the project (including the prospector's guide and the geological model) at an international workshop which will be convened for the purpose prior to the fourteenth session of the Authority in 2008.

58. As part of the 2008-2010 work programme, the Secretariat proposes to initiate development of a similar model for polymetallic nodule deposits in the Central Indian Ocean basin. As an initial step, the Secretariat will convene a meeting of experts on the resources of the Central Indian Ocean basin and model developers to consider various elements to be included in model development, and to devise a programme of work for model development. Following this meeting, the Secretariat will prepare a draft project plan and detailed terms of reference for implementation of the programme of work.

D. Promotion and encouragement of marine scientific research in the Area

59. Under articles 143 and 145 of the Convention, the Authority has a general responsibility to promote and encourage the conduct of marine scientific research in the Area and to disseminate the results of such research. It also has a duty to ensure effective protection of the marine environment from harmful effects which may arise from activities in the Area. A key factor for the Authority is that, although a significant amount of basic and applied research has been done in the past or is still in progress, it is broadly accepted that the current level of knowledge and understanding of deep sea ecology is not yet sufficient to allow conclusive risk assessment of the effects of large-scale commercial seabed mining. This is particularly so in relation to polymetallic sulphides and cobalt crusts. Effective administration of the Area requires knowledge of the Area. The only mechanisms available to the Authority to obtain better knowledge of the Area are through the results of general and applied marine scientific research, or through active prospecting and exploration for minerals.

60. Much knowledge has been gained by the present contractors through their prospecting and exploration for polymetallic nodules. However, it must be borne in mind that the majority of their work is not a broad pursuit of science to help the international community to manage the impact of exploration and mining, but has been primarily directed towards commercial extraction of polymetallic nodules from the abyssal depths of the oceans. In order to be able in future to manage the impact of mineral development in the Area in such a way as to prevent serious harm to the marine environment, it will be essential for the Authority to have better knowledge of the state and vulnerability of the marine environment in mineral-bearing provinces. This includes, inter alia, knowledge of baseline conditions in these areas, the natural variability of these baseline conditions and the relationship with impacts related to exploration and mining.

61. The most immediate and practical way in which the Authority has begun to implement its responsibilities under the Convention and to fulfil its various mandates under paragraph 5 of section 1 of the annex to the Agreement, particularly under subparagraphs (f) to (j), has been the establishment of a series of expert workshops, seminars and meetings. In all its workshops, the Authority has focused on obtaining a better understanding of the mineral resources to be found in the international seabed area and the environment in which they are found in order to better prepare itself to manage the impact of exploration and mining on the environment. At all of the workshops, the need for cooperation between scientists and coordination of their efforts has been raised repeatedly; hence the second major element in the Authority's efforts to promote marine scientific research has been to act as a catalyst for international collaboration in projects which will help to manage the impact of deep seabed mining and related activities.

62. There has also developed a practice of arranging technical briefings for the representatives of members of the Authority present in Kingston on matters relevant to the work of the Council and the Assembly. For example, there was a one-day seminar by invited experts on the status and prospects for polymetallic sulphides and cobalt crusts during the eighth session in 2002. A similar briefing session took place at the twelfth session in 2006, primarily designed to help the Council better address the question of the size of areas to be allocated for exploration for polymetallic sulphides and cobalt crusts. Such briefings enable delegates to gain greater understanding of highly technical matters that are important for the work of the Authority, and are much appreciated.

1. Technical workshops

63. Since 1998, the Authority has established a pattern of workshops and seminars on specific issues related to deep seabed mining, with participation by internationally recognized scientists, experts, researchers and members of the Legal and Technical Commission as well as representatives of contractors, the offshore mining industry and member States. Through these technical workshops, the Authority is able to obtain the views of recognized experts in the protection of the marine environment and other specific subjects under consideration and to obtain the most recent marine scientific research results pertinent to the subject matter. Since 1998, nine such workshops have been held on the following themes:

- (a) Development of guidelines for the assessment of the environmental impacts from exploration for polymetallic nodules (Sanya, China, 1998);
- (b) Proposed technologies for deep seabed mining of polymetallic nodules (Kingston, Jamaica, 1999);
- (c) Mineral resources of the Area other than polymetallic nodules (Kingston, 2000);
- (d) Standardization of environmental data and information (Kingston, 2001);
- (e) Prospects for international collaboration in marine scientific research to enhance understanding of the deep sea environment (Kingston, 2002);
- (f) Development of a geological model for the CCZ (Nadi, Fiji, 2003);
- (g) Establishment of environmental baselines at deep seabed cobalt-rich ferromanganese crust and polymetallic sulphide mine sites in the Area for the

purpose of evaluating the likely effects of exploration and exploitation on the marine environment (Kingston, 2004);

(h) Cobalt crusts and the diversity and distribution patterns of seamount fauna (Kingston, 2006);

(i) Mining of cobalt crust and polymetallic sulphide deposits: technological and economic considerations (Kingston, 2006).

64. The proceedings of these workshops are published in book format and on the Authority's website. They are increasingly recognized by the international scientific and research community as important and authoritative contributions to the specialized scientific literature on deep seabed mining.

65. In recent years, several contractors have expressed the desire for a workshop to enable an exchange of ideas to take place between them and developers of technology in the marine sector. For this reason, in 2008, it is proposed to convene a workshop on the progress that has been made in the development of mining and processing technologies for polymetallic nodules.

66. During the 2008-2010 work programme, three further international workshops will be convened. The first of these will review the outcomes of the project to establish a geological model of polymetallic nodule deposits in the Clarion-Clipperton zone. The second will be intended to ascertain the modalities for scientific collaboration on research into polymetallic sulphide deposits in the Area and potential sources of financing for such collaborations. The third will address the standardization of the environmental data contained in the exploration code for polymetallic sulphides and will aim to develop guidelines for the establishment of environmental baselines for these resources. The objective is to facilitate the acquisition of comparable environmental data from potential contractors that would contribute to the establishment of a cohesive monitoring programme by the Authority.

2. International cooperation in marine scientific research

67. Scientific research into the deep sea environment is essential, but it is also extremely expensive and beyond the capacity of many individual States. From the outset, the Authority has recognized that the most effective means of gaining better knowledge of the deep ocean environment is to encourage cooperation among States, national scientific institutions and contractors in areas of environmental study and research. To rely solely on contractors to gather comprehensive data is largely impractical and, at the least, a significant disincentive to potential contractors to engage in exploration programmes for seabed mineral resources. Thus, one of the core recommendations of the Authority's 1998 workshop was for the Authority to work with the international scientific community, and contractors, to identify critical issues suitable for international collaboration. Such common studies would encourage cooperation and economy and would be cost-effective for all concerned. This was followed up in 2002 with a workshop specifically aimed at identifying the prospects for international collaboration in marine scientific research. That workshop led to the development of the Kaplan project (described below) as well as efforts to establish other avenues for international collaboration.

The Kaplan project

68. To date, the most successful example of a collaborative project between a group of international scientists and institutions and the Authority is the Kaplan project, which was initiated in January 2002 and will conclude on 30 June 2007. The project was funded mainly by the J. M. Kaplan Fund with additional contributions from the Authority. The objectives of the project were:

(a) To estimate, using modern molecular methods, the number of polychaete, nematode and foraminifera species at two to three stations spaced at intervals of approximately 1,500 km across the Pacific nodule province;

(b) To evaluate, using state-of-the-art molecular and morphological techniques, levels of species overlap and, if possible, rates of gene flow, over scales of 1,000 to 3,000 km for key components of the polychaete, nematode and foraminifera fauna;

(c) To communicate the findings of the project broadly to the scientific and mining communities, and make specific recommendations to the Authority on minimizing risks to biodiversity resulting from mining.

69. The principal investigators for the project were Craig R. Smith of the University of Hawaii at Manoa; Gordon Paterson, John Lamshead and Adrian Glover of the Natural History Museum of London; Alex Rogers of the Zoological Society of London; Andy Gooday of the Southampton Oceanography Centre, United Kingdom; Hiroshi Katazato of the Japan Agency for Marine-Earth Science and Technology; and Myriam Sibuet, Joëlle Galeron and Lenaïck Menot of IFREMER. The final report of the project will be published.

70. In their report, the investigators responded to the following questions:

(a) What are the diversity levels of foraminifera, nematodes and polychaetes at the Kaplan sites E, C and W (eastern, central and western) spanning the Clarion-Clipperton zone?

(b) Is there evidence of a characteristic abyssal fauna in this region?

(c) What are the levels of species overlap (and rates of gene flow) across the Kaplan sites?

(d) What are the resulting ramifications and recommendations for the Authority for managing nodule mining and designing marine protected areas?

71. With regard to diversity levels at the three sites, the group reported that their results indicated high, unanticipated levels of species diversity for all three sediment-dwelling faunal components studied at the individual sites. The foraminifera contain at least 252 species (based on morphological analyses) at the eastern site and at least 180 species at the central site. Many of these species are new to science and appear not to have been collected elsewhere. In addition, the report speculated that, even based on the relatively limited number of samples it had been able to analyse thus far, the total species richness of sediment-dwelling foraminifera, nematodes and polychaetes (a subset of the total fauna) at a single site in the Clarion-Clipperton zone could easily exceed 1,000 species.

72. On the question of whether there is evidence of a characteristic abyssal fauna in this region, the group's results on all faunal components suggest that there is a

characteristic fauna of the abyss, i.e., the abyss is not merely a sink of non-reproducing individuals transported from the continental margins. Also, many of the hundreds of species of foraminifera identified in samples from the project appear to be restricted to, or at least characteristic of, the abyss. The group concluded that the abyss harbours a specially adapted diverse fauna distinct from the fauna of the continental margins. It therefore seems very unlikely that most, or even many, species found in the Clarion-Clipperton zone abyss are protected from extinction by populations residing many thousands of kilometres away at much shallower depths on the continental margins.

73. In relation to the question of the levels of species overlap (and rates of gene flow) across the Kaplan sites, the group reported that its data concerning species distributions and gene flow were still limited by relatively small sample sizes and incomplete intercomparisons. It therefore recommended that any conclusions be drawn with caution. Nonetheless, the group stated that there was significant evidence that the community structure of the foraminifera and polychaetes differed substantially on scales of 1,000 to 3,000 km across the zone.

74. With regard to the ramifications and recommendations for the Authority for managing nodule mining and the design of marine protected areas, the group stated the following:

Any recommendations made to the International Seabed Authority at this point must be considered preliminary and used with the precautionary principle (i.e., our understanding of biodiversity levels, species ranges and gene flow in the Clarion-Clipperton zone is still so limited that we must err on the side of over-protection of the environment). It is clear that novel taxa, and evolutionary novelty, occur in the abyss so we cannot assume that protection of only the ocean margins will preserve abyssal biodiversity. There is also substantial evidence from our studies that the Clarion-Clipperton zone is not one continuous habitat harbouring a single biotic assemblage; species appear to turn over, and community structure varies substantially, over spatial scales of 1,000 km or less (i.e., of scales less than the distance between our Kaplan sites E and C; see figure 1). This suggests that marine protected areas designed to safeguard biodiversity in the Clarion-Clipperton zone in the face of nodule mining should be set up as follows:

- Marine protected areas should be placed at multiple locations across the Clarion-Clipperton zone. At the very least, major areas should be established in the regions of our sites E, C, and W.
- Because of the steep latitudinal gradients in productivity and community structure within the equatorial Pacific (Smith et al., 1997; Smith and Demopoulos, 2003; Hannides and Smith, 2003), the marine protected areas should span the entire width of the Clarion-Clipperton zone, i.e., from 7° to 17° N latitude.
- The marine protected areas should be large enough to encompass major areas of the known benthic habitat types in the Clarion-Clipperton zone, including abyssal hills with and without nodules, rocky ridges, and multiple seamounts of various elevations above the sea floor.
- Each marine protected area must be large enough for most of its area to be buffered from the direct and indirect impacts of nodule mining

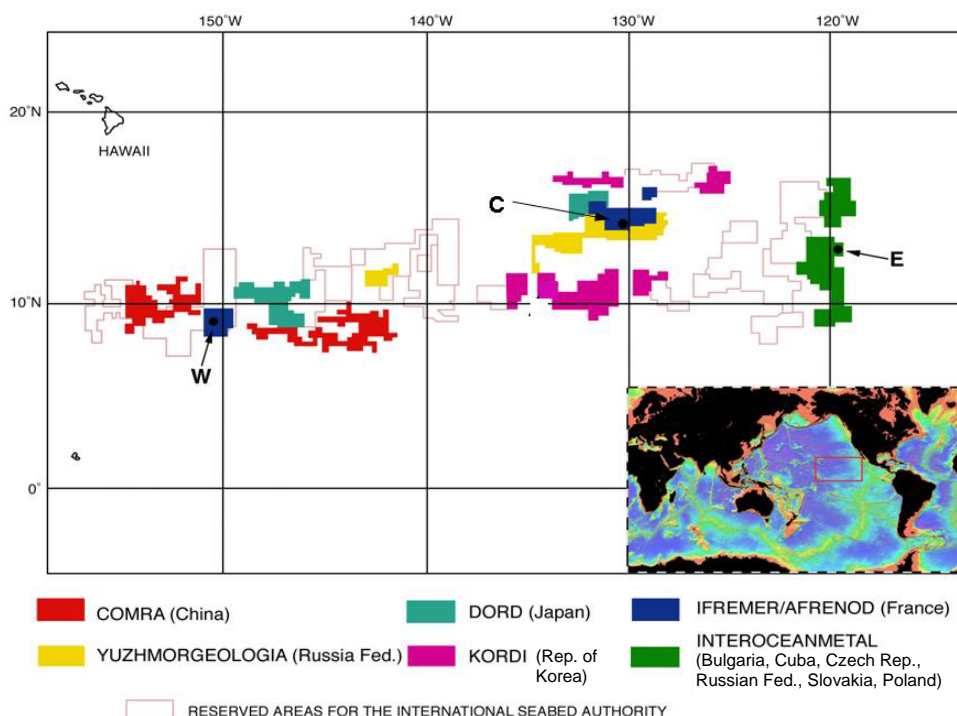
activities, including influences from sediment plumes in the water column and at the sea floor.

Because benthic processes and community structure in the Clarion-Clipperton zone (including biomass, growth rates, biodiversity and species composition) are strongly influenced by processes in the water column above (e.g., primary production and organic carbon export), it would be ideal if each marine protected area included control of substantial human activities (mining, energy exploitation, waste disposal and commercial fishing) from the abyssal sea floor to the ocean surface.

75. Finally, the group pointed out that its recommendations were based on a limited (albeit rapidly growing) database on biodiversity and species ranges in the Clarion-Clipperton zone, and should be applied in a precautionary manner.

Figure 1

Pioneer investors' allocated areas for exploration of polymetallic nodules in the Pacific Ocean



The region of maximum commercial interest in the Pacific nodule province (box in inset) and claim areas licensed to exploration contractors. The sites at which samples were collected for this project are indicated by E, C and W (the Kaplan eastern, central and western sites, respectively). Site E is located in the IOM claim area at ~15° N, 119° W (water depth = 3,990-4,096 m), site C is located in the eastern IFREMER claim area at ~14° 5' N, 130° 5' W (water depth 4,997-5,054 m) and site W is located in the western IFREMER claim area at 9° 33' N, 150° 0.5' W (water depth 5,043-5,059 m).

Note: The colour-coded version of this figure can be consulted by downloading the present document (ISBA/13/A/2) from the Official Document System of the United Nations (<http://documents.un.org>).

Future collaboration

76. As a result of the Authority's workshops, and based on the experience gained with the Kaplan project, a number of other potential collaborations have been identified. These include collaboration with the Census for Marine Life on study and analysis of hydrothermal vent fauna and collaboration on inactive sulphides deposits with scientists involved in the exploration programme by Nautilus Minerals Inc. in the waters of Papua New Guinea. These and other potential collaborations will be explored during the 2008-2010 period. In the event that interest and commitment to a possible collaboration is identified, the Authority will convene a workshop to ascertain the modalities of the collaboration and sources of financing.

E. Information and data

77. Information gathering and the establishment and development of unique databases of scientific and technical information continue to be among the most important functions of the Authority. The role of the central data repository has already been mentioned in conjunction with its role in the assessment of available data relating to prospecting and exploration for polymetallic nodules (see paras. 51-54 above). This section reports on the status of some of the specific databases established by the Secretariat as part of the central data repository.

78. In the 2005-2007 programme of work, it was indicated that the Secretariat would establish environmental databases of the best-known nodule-bearing provinces in the Clarion-Clipperton fracture zone and the Central Indian Ocean basin. The purpose of these databases is to assist the Authority in regulating the activities of contractors in respect of environmental requirements and to manage the environmental impacts of deep seabed polymetallic nodule mining when it occurs. The databases would include benthic/biological databases of the Clarion-Clipperton zone and Central Indian Ocean basin, as well as the carbonate compensation depth, oxygen minimum zone, organic carbon, sedimentation, bioturbation and ocean currents.

79. Between 2005 and 2007, a map of the Clarion-Clipperton zone nodule province that provides the locations of all benthic/biological sampling sites available in the public domain was completed. In addition, as part of the project to establish a geologic model of polymetallic nodule resources in the Clarion-Clipperton zone (see paras. 55-58 above), data and information required to compile a database on the carbonate compensation depth and oxygen minimum zone in the Clarion-Clipperton zone were acquired. A sediment map based on data available in the public domain, as well as data and expertise provided by experts from the contractors, was also produced. In addition, the Authority convened international workshops related to the environment of deposition of cobalt crusts and polymetallic sulphides in 2004 (on the establishment of environmental baselines at deep sea floor cobalt crust and polymetallic sulphide mine sites) and in 2006 (on the diversity and distribution patterns of seamount fauna at cobalt crust sites). The latter workshop was organized in conjunction with a number of international research programmes and organizations active in this field (see para. 63 above).

80. The Secretariat has also largely completed work on a bibliographic database on polymetallic nodule resources. The database contains articles from 456 journals. The oldest article is from 1878 and the most recent from 2005. The database also

contains an analysis of the trends in publications, most published scientists and their subject areas. Most of the publications in the database are on geology and geochemistry. Since it was placed on the central data repository, the bibliographic database has been accessed by individuals from, inter alia, Australia, China, the Czech Republic, France, Kenya, Jamaica, the United Kingdom and the United States.

81. During the period 2008-2010, the Secretariat will continue to develop its environmental databases to cover the three mineral resources currently under consideration by the Authority: polymetallic nodules, polymetallic sulphides and cobalt crusts. In relation to polymetallic nodules, the Secretariat will continue to work with contractors and experts to assemble available public and private data and introduce them into the selected databases. Some of the methods to be utilized will include meetings of experts in the relevant fields and the establishment of cooperative arrangements with contractors and other private institutions for data exchange and for the establishment of data protocols. Efforts will be primarily geared to the Clarion-Clipperton zone and the Central Indian Ocean basin. However, public domain data will also be sought for other areas such as the Peru basin. Outputs will include web-enabled bibliographic databases, a web-enabled environmental database linked to contractor and non-contractor databases, information notes on databases and periodic reports to the Authority and its organs on the status of these databases.

82. The Secretariat's ability to deliver many of the products foreseen in its previous and current work programme has been significantly enhanced by the recruitment of a dedicated geographic information specialist. Since the recruitment of the specialist, an online Geographic Information System (GIS) has been selected and the software application has been transferred onto the Authority's web server following acceptance testing of system functions and design. In addition, enhanced map layout and analysis capabilities have been made available by introducing a new software module, ArcGIS. The ArcGIS software is state-of-the-art desktop software for digital map production and is recommended as a standard by the United Nations working group on geospatial information. These architectural and infrastructural developments will make it possible to undertake many of the mapping and GIS applications such as the digital atlas envisioned in the 2005-2007 programme of work.

XI. Conclusions

83. As in the previous three years, the primary focus of the substantive work of the Authority over the next three years will be on the scientific and technical work necessary to carry out its functions under the Convention and the 1994 Agreement and in particular to promote a better understanding of the potential environmental impact of deep seabed mining, when it takes place. The Secretariat will build upon the success of the Authority's international scientific workshops and seminars and aim to expand the possibilities for international collaboration in marine scientific research. Greater efforts will also be made to disseminate the results of scientific research through the ongoing development of the central data repository and the Authority's website. The Secretariat will also continue to study developments relating to the exploration and exploitation of mineral resources of the continental

shelf beyond 200 nautical miles in the light of the provisions of article 82, paragraph 4, of the Convention.

84. Article 154 of the Convention provides that the Assembly shall undertake every five years a general and systematic review of the manner in which the international regime of the Area has operated in practice, and that in the light of the review the Assembly may take, or recommend that other organs take, measures in accordance with the provisions and procedures of Part XI and the annexes related thereto which will lead to the improvement of the operation of the regime. The first such review was conducted at the sixth session in July 2000, on the basis of a report prepared by the Secretary-General (ISBA/6/A/8) and in conjunction with the consideration by the Assembly of the Secretary-General's annual report. In the report, the Secretary-General proposed that in the light of the very short experience that the Authority had had in implementing the regime, it would be premature for the Assembly to take or recommend any measures. The Assembly agreed. The second five-year review was done in 2005. Again, the Secretary-General's comprehensive report (ISBA/10/A/3) provided necessary background material and again, the Assembly did not consider it necessary to take or recommend any measures. The third such review is to be conducted in 2010, which will also mark the completion of the 2008-2010 work programme.

85. In the year commemorating the twenty-fifth anniversary of the opening for signature of the Convention, with more than three quarters of the members of the United Nations being also members of the Authority, the goal of universal participation is within reach. However, as noted in paragraph 5 above, a recurring problem for the Authority is poor attendance at the Assembly. This is a serious problem. It is not good for the Authority's standing and undermines the credibility of the Authority. Over the past few years considerable efforts have been made to rationalize the meetings of the Assembly and reduce their length and frequency, but these efforts have not had the effect of increasing the level of participation, which remains constant. As the number of members of the Authority grows, the required quorum becomes more difficult to achieve.