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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. It provides the usual detailed account of the work of the Authority over the past year as well as an overview of the outcomes of the 2008-2010 programme of work. The proposed programme of work for 2011-2013 is set forth in parts XII to XVIII of the report.

2. The Authority is the organization through which States parties to the Convention, 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 and other related provisions 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 of 10 December 1982 (the "1994 Agreement") 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.

3. The Authority has a number of additional specific responsibilities under other provisions of the Convention, 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, and the responsibility under articles 145 and 209 of the Convention to establish international rules, regulations and procedures to prevent, reduce and control pollution of the marine environment from activities in the Area, and to protect and conserve the natural resources of the



Area and prevent damage to the flora and fauna (that is, the biodiversity) of the marine environment.

II. Membership of the Authority

4. In accordance with article 156, paragraph 2, of the Convention, all States parties to the Convention are ipso facto members of the Authority. By 28 February 2010, there were 160 members of the Authority (159 States and the European Union). On the same date, there were 138 parties to the 1994 Agreement. Since the last report of the Secretary-General (ISBA/15/A/2), Switzerland (1 May 2009), the Dominican Republic (10 July 2009) and Chad (14 August 2009) have become parties to the Convention and the Agreement.

5. There are still 22 members of the Authority that became parties to the Convention prior to the adoption of the 1994 Agreement but have not yet become parties to that Agreement, namely: Angola, Antigua and Barbuda, Bahrain, Bosnia and Herzegovina, Comoros, Democratic Republic of the Congo, Djibouti, Dominica, Egypt, Gambia, Ghana, Guinea-Bissau, Iraq, Mali, Marshall Islands, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Sao Tome and Principe, Somalia, Sudan and Yemen. Although members of the Authority which are not parties to the 1994 Agreement necessarily participate in the work of the Authority under arrangements based on that 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 letter to all members in this position, urging them to consider becoming parties to the 1994 Agreement. In the last such letter, sent on 12 January 2010, attention was drawn to the relevant paragraphs of the report of the Secretary-General for 2009 (ISBA/15/A/2) and to operative paragraph 3 of General Assembly resolution 64/71, 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. The Secretary-General encourages all those members of the Authority that are not yet parties to the 1994 Agreement to become parties at the earliest possible opportunity.

III. Permanent missions to the Authority

6. As at 28 February 2010, the following 20 States and the European Union maintained permanent missions to the Authority: Argentina, Belgium, Brazil, Cameroon, Chile, China, Cuba, France, Gabon, Germany, Haiti, Italy, Jamaica, Mexico, Nigeria, Republic of Korea, Saint Kitts and Nevis, South Africa, Spain and Trinidad and Tobago.

IV. Previous session of the Authority

7. The fifteenth session of the Authority was held in Kingston from 25 May to 5 June 2009. Mario José Pino (Argentina) was elected President of the Assembly for the fifteenth session, and Mahmoud Samy (Egypt) was elected President of the Council. The work of the Assembly during the fifteenth session included a general debate on the annual report of the Secretary-General and the consideration of

applications for observer status by the World Wildlife Fund and the Commonwealth Secretariat. The Council continued its consideration of the outstanding issues with respect to the draft regulations on prospecting and exploration for polymetallic sulphides in the Area (see para. 66 below).

V. Protocol on the Privileges and Immunities of the Authority

8. The Protocol on the Privileges and Immunities of the International Seabed Authority entered into force on 31 May 2003. The Protocol, among other things, provides essential protection to representatives of members of the Authority who attend meetings of the Authority or who travel to and 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.

9. As at 28 February 2010, the number of parties to the Protocol was 31, as follows: Argentina, Austria, Brazil, Bulgaria, Cameroon, Chile, Croatia, Cuba, Czech Republic, Denmark, Egypt, Estonia, Finland, Germany, India, Italy, Jamaica, Mauritius, Mozambique, Netherlands, Nigeria, Norway, Oman, Poland, Portugal, Slovakia, Slovenia, Spain, Trinidad and Tobago, United Kingdom of Great Britain and Northern Ireland and Uruguay.

10. It is a matter of some concern that there have been no new ratifications of or accessions to the Protocol since February 2009. The Secretary-General would like to draw the attention of members of the Authority to operative paragraph 37 of General Assembly resolution 64/71, in which the Assembly called upon States that had not done so to consider ratifying or acceding to the Protocol.

VI. Relations with the host country

11. The refurbishment of the Jamaica Conference Centre, including the replacement of obsolete audio equipment and upgrading of sound and interpretation systems, was largely completed in time for the fifteenth session in 2009. The Secretary-General wishes to express his appreciation to the Government of Jamaica for its continued commitment to the future of the Jamaica Conference Centre.

12. With respect to the premises occupied by the secretariat as the permanent headquarters of the Authority, it is understood that the Government of Jamaica continues to promote the concept of an “International Seabed Authority House”, which would provide accommodation for all United Nations programmes and agencies based in Jamaica. At present, the only such agency located in the headquarters building is the United Nations Environment Programme (UNEP), which has occupied the third floor of the building for a considerable period. A perception of security problems has been one of the primary obstacles preventing the United Nations agencies in Jamaica from taking up the unused space at the Authority’s headquarters. In particular, they were concerned that the downtown Kingston area, including the Authority’s headquarters and the Jamaica Conference Centre, had been designated as “Security Phase I” areas requiring enhanced security measures. This concern was alleviated, however, when in January 2009 the Department of Safety and Security of the United Nations Secretariat declared the

whole of the island of Jamaica to be under Security Phase I, and thus subject to the same security measures as the downtown area.

13. In May 2009, the secretariat learned that the United Nations Educational, Scientific and Cultural Organization (UNESCO) had agreed to relocate its office in Jamaica to the headquarters building, but the move has yet to take place. It is considered that there would be considerable advantages in placing the secretariat of the Authority and the United Nations programmes and agencies in the same building. Such advantages would include potential cost savings for member States in terms of implementing the minimum operational security standards established periodically by the Department of Safety and Security, more effective contingency planning for natural disasters, and the possibility of enhancing staff morale through the provision of shared facilities.

VII. Relations with the United Nations and other international organizations

A. United Nations

14. The secretariat continued to maintain a good working relationship with the Department for General Assembly and Conference Management of the Secretariat. Under the Relationship Agreement between the United Nations and the International Seabed Authority, the Department provided conference services for every regular session of the Authority between 1996 and 2008. In 2009, the Department was regrettably unable to service the meeting of the Legal and Technical Commission, and alternative arrangements were made for interpretation to be provided by a firm based in Cuba. Since these arrangements were not only successful, but also resulted in considerable cost savings for the Authority, the same arrangements have been in place for the 2010 meeting of the Commission. At the same time, to avoid further problems in the future, the secretariat requested the United Nations as early as July 2008 to ensure that the Authority's needs be taken into account in planning the Calendar of United Nations Conferences and Meetings for 2010 and subsequent years. It is noted in this regard that bringing forward the annual session from August to May appears to have resulted in an improvement in the level of participation by member States.

15. The secretariat also maintains a cordial working relationship with the Division for Ocean Affairs and the Law of the Sea of the Office of Legal Affairs of the Secretariat and participates actively in UN-Oceans and its relevant working groups such as the United Nations-Oceans Task Force on Biodiversity in Areas Beyond National Jurisdiction.

B. Other international organizations

16. Both the Convention and the resolutions of the General Assembly on ocean affairs and the law of the sea emphasize the fact that activities in the oceans are interrelated and need to be considered as a whole. Better cooperation and coordination between international organizations with mandates over activities in the ocean is therefore essential, not only to ensure consistency of approach, but also to ensure comprehensive protection of the marine environment where necessary.

17. It is recalled that in 2008, the secretariat was contacted by the secretariat of the OSPAR Commission, a body established by the 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (“the OSPAR Convention”),¹ with respect to a proposal submitted to the Commission for the establishment of a marine protected area at the Charlie Gibbs Fracture Zone on the Mid-Atlantic Ridge. At their meeting held on 11 and 12 November 2008, the OSPAR heads of delegation acknowledged the mandate of the Authority as the competent organization to regulate deep seabed mining and welcomed a suggestion to develop a memorandum of understanding between the OSPAR Commission and the Authority in order to ensure appropriate coordination of measures between the two organizations. That proposal was further supported and welcomed by members of the Authority during the debate on the annual report of the Secretary-General at the fifteenth session.

18. Since the fifteenth session, the secretariat has discussed with the secretariat of the OSPAR Commission the content of a draft memorandum of understanding. A draft was circulated to OSPAR Contracting Parties in accordance with the procedures of the organization and was further considered at the meeting of the OSPAR Commission heads of delegation on 17 February 2010. Subject to editorial changes, OSPAR heads of delegation agreed that the proposed memorandum of understanding should be submitted to the Authority for approval at the sixteenth session. At the same time, the OSPAR Commission’s request for observer status in the Assembly (ISBA/16/A/INF.2) has been included in the provisional agenda of the sixteenth session of the Assembly (ISBA/16/A/L.1/Rev.1).

19. In 2009, following the 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, the Council was given a technical briefing on the work of the International Cable Protection Committee by its chairman, Mr. Mick Green. The Committee is the global organization representing the telecommunications and cable-laying industry. It exists to promote the safeguarding of submarine cables against man-made and natural hazards and provides a forum for the exchange of technical and legal information pertaining to submarine cable protection methods and programmes, including exchanging information on the location of existing and proposed cables.

20. In discussions following the presentation, members of the Authority noted that while the laying of submarine cables is a freedom of the high seas, it was in the interest of both the Authority and the members of the International Cable Protection Committee to avoid potential conflicts between the laying of cables and activities in the Area. It was further noted that both organizations also had a strong interest in the protection of the marine environment from adverse impacts arising from their respective activities. It was therefore suggested that the Committee be invited to become an observer to the Assembly.

21. Following further discussions between the secretariat and the International Cable Protection Committee, the Secretary-General signed on 15 December 2009 a memorandum of understanding between the Authority and the Committee regarding the scope of cooperation between the two organizations. The memorandum was signed on behalf of the Committee on 25 February 2010. The memorandum, which

¹ The parties to the OSPAR Commission are: Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland and the European Union.

confers reciprocal observer status to the two organizations, will be submitted to the Assembly for approval at the sixteenth session (see ISBA/16/A/INF.1, annex).

22. In September 2009, the Secretary-General and Legal Counsel of the Authority paid a courtesy visit to the International Tribunal of the Law of the Sea in Hamburg. The Secretary-General held informal consultations on the work of the Authority with the President of the Tribunal, Judge José Luis Jesus.

VIII. Secretariat

23. Two new staff members joined the secretariat in 2009. Mr. James A. R. McFarlane (United States of America) was appointed as head of the Office of Resources and Environmental Monitoring and Mr. Frazer Henderson (United Kingdom of Great Britain and Northern Ireland) was appointed as Editor.

24. As a result of the decision by the General Assembly to abolish, as of 1 July 2009, the joint appeals boards and, with effect from 31 December 2009, the United Nations Administrative Tribunal and to implement a new system for the administration of justice in the United Nations (see resolution 63/253), it is necessary for the Authority to make certain adjustments to its Staff Regulations and Rules. In particular, it is proposed to make amendments to the Staff Regulations of the Authority in order to recognize the competence of the newly established United Nations Appeals Tribunal to hear and pass judgment on applications filed by staff members of the Authority, and to reflect a number of other changes that have been made to the Staff Regulations of the United Nations since the Staff Regulations of the Authority were adopted in 2001. A note by the Secretary-General on the proposed changes has been prepared for consideration by the Council during the sixteenth session (ISBA/16/C/4).

IX. Budget and finance

A. Budget

25. The budget for the financial period 2009-2010 was approved by the Assembly at the fourteenth session in the amount of \$12,516,500 (ISBA/14/A/8). That represented an increase of 6.2 per cent over the budget for the previous financial period. The proposed budget for the financial period 2011-2012 (ISBA/16/A/3-ISBA/16/C/2) will be presented to the Finance Committee for consideration at the sixteenth session.

B. Status of contributions

26. 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 is based on the scale used for the regular budget of the United Nations, adjusted for differences in membership, with a ceiling assessment rate of 22 per cent and a floor assessment rate of 0.01 per cent. As at 1 March 2010, 52.8 per cent of the value of contributions to the 2010 budget due from member

States and the European Union had been received from 46 members of the Authority.

27. Contributions outstanding from member States for prior periods (1998-2009) totalled \$340,751. 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 March 2010, 46 members of the Authority were in arrears for a period of two years or more: Belarus, Belize, Benin, Bolivia, Burkina Faso, Cape Verde, Comoros, Cook Islands, Côte d'Ivoire, Cuba, Democratic Republic of the Congo, Djibouti, Dominica, Equatorial Guinea, Fiji, Gambia, Grenada, Guinea, Guinea-Bissau, Honduras, Iraq, Lesotho, Madagascar, Maldives, Mali, Mauritania, Micronesia (Federated States of), Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Republic of Moldova, Saint Lucia, Saint Vincent and the Grenadines, Sao Tome and Principe, Seychelles, Sierra Leone, Solomon Islands, Somalia, Sudan, Togo, Tonga, Vanuatu, Zambia and Zimbabwe.

28. Also as at 1 March 2010, the balance of the Working Capital Fund stood at \$438,145, exceeding its approved ceiling of \$438,000 by \$145.

C. Voluntary Trust Fund

29. The Voluntary Trust Fund to enhance the participation of members of the Finance Committee and the Legal and Technical Commission from developing countries was established in 2002. 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).

30. The Fund is made up of voluntary contributions from members of the Authority and others. Over the life of the Fund, contributions totalling \$178,318 have been received into the Fund. The most recent contribution, in December 2009, was from China (\$20,000). As at 1 March 2010, the balance of the Voluntary Trust Fund stood at \$83,913, including accrued interest of \$6,574. The total amount paid out of the Fund to date is \$255,979.

X. Endowment Fund for Marine Scientific Research in the Area

31. The International Seabed Authority Endowment Fund for Marine Scientific Research in the Area was established by the Assembly in resolution ISBA/12/A/11 of 16 August 2006. The Endowment Fund aims 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, including through training, technical assistance and scientific cooperation programmes.

32. In accordance with the resolution of the Assembly, the initial capital of the Endowment Fund (\$2,631,803) was derived from application fees paid under resolution II of the Third United Nations Conference on the Law of the Sea by seven former registered pioneer investors that have since entered into contract with the Authority. Additional contributions to the Fund may be made by the Authority, members of the Authority, other States, relevant international organizations, academic, scientific and technical institutions, philanthropic organizations and private persons. Since its establishment, additional contributions to the Fund have been made by the Governments of Germany (\$250,000), Mexico (\$2,500), Norway (\$250,000), Spain (\$25,514) and the United Kingdom of Great Britain and Northern Ireland (\$29,800). By December 2009, the capital of the Fund stood at \$3,202,440, with accumulated interest of \$360,136.

33. In 2007, the Assembly, on the recommendation of the Finance Committee, adopted detailed rules and procedures for the administration and utilization of the Endowment Fund (ISBA/13/A/6). These rules and procedures provide comprehensive guidance on making applications for assistance from the Fund, the information that must be submitted, the type of activities that are eligible for funding, and the dissemination and reporting of the outcomes of marine scientific research programmes and scientific cooperation programmes. Applications for assistance from the Fund may be made by any developing country or by any other country if the purpose of the grant is to benefit scientists from developing countries.

34. Pursuant to the agreed procedures, an advisory panel was appointed by the Secretary-General in March 2008 to evaluate applications for assistance from the Fund. The Panel is composed of permanent representatives to the Authority, representatives of educational institutions or international organizations and individuals closely associated with the work of the Authority. The members of the Panel were appointed with due regard to equitable geographic representation. The names of the persons appointed to the Advisory Panel are set forth in the annex to the present report.

35. The Endowment Fund is administered by the secretariat of the Authority, which is required to endeavour to make arrangements with universities, scientific institutions, contractors and other entities for opportunities for scientists from developing countries to participate in marine scientific research activities. Such arrangements may include the reduction or waiver of fees for training. The secretariat has carried out a number of activities designed to draw the attention of the international donor community to the opportunities offered by the Fund and to encourage additional contributions. These activities include issuing press releases and promotional materials, maintaining a specially designed page on the Authority's website at <http://www.isa.org.jm/en/efund>, and establishing a network of cooperating institutions that may be interested in offering places on courses or research opportunities. Members of the network to date include the National Oceanography Centre (United Kingdom); the National Institute of Ocean Technology (India); the French Research Institute for Exploitation of the Sea (IFREMER); the Federal Institute for Geosciences and Natural Resources (Germany); the National Institute of Oceanography (India); the Natural History Museum (United Kingdom); Duke University, North Carolina (United States of America); and the International Cooperation in Ridge-crest Studies (InterRidge), an international, non-profit organization promoting interdisciplinary studies of oceanic spreading centres.

36. To date, a total of \$254,312 has been disbursed by the Endowment Fund through six awards for activities that promote capacity-building. A total of 16 scientists from developing countries have been recipients of financial support, with the names and nationalities of a further seven yet to be finalized at the time of preparation of the present report. The recipients to date are from Argentina, Bangladesh, China, Egypt, Guyana, India, Indonesia, Mauritania, Nigeria, Papua New Guinea, the Philippines, Sri Lanka, Thailand and Viet Nam. Each of the recipients has been able to participate in international training programmes or in research projects, which would not have been possible without the assistance of the Fund.

37. The first award to be made from the Endowment Fund was a grant of \$30,000 to InterRidge to contribute towards the funding of two marine science fellowships each year for the period 2009-2011. Under the programme, and in accordance with the terms of reference of the Endowment Fund, these fellowships are available only to graduate or postdoctoral students from developing countries. A further fellowship, fully funded by InterRidge, is available to a similar individual from any country. The fellowships can be used for any field of ridge-crest science. In particular, the awards are encouraged to be used for international cruise participation, international laboratory use, and for adding an international dimension to candidates' research work. For example, one fellowship was granted in 2009 to a candidate from India in order to analyse helium isotopes in water samples collected in a systematic survey of the Carlsberg Ridge in the Indian Ocean. Applications for the 2010 fellowships were opened to candidates in January 2010.

38. In March 2009, an award of €25,000 was made to the Rhodes Academy of Oceans Law and Policy to help fund a number of fellowships for students from developing countries and to expand the Academy's training programme to cover issues relating to deep seabed marine science. The Rhodes Academy was founded in 1995 and entails an intensive, three-week course of study, with lectures by leading jurists, practitioners and international law faculty from around the world. It is a cooperative undertaking sponsored jointly by the Centre for Oceans Law and Policy (University of Virginia, Charlottesville, United States of America), the Aegean Institute of the Law of the Sea and Maritime Law (Rhodes, Greece), the Law of the Sea Institute of Iceland (Reykjavik), the Max Planck Institute for Comparative Public Law and International Law (Heidelberg, Germany), and the Netherlands Institute for the Law of the Sea (Utrecht, the Netherlands). More than 400 students from 96 different countries have graduated from the Academy since its establishment. A total of nine participants benefited from the support of the Endowment Fund in 2009, and they are now better equipped to build the capacity of their home countries in the areas of the law of the sea and marine science.

39. In 2009, the National Institute of Oceanography (NIO) in India was provided with assistance to train scientists from developing countries through the Technical Assistance Programme-Marine Scientific Research (TAP-MAR). This enabled three scientists from developing countries, Ms. Alejandra Mariana Rocha (Argentina), Mr. Olubunmi Nubi (Nigeria) and Mr. Niroshana Wickramaarachchi (Sri Lanka), to gain new skills and carry out individual, supervised research projects at the Institute. During the training programme, the participants were acquainted with topics related to the exploration of deep seabed minerals, resource evaluation, marine ecosystems and biodiversity-inclusive environmental impact assessment of offshore projects. They were also given hands-on experience with live projects in relevant areas and

training in laboratory and field techniques through visits to sites of marine significance. It is hoped that as a result of this training, research programmes between the trainees, their institutions and NIO will be developed that enable additional and ongoing capacity-building.

40. A further award from the Endowment Fund is currently enabling a researcher from Papua New Guinea to perform research at Duke University in North Carolina, United States of America, to develop conservation strategies for sea floor massive sulphide ecosystems. The study will focus on the genetic diversity of selected marine invertebrate taxa from the Manus basin in the Bismarck Archipelago near Papua New Guinea, and will cover the population structure and classification of species. It is hoped that information generated by this study will help to develop knowledge and understanding of these ecosystems and increase the capacity of Papua New Guinea to employ appropriate marine conservation strategies.

41. The Advisory Panel has also recommended the award of financial support from the Fund for the participation of two Indian scientists in a multidisciplinary investigation aimed at expanding current knowledge of the geology of the Shag Rock Passage on the North Scotia Ridge. The programme of scientific research will create a network, across two continents, of cooperating scientists that share the same scientific goals. In addition, the project will facilitate the transfer of geochemical analytical skills to scientists from a developing country. The linking of these scientists will build capacity by enabling them to share and develop the skills, knowledge and expertise they have gained within their chosen fields of marine scientific research, which they will be able to pass on to other scientists in their home country.

42. During 2010, the China Ocean Mineral Resources Research and Development Association (COMRA) will carry out an international cooperative study of the sea floor hydrothermal system in the Indian Ocean. The study will focus on the geology and geochemistry of the Southwest Indian Ridge. As part of this programme, the Endowment Fund will provide funding for the participation of two scientists from developing countries in the research cruise. A capacity-building workshop will also be held. It is expected that this collaboration will result in a future international cooperative project between COMRA and the Authority, which would involve a large component of capacity-building. At the time of preparation of the present report, member States of the Authority have been invited to nominate qualified scientists to participate in this programme.

43. The secretariat of the Authority will continue to take steps to generate interest in the Endowment Fund on the part of potential donors and institutional partners. In this regard, it is noted that in operative paragraph 11 of its resolution 64/71, the General Assembly called upon “States and international financial institutions, including through bilateral, regional and global cooperation programmes and technical partnerships, to continue to strengthen capacity-building activities, in particular in developing countries, in the field of marine scientific research by, inter alia, training personnel to develop and enhance relevant expertise, providing the necessary equipment, facilities and vessels and transferring environmentally sound technologies”. The importance of capacity-building to facilitate the participation of developing countries in marine scientific research, particularly through the mechanism of the Endowment Fund, was also highlighted in the recommendations adopted by the Ad Hoc Open-ended Informal Working Group of the General

Assembly to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction, held in New York from 1 to 5 February 2010 (see A/65/68, annex I).

44. The Secretary-General wishes to encourage members of the Authority, other States, relevant international organizations, academic, scientific and technical institutions, philanthropic organizations, corporations and private persons to contribute to the Endowment Fund, which is one of the key mechanisms for enabling capacity-building in the field of marine scientific research in the deep ocean.

XI. Library, publications and website

A. Satya N. Nandan Library

45. The Satya N. Nandan Library serves as the main information resource for the secretariat, and for member States and other individuals or institutions looking for specialist information on seabed resources and legal and political issues relating to the deep seabed. 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. It 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.

46. The facilities available in the Satya N. Nandan Library include a reading room with access to the collection for reference purposes and computer terminals for e-mail and Internet access. The specialized research capability of the existing collection continues to improve through an acquisitions programme that is aimed at building upon and strengthening the Library's comprehensive collection of reference materials. During the reporting period, 78 books and CD-ROMs and over 360 journal issues were acquired. A number of donations were received from institutions, libraries and individuals, including from the Division for Ocean Affairs and the Law of the Sea of the Office of Legal Affairs of the United Nations Secretariat, the International Tribunal for the Law of the Sea, UNESCO, UNEP, the United Nations Development Programme (UNDP), the Food and Agriculture Organization of the United Nations (FAO), the United States Institute of Peace, the Center for Oceans Law and Policy, University of Virginia, and the Ministry of Transport and Communication of Ukraine.

47. During the period under review, the Library continued to receive requests for copies of the publications and documents of the Authority. The Library also continued to respond to requests for information, and to offer guidance on sources of information on subject areas related to the activities of the Authority, the international law of the sea and deep seabed mining, from institutions, non-governmental organizations, academics, government departments and the general public. Some of the areas for which requests were received included: general information on the current activities and the functions of the Authority; law of the sea conferences; rights to the Arctic; fishing and navigation in the north-west

passage; sustainable mining of sea floor massive sulphide deposits; methane hydrates and the work of the Authority in this area; the establishment of the Enterprise; and general information on sea floor massive sulphide deposits. Most requests are received electronically. Requests came from individuals from a number of countries including Algeria, India and the United States of America, and from a variety of academic and research institutions including Queen's University, Canada; the German Institute for International and Security Affairs (Stiftung Wissenschaft und Politik); the Law of the Sea and Maritime Law Institute, University of Hamburg, Germany; the National Institute of Oceanography, India; Larsen & Toubro Limited, Marine Business, Heavy Engineering Division, India; the University of Tromsø library, Norway; the Commonwealth Secretariat; the Ministry of Transport and Communication of Ukraine; Associated Press, Boston, Massachusetts, United States of America; the University of Wyoming, United States of America; the UNDP Water Governance Programme for United Nations World Oceans Day 2009; and from Jamaica, the Caribbean Maritime Institute; the Attorney-General's Department; the National Environment and Planning Agency; the Ministry of Foreign Affairs and Foreign Trade; the University of Technology; and the Departments of Government, Language and Linguistics, and Geography and Geology of the University of the West Indies.

48. The Library also hosted three postgraduate students from the University of the West Indies, Department of Language and Linguistics, conducting research towards the development of multilingual terminology glossaries on select areas relating to the International Seabed Authority and the United Nations Convention on the Law of the Sea.

49. While significant progress has been made in archiving unique source material and in establishing a basic library catalogue that is accessible to all users, it is clear that more work is now needed to maximize the possibilities offered by electronic information technology. Over the period of the 2011-2013 work programme, the Library will move towards providing a fully electronic resource for staff and visitors to the Authority, including representatives to the annual sessions. This will require the establishment of a dedicated Intranet page that enables staff and visitors to access the library catalogue and the full range of online subscriptions maintained by the Library.

B. Publications

50. 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, inter alia, 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. The secretariat also circulates a quarterly newsletter designed to keep member States and other stakeholders informed of new initiatives and current developments with respect to the Authority's programme of work. The newsletter is available via an electronic mailing list or may be downloaded from the Authority's website. So far, more than 150 individuals have subscribed to the mailing list.

51. The Authority also publishes the proceedings of its workshops and a range of specialized legal and technical reports. Publications issued during the period covered by the present report include the proceedings of the March 2006 international Workshop on Cobalt-rich Crusts and the Diversity of Distribution Patterns of Seamount Fauna, the proceedings of the May 2003 Workshop on the Establishment of a Geological Model of Polymetallic Nodule Resources in the Clarion-Clipperton Fracture Zone (CCZ) of the Equatorial North Pacific Ocean, and ISA Technical Study No. 4, entitled “Issues associated with the implementation of article 82 of the United Nations Convention on the Law of the Sea”. The Authority’s website hosts a complete list of all current and forthcoming publications.

C. Website

52. The Authority’s website contains essential information on the activities of the Authority, primarily in English, French and Spanish. The texts of all the official documents and decisions of the organs of the Authority are available in the six official languages of the United Nations. Press releases are available in English and French. The Authority’s workshop proceedings, technical reports and other publications are also published electronically in downloadable format. The website also provides users with access to specialized databases, such as the Central Data Repository, a bibliographical database and the library catalogue, as well as an Internet-based geographical information system that allows the interactive production of some maps.

53. One of the goals of the Authority is to develop educational resources and opportunities for students interested in the marine environment, marine mineral development, marine policy and law, science and technology. As part of the outreach programme, it is also proposed to set up a marine mineral museum at the Authority’s headquarters. The museum exhibits would be housed on the ground and first floors of the headquarters building, using space that is presently unused. It is considered that such a resource would be of interest to the local community in Jamaica as well as representatives of member States attending meetings in Kingston. This activity would not be funded from the regular administrative budget; the secretariat will seek generous contributions from member States and contractors to establish the museum.

XII. Overview of the substantive programme of work of the Authority for the period 2008-2010 and proposed programme of work for the period 2011-2013

54. It should be recalled that the substantive functions of the Authority derive exclusively from the Convention, particularly Part XI, and the 1994 Agreement. Pending the approval of the first plan of work for exploitation, the Authority is to concentrate on the 11 areas of work listed in paragraph 5 of section 1 of the annex to the 1994 Agreement. In view of the limited resources available to the Authority, the relative priority to be given to each of these areas of work is dependent on the pace of development of commercial interest in deep seabed mining.

55. The substantive programme of work of the Authority for the period 2008-2010 was presented to and approved by the Assembly at the thirteenth session in 2007 (see ISBA/13/A/2). The approved programme of work was based on the implementation of subparagraphs (c), (d), (f), (g), (h), (i) and (j) of paragraph 5 of section 1 of the annex to the 1994 Agreement, in particular the following main areas:

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

(b) Monitoring of trends and developments relating to deep seabed mining activities, including world metal market conditions and metal prices, trends and prospects;

(c) 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;

(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 contractors and the international scientific community;

(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;

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

56. For the period 2011-2013, the work programme will continue to focus primarily on the scientific, technical, legal and policy work necessary to carry out the functions of the Authority under the Convention and the 1994 Agreement. In addition, the general and specific routine tasks described above in connection with the work of the secretariat will continue to be performed.

57. The following sections of the present report provide an indication of the main areas of work to be addressed during the period 2011-2013, as well as a summary of progress and developments in relation to the 2008-2010 work programme. Although many items are interrelated, for ease of reference the proposed work programme is organized thematically around the following major substantive work streams, reflecting the provisions of paragraph 5 of section 1 of the annex to the 1994 Agreement:

(a) Ongoing supervision of contracts for exploration and award of new contracts as necessary;

(b) Progressive development of the regulatory regime for activities in the Area;

(c) Monitoring of trends and developments relating to deep seabed mining activities, including world metal market conditions and metal prices, trends and prospects;

- (d) Collection and assessment of data from prospecting and exploration and analysis of the results;
- (e) Promotion and encouragement of marine scientific research in the Area;
- (f) Database development.

XIII. Ongoing supervision of contracts for exploration and award of new contracts as necessary

58. At the core of the Authority's functions as the organization through which States parties to the Convention administer the resources of the Area is the responsibility to approve and issue contracts to qualified entities wishing to explore for or exploit deep-sea mineral resources. The contractual nature of the relationship between the Authority and those wishing to conduct activities in the Area is fundamental to the legal regime established by Part XI of the Convention and the 1994 Agreement. Annex III to the Convention, which sets out the "Basic Conditions of Prospecting, Exploration and Exploitation", also forms an integral part of this legal regime, which is to be further elaborated in the rules, regulations and procedures adopted by the Authority.

59. Pursuant to section 1, paragraph 15, of the annex to the 1994 Agreement, as read with articles 153 and 162(2) (o) (ii) of the Convention, the Council may undertake the elaboration of such rules, regulations and procedures as may be necessary to facilitate the approval of plans of work for exploration or exploitation for seabed minerals any time it deems that such rules are required for the conduct of activities in the Area, or whenever it determines that commercial exploitation is imminent, or at the request of a State whose national intends to apply for approval of a plan of work for exploitation. To date, the Council has adopted Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area (ISBA/6/A/18, annex) and, having been requested by a State to do so, is in the process of elaborating rules, regulations and procedures governing prospecting and exploration for polymetallic sulphides and cobalt-rich crusts in the Area. In addition to specifying the process through which contracts may be applied for and granted, these rules, regulations and procedures set out the standard terms and conditions, applicable to all entities, of contracts with the Authority.

A. Status of contracts for exploration

60. There are at present eight contractors for exploration for polymetallic nodules in the Area. These are: Yuzhmorgeologiya (Russian Federation); Interoceanmetal Joint Organization (IOM) (Bulgaria, Cuba, Czech Republic, Poland, Russian Federation and Slovakia); the Government of the Republic of Korea; China Ocean Mineral Resources Research and Development Association (COMRA) (China); Deep Ocean Resources Development Ltd. (DORD) (Japan); IFREMER (France); the Government of India; and the Federal Institute for Geosciences and Natural Resources of Germany (BGR). The first six contracts were signed in 2001; the contract with the Government of India was signed in 2002 and the contract with BGR was signed in 2006.

61. The rules, regulations and procedures of the Authority contain prescriptive requirements relating to the relationship between the Authority (represented by the Secretary-General) and contractors. These include, inter alia, time-sensitive reporting requirements. The regulations are supplemented by recommendations for guidance issued from time to time by the Legal and Technical Commission. In accordance with the terms of their contracts, each contractor is under an obligation to submit an annual activity report. Annual reports are due every year on 31 March. The objective of the reporting requirement is to establish a mechanism whereby the Secretary-General and the Legal and Technical Commission are properly informed of the contractors' activities so as to be able to exercise their 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, in 2002 the Commission recommended a format and structure of annual reports (see ISBA/8/LTC/2, annex), including a standardized content 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 for exploration contract set out in annex 4 to the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area (see ISBA/6/A/18, annex). Additional assistance for contractors in preparing their annual reports appears in the Recommendations for the guidance of the 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 (ISBA/7/LTC/1/Rev.1).

62. In 2009, the Commission decided to promulgate further Recommendations for the guidance of contractors for the reporting of actual and direct exploration expenditures as required by annex 4, section 10, of the Regulations (ISBA/15/LTC/7). The purpose of these recommendations is to provide guidance to contractors in relation to the books, accounts and financial records to be maintained in accordance with the Regulations, the identification of internationally accepted accounting principles, the format for the presentation of financial information in the annual report, the definition of the actual and direct costs of exploration, and the form of certification of actual and direct exploration expenditures.

63. 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.

B. Pending applications for contracts for exploration

64. In 2008, the Authority received two new applications for approval of plans of work for exploration for polymetallic nodules in reserved areas within the Clarion-Clipperton fracture zone of the Central Pacific Ocean. These applications were submitted by Nauru Ocean Resources, Inc. (sponsored by the Republic of Nauru) and Tonga Offshore Mining Ltd. (sponsored by the Kingdom of Tonga). In

accordance with the Regulations, the applications were considered by the Legal and Technical Commission during the fourteenth session. As the Commission was unable to complete its consideration of these applications during that session, the matter was carried over to the fifteenth session. Prior to the fifteenth session, however, the Commission was informed, in a letter dated 5 May 2009 and addressed to the Legal Counsel of the Authority, that the applicants had requested that consideration of their applications be postponed for a number of reasons that were set out in the letter. The Commission took due note of the request and decided to defer further consideration of this item until further notice. At the time that the present report is being compiled, the applications remain pending.

XIV. Progressive development of the regulatory regime for activities in the Area

65. Notwithstanding continued uncertainty in the prospects for commercial production of metals from deep seabed mining, the Authority has an important role to play in ensuring that an appropriate regulatory regime is established, in accordance with the Convention and the 1994 Agreement, that provides adequate security of tenure for future exploration for and exploitation of the mineral resources of the Area, while ensuring effective protection for the marine environment. It has always been envisaged that this regulatory regime would ultimately be encapsulated in a Mining Code, which would be the whole of the comprehensive set of rules, regulations and procedures issued by the Authority to regulate prospecting, exploration and exploitation of marine minerals in the Area. The Mining Code, however, is not yet complete. To date, the Authority has issued Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area and is in the process of adopting similar regulations on prospecting and exploration for polymetallic sulphides and cobalt-rich ferromanganese crusts (see section A below). One of the main problems for potential investors, however, is that no detailed regulations for the exploitation of the resources of the Area are yet in place, which makes commercial exploitation of these resources very difficult to contemplate.

66. While it may be considered premature to develop such regulations immediately, if the matter is to be addressed in the medium term, it is necessary to commence in-depth studies and analyses of the issues involved from both legal and economic perspectives now, while at the same time exercising caution not to exceed the mandate prescribed by the 1994 Agreement. Within these constraints, it is envisaged that over the period of the 2011-2013 work programme, the secretariat may commission a preliminary study of some of the issues associated with developing an exploitation code. That may include, for example, studies of relevant experience from offshore oil and gas development, as well as comparison studies of fiscal regimes for land-based mining.

A. Regulations on prospecting and exploration for polymetallic sulphides and cobalt-rich ferromanganese crusts in the Area

67. The Council will resume its work on the revised draft regulations on prospecting and exploration for polymetallic sulphides at the sixteenth session. It

will be recalled that during the fifteenth session, the Council considered a number of outstanding issues with respect to the draft regulations. As a result of its discussions, the Council reached agreement on revisions to the following draft regulations: 21(3); 24(1); 28; and 45(3), and to the following provisions of annex 4 to the draft regulations: section 17.3; section 21.1 bis; and section 25.2. At the conclusion of the session, the secretariat issued a revised text of the draft regulations incorporating the revisions on which agreement had been reached (ISBA/15/C/WP.1/Rev.1). The Council was not able to complete its consideration of proposed revisions to regulations 12(5) and 23 dealing with, respectively, anti-monopoly and overlapping claims, and it was agreed to continue discussion of these issues at the sixteenth session with a view to finally adopting the draft regulations.

68. With respect to the draft regulations on prospecting and exploration for cobalt-rich ferromanganese crusts in the Area, it will be recalled that the Legal and Technical Commission began consideration of the draft regulations during the thirteenth session, in 2007, in accordance with a request made by the Council in 2006, the Commission having previously submitted (in 2004) draft regulations on prospecting and exploration for both cobalt-rich crusts and polymetallic sulphides. At the twelfth session, in 2006, the Council decided to separate the draft regulations dealing with cobalt-rich crusts from those dealing with polymetallic sulphides. The former were to be remitted to the Commission for further and more detailed consideration in the light of the discussions that had taken place in the Council in 2005 and 2006, as well as any new or updated technical information that may have become available. The Commission worked on the draft regulations at the thirteenth, fourteenth and fifteenth sessions. At the fifteenth session, the Commission decided to adopt a revised text of the draft regulations as its recommendation to the Council, noting that the text adopted by the Commission had been fully aligned with the adjustments to the text of the draft regulations on polymetallic sulphides agreed by the Council in 2007 and 2008. The text adopted by the Commission has been submitted to the Council under the symbol ISBA/16/C/WP.2.

B. Implementation of article 82, paragraph 4, of the Convention

69. As noted in paragraph 3 of the present report, one of the specific responsibilities of the Authority under article 82, paragraphs 1 and 4, of the Convention is the responsibility to distribute to States parties to the Convention the payments or contributions in kind derived from exploitation of the non-living resources of the continental shelf extending beyond 200 nautical miles from the baselines of the territorial sea (the “outer continental shelf”).

70. Under article 82 of the Convention, States or individual operators who exploit the non-living resources of the outer continental shelf are required to contribute a proportion of the revenues they generate from such exploitation for the benefit of the international community as a whole. This proportion is defined as 1 per cent of the value or volume of production at the site, rising by 1 per cent annually until it reaches 7 per cent, at which level it remains. Article 82, paragraph 4, gives the Authority responsibility for distributing these revenues “on the basis of equitable sharing criteria, taking into account the interests and needs of developing States, particularly the least developed and the land-locked among them”. As the competent international institution to administer article 82 payments and contributions, it is

reasonable to expect that the Authority should anticipate and take steps towards the implementation of this provision.

71. In February 2009, the Authority collaborated with the Royal Institute of International Affairs (Chatham House), United Kingdom of Great Britain and Northern Ireland, an independent policy research institution, in convening a seminar as a preliminary step in the exploration of issues associated with the implementation of article 82. As part of this work, the Authority commissioned two studies dealing with the legal and policy issues associated with the implementation of article 82, and the technical and resource issues associated with the outer continental shelf, respectively. During the seminar, legal, economic, technical and policy experts from the International Tribunal for the Law of the Sea (ITLOS), the Organization of the Petroleum Exporting Countries (OPEC), the private sector and academia reviewed the studies and provided commentaries on specific aspects of the issues concerned. The two studies commissioned by the Authority were revised in the light of the views of the experts participating in the seminar and have since been issued as ISA Technical Studies No. 4 (published December 2009) and No. 5 (publication due April 2010).

72. Among the conclusions of the seminar were that, notwithstanding current global economic conditions, exploitation of non-living resources on the outer continental shelf is moving inexorably closer, particularly in relation to hydrocarbons. Other resources of potential significance include gas hydrates, which are abundant. It can be realistically anticipated that the first commercial production of resources from the outer continental shelf will occur by 2015.² It was further noted that the implementation of article 82 raises practical issues for the Authority as well as for individual producer States. Among the key issues for the Authority are how it should interact with producer States and how it should devise a scheme for the distribution of potential payments and contributions. In view of the long lead time needed for mineral development projects, it would be important to address these issues well before the commencement of commercial production from the outer continental shelf.

73. One of the critical impediments to the development of non-living resources on the outer continental shelf is the process of determining the extent of that area. The procedure for the definition of the outer limit of the continental shelf is set out in article 76 of the Convention and includes consideration by the Commission on the Limits of the Continental Shelf, an expert international body established in that instrument for this purpose. On completion of this procedure, including taking into consideration the recommendations of the Commission, if any, a coastal State can establish the outer limits of its continental shelf, which shall then be final and binding. It is estimated that between 60 and 70 coastal States may have claims to areas of continental shelf beyond 200 nautical miles. As of January 2010, 51 submissions in respect of potential continental shelf areas beyond 200 nautical miles had been deposited with the Commission, and a further 44 preliminary indicative notifications of potential claims had been deposited with the Secretary-General of

² See ISA Technical Study No. 5 (2010), “Non-living Resources of the Continental Shelf Beyond 200 Nautical Miles: speculations on the implementation of article 82 of the United Nations Convention on the Law of the Sea”.

the United Nations in accordance with the procedures agreed by the Meeting of States Parties to the Convention (SPLOS/183).³

74. An obvious difficulty for the Authority and its member States is that, until the precise delineation of all areas of continental shelf beyond 200 nautical miles is known, the geographic limits of the Area cannot be established with any certainty. For this reason, article 84, paragraph 2, of the Convention requires coastal States to give due publicity to charts or lists of geographical coordinates of the outer limit lines of the continental shelf and, in the case of those extending beyond 200 nautical miles, to deposit a copy of such charts or lists with the Secretary-General of the Authority. This requirement is in addition to the requirement under article 76, paragraph 9, of the Convention to deposit such charts or lists, as well as other relevant information, with the Secretary-General of the United Nations. In this regard, the Secretary-General is pleased to inform the Assembly that, on 21 October 2009, Mexico became the first member of the Authority to formally notify the Secretary-General that it had deposited charts and other relevant information on the outer limit of its continental shelf with respect to the western polygon in the Gulf of Mexico. The Authority estimates that the delineation of all pending claims to areas of outer continental shelf will, unfortunately, be a lengthy process. Nevertheless, article 84, paragraph 2, of the Convention is an important provision which is designed to facilitate the effective administration of the Area for the benefit of all States. Members of the Authority are thus encouraged to observe the provisions of article 84, paragraph 2, as soon as possible after the outer limits of the continental shelf have been established in accordance with the other provisions of the Convention.

75. In the context of the programme of work for the period 2011-2013, and as a follow-up to the Chatham House seminar held in 2009, it is proposed to convene an expert group meeting involving representatives of member States, members of the Legal and Technical Commission and other relevant experts, to consider and help to prepare draft recommendations to the Council and the Assembly on the implementation by the Authority of article 82, paragraph 4, of the Convention.

XV. Monitoring of trends and developments relating to deep seabed mining activities, including world metal market conditions and metal prices, trends and prospects

76. As in other sectors, the ocean mining industry continues to suffer from the world economic downturn and its effect on mineral prices. However, there are limited signs that the market for the traditional metals of interest obtainable from seabed minerals, particularly nickel and cobalt, is in a recovery phase. In particular, the global market structure for cobalt has changed drastically over the past few years. Unlike in previous years, when it was a by-product of other operations, cobalt is now being manufactured separately as new end-use applications have emerged and the commodity price has continued to increase. The global market for nickel is driven primarily by demand in emerging economies, which can be expected to increase rapidly once these economies move out of recession. Furthermore, several experts have recently suggested that the presence of rare earth elements, such as

³ See http://www.un.org/Depts/los/clcs_new/commission_submissions.htm.

gallium, indium and tellurium, in marine mineral deposits may become a driving force for exploration for and mining of these deposits as the demand for rare earth elements in emerging technologies increases and supply tightens.

77. Overall, however, it is clear that the global economic crisis has contributed to further delay in the advancement of commercial mining. The private seabed exploration and mineral development company, Neptune Minerals, for example, was delisted from the Alternative Investment Market of the London Stock Exchange in February 2009 and began a restructuring effort. Since then, senior management has been replaced and the company is in the process of raising additional funding to continue its operations. Despite this, the company has maintained its 100 per cent interest in 25 prospecting licences for sea floor massive sulphide deposits. These prospecting licences are located in the continental shelves of New Zealand, the Federated States of Micronesia, Papua New Guinea and Vanuatu, and total over 278,000 square kilometres of sea floor.⁴

78. Another private corporation, Nautilus Minerals, Inc., cancelled all of its capital equipment expenditures in December 2008. However, that did not stop the company from moving ahead with further exploration and research of possible mine sites. It is particularly notable that Nautilus Minerals has invested in the development of new target generation techniques and technology for locating and identifying sea floor massive sulphide deposits. These new methodologies have improved the company's success ratio in identifying probable new sites. The Solwara sites located in the Bismarck Sea in the territorial waters of Papua New Guinea and under licence to Nautilus were subject to further exploratory drilling in late 2008 and through 2009. The mineral results were found to be positive, with many of these areas characterized as high grade zones. In conjunction with its partner, Teck Resources, a major Canadian mining company, Nautilus has also discovered additional dormant sea floor massive sulphide deposits in the Bismarck Sea, bringing the total identified sites in this area to 18.

79. In 2009, Nautilus also received its final environmental permit for the Solwara 1 site from the Department of Environment and Conservation of Papua New Guinea. The permit is valid for a term of 25 years, expiring in 2035. Nautilus also secured an agreement for port capacity at Rabaul, Papua New Guinea, for 1.5 million tons of ore per year with an option to begin operations in January 2012. Nautilus and Teck Resources also report that they have established that there are at least four commercially viable sea floor massive sulphide sites around Tonga: at Maka and Tunu-Sosisi (comprising three subsystems), and Pia and Niua (comprising two subsystems).

A. Trends in demand for rare earth elements used in emerging technologies and the potential impact on seabed mining

80. During the Authority's workshop on the results of the project to develop a geological model of polymetallic nodule formation in the Clarion-Clipperton zone (see part XVI), held in December 2009 in Kingston, a number of experts recommended that a market-oriented study be commissioned to help the international community to assess the economic potential of trace elements

⁴ Source: Nautilus Minerals, Inc. website at <http://www.nautilusminerals.com>.

contained in sea floor deposits. These rare earth elements and other trace metals have recently been receiving an increasing amount of attention from potential investors and the international press. Major television stations and newspapers worldwide, especially in the United States of America, have recently taken up the issue of the effect of possible shortages in the supply of these raw materials.⁵

81. The increased awareness of rare commodities (other than major elements like nickel and copper) potentially obtainable from sea floor deposits is based on several circumstances. First, emerging technologies, especially so-called “green technologies” such as hybrid cars, wind turbines and battery systems, require enormous amounts of rare earth elements, resulting in an impending increase of the commodity prices of, for example, dysprosium, neodymium and europium. The availability of sufficient quantities of these elements at moderate cost is closely related to the broader context of renewable energies, carbon dioxide emission reduction and climate change; the supply of certain key elements may become an enabling or prohibitive factor for future “clean technologies”. Second, besides energy and transport technologies, rare earth elements are used increasingly in electronics and other applications, including military technologies. The term “spice metals” has been coined, which refers to the fact that these metals are sprinkled like spices in most modern technologies, such as mobile phones, laptop computers, batteries and MP3 players. Industry sources suggest that 25 per cent of all new technologies rely on rare earth elements.

82. More than 95 per cent of all the rare earth elements currently consumed in the world are produced in China at present. However, the rapid increase in Chinese domestic electronics manufacturing may consume the entire domestic rare earth element production in the near future. As a result, China has already been imposing quotas on rare earth element exports, resulting in a shaky supply to the world market. Significant land-based reserves of rare earth elements exist throughout the world and are yet to be developed. The United States of America, for example, has one of the largest reserve bases (14 million tons of the global total of approximately 80 million tons). However, no mining has taken place in recent years, since economic considerations and environmental issues have been prohibitive to commercial operations.⁶

83. The global consumption of rare earth elements in 2008 amounted to 124,000 tons, valued at US\$ 1.25 billion. Presently, midterm market demand forecasts assume a growth of 10 per cent per annum from existing technology only, leading to an estimated demand in 2014 of 200,000 tons, valued at between US\$ 2 billion and US\$ 3 billion.⁷ Long-term projections for rare materials that factor in the demand from new technologies are even more optimistic. A study by the German Fraunhofer Institute predicts a drastic increase worldwide in the demand for certain elements used in future key technologies until 2030. These include gallium (increase of 609 per cent), neodymium (382 per cent), indium (329 per cent) and germanium

⁵ For example, the video entitled “China Rides Green Revolution, Limiting Export of Rare Metals” contains a discussion with *The New York Times* international business editor on “World Focus”.

⁶ A Conference on Technology and Rare Earth Metals for National Security and Clean Energy Policy takes place on 17 and 18 March 2010 in Washington, D.C.

⁷ IMCOA 2009 updated market forecast.

(244 per cent).⁸ Driven by the market and possibly also by political decisions, more land-based deposits are expected to be developed. However, owing to the widely dispersed, but rarely concentrated nature of the spatial distribution of the ores, only small amounts of these deposits are profitable.⁹ Alternative sources are being explored and related studies aiming at meeting future demand are being commissioned by many Governments. For example, Japan, which is one of the world's largest consumers of rare earth elements, is actively assessing sea floor deposits as a potential new source for rare earth elements, primarily cobalt-rich ferromanganese crust deposits within its exclusive economic zone.¹⁰

84. In the light of these developments, it is proposed to carry out a study to address the question of whether sea floor deposits have the potential to become an alternative source of rare earth elements and other trace metals. Such a study will provide an analysis and synthesis of long-term market projections and the available information on geochemical composition and geographical distribution of various sea floor deposits. The study will also identify relevant economic, environmental and technological considerations relating to the assessment of the commercial potential of seabed deposits in comparison with land-based deposits. Over the past few years, the secretariat has significantly enhanced its geographic databases, including information on the location and geochemical composition of mineral resource deposits. It has to be noted, however, that the significance of the proposed study is still limited by a lack of adequate geochemical and geographical information on quantities and qualities of seabed resources. Economic and technological changes, as well as potential new discoveries on land, represent further uncertainties related to the assessment of the economic potential of seabed resources.

85. The outcome of this project will be a technical study, which is also accessible to non-scientific audiences, including policymakers. The study will be structured in three parts, based on the selection of relevant commodities of interest. The first part will contain economic data, including historical charts, recent trends, midterm forecasts and long-term projections for relevant commodities. The second part will focus on the geochemistry, geographic distribution and regional economic potentials of known seabed mineral resources (polymetallic nodules, cobalt-rich ferromanganese crusts and polymetallic sulphides). This section will reproduce geochemical analysis results for sampling locations from the Authority's databases and from other sources, covering the major deposit types. An updated dataset on polymetallic sulphides, including geochemical analysis results for rare earth elements, has recently been compiled and integrated into the secretariat's geographical information system. Entities under exploration contract with the Authority will be encouraged to contribute additional data. Based on the secretariat's geographic information on deposit locations and properties, bathymetry,

⁸ Study commissioned by the German Federal Ministry of Economics and Technology and published in German under the title *Rohstoffe für Zukunftstechnologien* (2009). The study focuses on future key technologies in the areas of transport, information and communication technology, energy, electrical and drive technology, chemistry, mechanical engineering and medicine. The study examines prospects for the "high-tech" metals copper, chromium, cobalt, titanium, tin, antimony, niobium, tantalum, platinum, palladium, ruthenium, rhodium, osmium, iridium, silver, neodymium, scandium, yttrium, selenium, indium, germanium and gallium.

⁹ A. V. Naumov (2008), "Review of the world market of rare-earth metals", in *Russian Journal of Non-Ferrous Metals*, vol. 49, No. 1 (February, 2008).

¹⁰ H. Kawamoto, Japan's Policies to be adopted on Rare Metal Resources, 2008. Available from <http://www.nistep.go.jp/achiev/ftx/eng/stfc/stt027e/qr27pdf/STTqr2704.pdf>.

terrain structure and other related data, this part of the study will also attempt to localize geographic areas of particular interest. This will feature thematic maps on mineral resource distribution, regional potentials, geostatistical assessments and other spatial modelling results. Knowledge gaps in terms of geographic information and future needs for data accumulation will also be identified. The third part of the study will examine the economic, environmental and political considerations of the exploration and mining of seabed deposits and issues related to present and future metallurgical and mining technologies, comparing land-based and seabed operations. Given the limitations imposed by the present data available and other uncertainties with respect to future technological, economic and regulatory regimes, the study will not be able to determine conclusively whether conditions for mining rare earth elements are more favourable on land or on the seabed, either within exclusive economic zones or in the Area. However, it can, based on available information, help to assess the regional and overall potentials of seabed mineral resources with respect to emerging technologies.

B. Developments in ocean technology relevant to seabed mining

86. One of the principal driving factors behind the commercial viability of deep seabed mining is the availability of appropriate and cost-effective technological solutions to enable miners to operate in deep water environments. In this regard, it will be recalled that a workshop was held by the Authority in Chennai, India, in February 2008 on the current status and challenges ahead for polymetallic nodule mining technology. The report of the Workshop recognized that there had been considerable duplication in many development efforts to that stage. It also recognized that much of the technology that would be needed for mining was mature and already commercially available for use in other applications. The current contractors with the Authority — six of which made presentations at the workshop — have in general made limited progress in the development of commercial mining technology. Small-scale prototype collectors for polymetallic nodules have been tested at shallow depths by COMRA (tests at 8 metres with a proposal to conduct a test at 1,000 metres), Korea Ocean Research & Development Institute (KORDI) (planning a test at 100 metres' depth) and the National Institute for Ocean Technology, India (tested at 410 metres' depth). One expert participant in the workshop who had worked for the Kennecott Consortium in the 1970s noted that the offshore oil and gas industry was already operating at depths approaching those of future polymetallic nodule mines. In 1985 the world record for deep ocean exploratory drilling was 2,290 metres of seawater; currently, the world record stands at 2,851 metres. This participant noted further that riser hardware for deepwater and harsh environments is mature, subsea power systems and pumps of the magnitude required for mining are now used routinely, and that as long as functional designs for deep seabed mining are ready, equipment would be commercially available.

87. The undersea technology marketplace continues to mature, especially as the offshore oil and gas industry, for example, continues to move into deeper and deeper water. In particular, the past two decades have seen rapid progress in the development of mature marine technology, particularly remotely operated vehicles (ROV) and autonomous underwater vehicles (AUV) with the capability of operating safely and efficiently at great depths. Development of ROV systems began in the early 1970s and the technology is today considered mature and robust. Many

specialized tooling systems have been created to allow for efficacious surface intervention using ROVs in support of ultra-deepwater oil and gas drilling operations. These tools are analogous to the tools that will eventually collect minerals from the sea floor, and it can be expected that ROV and AUV technology will find application in exploration for marine minerals. Nautilus Minerals, Inc., for example, made extensive use of ROVs for detailed site surveys where basic visual, advanced sub-bottom imagery and rock coring operations were conducted at its exploration tenements off the coast of Papua New Guinea. Nautilus also made use of the mature technology being used for diamond mining by the DeBeers Group off the coast of Namibia and South Africa in developing its proposed mining equipment for sea floor massive sulphides.

88. The 23rd of January 2010 marked the fiftieth anniversary of the record-breaking dive by the bathyscaphe *Trieste*, crewed by Jacques Piccard and Don Walsh, to the Challenger Deep in the Marianas Trench, which, at a depth of 10,920 metres, is the deepest point in the oceans. Since that time no humans have ever physically revisited this site. The Japan Agency for Marine-Earth Science and Technology (JAMSTEC) returned to the site on 24 March 1995 using the ROV *Kaiko*, but this remained the only full ocean depth-capable system available globally until its loss in a typhoon in 2003. Recently, however, on 31 May 2009, the Woods Hole Oceanographic Institution (WHOI) Deep Submergence Laboratory returned to the Challenger Deep using the new hybrid ROV/AUV *Nereus*. This vehicle, which is at present the only system currently available that is full ocean depth-capable, can operate in shallower depths as an AUV, but in deeper depths a small fibre-optic cable allows pilots to control it as a traditional ROV.

89. China has been developing the *Harmony 7000* human occupied vehicle (HOV) for many years; this effort reached a milestone in September 2009 with the completion of operational sea trials. The *Harmony 7000* is a three-person submersible designed to dive to 7,000 metres, equipped with a full suite of scientific sensors in addition to assorted subsystems, including manipulators, cameras, navigation systems, lighting, life support, communications, ballast and structure.

90. Significant developments have also taken place in AUV design and development, and it can also be expected that these systems will have an important role to play in better understanding the environment of the Area. AUVs have considerable range and can be configured with sub-bottom profilers, sidescan sonar and high resolution inertia navigation systems. A single surface vessel can support multiple AUVs, which allows large areas of sea floor to be surveyed much faster than using traditional single towed bodies. In 2009, a Rutgers University AUV Slocum glider, the *Scarlet Knight*, successfully crossed the Atlantic Ocean. The vehicle was launched off the coast of New Jersey, United States of America, and travelled nearly 7,300 kilometres over 201 days, finally surfacing inside Spanish territorial waters on 14 November 2009. Glider AUVs such as the Slocum and Sea Glider have attributes that make them well suited for environmental monitoring tasks. They are designed to use internal ballast that causes them to dive and surface in an undulating fashion. Since these AUVs use very little power they can be deployed for long durations. These systems have satellite communications and every night they can surface and broadcast the data collected that day. Different sensor systems can be deployed depending on the requirements of the mission. It is envisioned that technology like this could in future be deployed around a mine site to assist in performing monitoring operations.

91. Oceanographic research laboratories globally have also evolved into taking a multidisciplinary approach to their research programmes. These efforts have identified the requirement for diverse systems designed for mission-driven operations, allowing researchers ready access to areas of the sea floor that had previously been inaccessible, such as in the Arctic Ocean. For example, in March 2010, Natural Resources Canada (NRCan) took delivery of two AUVs' depth rated to 5,000 metres of seawater to perform research operations under ice in the Lincoln Sea in support of Canada's seabed survey programme for article 76 of the Convention. Once an AUV has mapped any area, this data can be further analysed for areas of interest for additional detailed exploration. The ROV provides the next tool in these research programmes for specific site visual survey and sample collection operations. Diverse and specialized sensors, tools and in situ experiments have been developed in support of scientific ROV operations. Tools and operational methodologies such as these provide an excellent repository of intellectual property from which to develop standardization requirements for environmental impact assessment.

92. Another potential tool for researchers is the cabled research observatory. It has been a topic of discussion in the global scientific community for the past decade. Cabled research observatories are diverse in their design and have sensor suites deployed to answer specific scientific questions and provide real-time monitoring. Deployment of these observatories began with the Victoria Experimental Network Under the Sea (VENUS) project established at the University of Victoria in British Columbia, Canada. This was closely followed by the Monterey Accelerated Research System (MARS), installed and operated by the Monterey Bay Aquarium Research Institute (MBARI) in Moss Landing, California, United States of America. The Government of the United States also recently funded the Ocean Observatory Initiative (OOI), the designs for which are currently being finalized. In Europe, the European Seafloor Observatory Network (ESONET) is in development and has nodes planned for locations in the Arctic Ocean, the Norwegian margin, the Nordic Seas, the Azores, the Iberian Margin, the Ligurian Sea, the Hellenic and East Sicily regions in the Mediterranean Sea, and the Black Sea. Meanwhile, JAMSTEC has been developing and is in the early stages of deploying the Dense Oceanfloor Network System for Earthquakes and Tsunamis (DONET). This is a submarine cabled real-time sea floor observatory network for precise earthquake and tsunami monitoring. The Information System about the Marine Environment (ISMO) in the Gulf of Trieste is a system of continuous data exchange among institutions that have set up stationary measurement platforms on the Adriatic Sea. The System is intended to offer environmental information to a broad public constituency and to strengthen collaboration among the institutions that will participate in the data exchange.

93. Observatory programmes such as those described above will provide new measuring and monitoring technology that will ultimately be deployable in the Area. The Authority will continue closely to monitor the development of these new systems and to evaluate their relevance to the implementation of its responsibilities under the Convention and the 1994 Agreement. In the context of the 2011-2013 work programme, and taking into account the new developments since 1999, it is proposed to prepare new technology guidelines for the benefit of prospective contractors. These guidelines will furnish information on available vehicle types and subsystems, providing detailed information on how each of these subsystems

functions within the confines of the application. Subsystem integration is another topic that will be addressed so that anyone undertaking a development programme will have a template of questions on which to base the system design. Additional information will be provided listing existing companies producing this technology. All vehicles are mission-driven and the guidelines will address how to make the correct technological decisions. A discussion will also be included defining what technologies are appropriate for performing different tasks, for example, survey versus mining operations.

XVI. Collection and assessment of data from prospecting and exploration and analysis of the results

94. It will be recalled that in 2003, during an international workshop held at Nadi, Fiji, the Authority launched a project to develop a geological model of polymetallic nodule deposits in the Clarion-Clipperton fracture zone. This project was completed in December 2009, when a final workshop to introduce the results of the model was held at the headquarters of the Authority. The workshop was attended by experts from academic institutions, public and private enterprises, contractors and member States, as well as a number of members of the Legal and Technical Commission. The workshop was also webcast live over the Internet. The outputs of the geological model project — the Prospector's Guide and the Geological Model itself — were reviewed by external experts and a number of recommendations were put forward. These have been incorporated in the final document, which will be published as an ISA technical study. The workshop recommendations will be submitted to the Legal and Technical Commission and the Council for review during the sixteenth session.

95. The Geological Model as finally adopted following peer review consists of a set of digital and hard copy maps and tables describing the predicted metal content and abundance of deposits in the Clarion-Clipperton fracture zone, along with associated error estimates. The associated documentation describes the model testing procedures and algorithms used in producing the final model results. The Prospector's Guide examines all potential proxy data variables identified as important indicators of metal content and abundance, and outlines specific data sets that qualify for use in the Geological Model and data information on all known nodule deposits in the Clarion-Clipperton fracture zone. The Authority's effort to model the polymetallic nodule resources in the Clarion-Clipperton fracture zone, an area covering nearly 12 million square kilometres, is the largest and most complex such undertaking to date.

96. During 2009, the secretariat was able to initiate work on a new project to establish a geological model of polymetallic nodule deposits in the Central Indian Ocean basin. For this purpose, the services of scientists with expertise in polymetallic nodule exploration and environmental impact assessment were engaged to prepare a project inception report. A meeting of experts was convened in October 2009 at the National Institute of Oceanography, Goa, India, to consider the possible proxy data that can be used for model studies and to identify possible expert team members to begin to work on developing the model throughout the period 2010-2012.

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

97. Under article 143 of the Convention, the Authority has a general responsibility to promote and encourage the conduct of marine scientific research in the Area and to coordinate and disseminate the results of such research when available. It also has a duty under articles 145 and 209 to ensure effective protection of the marine environment from harmful effects which may arise from activities in the Area. 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 1994 Agreement, particularly under subparagraphs (f) to (j), has been the establishment of a series of expert workshops, seminars and meetings. The Endowment Fund also contributes to the development of capacity to carry out marine scientific research in the Area.

98. 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, as opposed to exploration. In order to be able in future to manage the impact of mineral development in the Area in such a way as to prevent harmful effects 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 their relationship with impacts related to mining. It is also important that such data are standardized, including taxonomic information.

A. Technical workshops

99. The objective of the technical workshops convened by the Authority is 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. In order to disseminate the results as broadly as possible, the proceedings of the workshops are published in book format and on the Authority's website. The outcomes of these workshops have also been submitted to the Legal and Technical Commission to assist it in its work. Most of the international workshops convened by the Authority to date have covered issues associated with managing the possible impacts of mining on the marine environment. 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.

100. During 2010, the Authority will convene an international workshop to review further a proposal under consideration by the Legal and Technical Commission for the establishment of a network of areas of particular environmental interest in the Clarion-Clipperton fracture zone of the Central Pacific Ocean. At its meeting during the fifteenth session, the Commission concluded that to prevent future irreversible damage to the marine environment, and taking into account its mandate under article 165, paragraphs (d), (e) and (h), of the Convention, and regulation 31(2) of

the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area, the development of polymetallic nodule resources in the Clarion-Clipperton fracture zone demanded a rational and comprehensive environmental management plan for the region as a whole, based on the best available scientific knowledge. Such a plan should include a clear definition of the conservation objectives for the zone, as well as a comprehensive environmental monitoring programme and the definition of a network of representative areas, based on sound scientific criteria, for environmental purposes. The plan should also be fully consistent with the precautionary principle, but should be flexible in order to allow changes as and when new scientific information is gathered. The objective of the workshop will therefore be to obtain the best possible scientific and policy advice on the formulation of an environmental management plan at the regional scale for this area.

B. Strengthening and coordination of international cooperation in marine scientific research

101. At all of the Authority's 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. Specific recommendations from these workshops have included proposals for:

(a) Collaborative studies on the natural variability of the deep-sea ecosystem, consisting of interdisciplinary variability studies of areas under contract, and unification and standardization of research and development methods;

(b) Cooperative biological research on the typical latitudinal and longitudinal ranges of benthic species, the rate and spatial scales of gene flow and the natural spatial and temporal patterns and scales of benthic community variability;

(c) Taxonomic coordination utilizing recognized experts to assist in the correct identification of animal fauna living on the deep seabed, for the purposes of establishing the geographical ranges of species and thus the likelihood of their extinction by a mining operation;

(d) The creation of databases by the Authority to enable contractors to keep up to date with the environmental data and information collected by other contractors and researchers, and to facilitate the work of the Legal and Technical Commission and the other organs of the Authority;

(e) Collaboration in the development of technology, including data-sharing, participation in tests and joint environmental investigation.

102. The Authority has taken steps to progressively address these recommendations in its substantive programme of work. However, it is clear that much more collaborative work among contractors, marine research organizations and the Authority is required if the international community is to be able to take informed decisions on measures required for better environmental management of the Area.

103. Based on the experience gained from previous collaborations, a number of partnerships have been implemented and others have been identified for future

consideration. These include a collaboration with the Global Census of Marine Life on Seamounts (CenSeam) programme to obtain data on seamount biodiversity in the western Pacific Ocean, and a collaboration with the Biogeography of Deep-Water Chemosynthetic Ecosystems (ChEss) programme of the Census of Marine Life to obtain relevant species lists for fauna associated with polymetallic sulphide deposits in the Area.

104. The objective of the arrangement with CenSeam was to obtain new data on seamount biodiversity in the western Pacific Ocean. The area identified as of greatest interest, and where very few seamounts have been sampled, stretches west from the Hawaiian Islands to the Marianas Trough in a band between approximately 8°N and 24°N. The collaboration took place between 2007 and 2009. The final report from the collaboration was received in 2009. It contains a complete species list of organisms found at the crust and non-crust locations sampled, representative images of each species listed, and full sample data (latitude and longitude, seamount name, depth and other appropriate information). The report also identifies information gaps, and makes suggestions on how best to increase the knowledge of communities associated with cobalt-rich crusts and their vulnerability to commercial activity associated with these minerals, including recommendations that may be reflected in future guidance to exploration contractors. The report is being edited for distribution in 2010 as a technical publication of the Authority. It is also proposed to hold a workshop to review the outcomes of the collaboration and to assist the Authority in deciding the direction of environmental study with regard to cobalt-rich crusts.

105. Both ChEss and the Authority are concerned with the protection of chemosynthetic ecosystems found at hydrothermal vent sites from human impact. In 2008, ChEss proposed a collaboration with the Authority to convene a workshop to formulate a general approach for the design of networks of areas for the environmental protection of hydrothermal-vent and cold-seep ecosystems, and to outline research needs to assist the spatially based ecosystem management of human impacts in deep-sea chemosynthetic ecosystems. It is anticipated that this workshop will take place in June 2010, and it is hoped that it will be able to identify gaps in current knowledge and potential areas for future collaboration to fill such gaps.

106. In June 2009, in another type of collaboration, the Secretary-General of the Authority and the Secretary-General of COMRA signed a memorandum of understanding at the headquarters of the Authority to enhance future cooperation. As a follow-up to this development, in November 2009 the School of Oceanic and Earth Science of Tongji University, Shanghai, China, which is affiliated with COMRA with regard to research projects for deep seabed activities, offered to provide five scholarships for master's and doctorate degree candidates from developing countries in the field of marine sciences. It is planned that the candidates will be jointly selected by the Authority and Tongji University, and the project will be made long term, given a successful start. In addition, the secretariat and Tongji University are currently working on a short-term training course for scientists from developing countries in marine sciences, to be conducted in 2010 in Shanghai.

107. The Authority's regional, national and international relationships with academia, research, governments and non-governmental organizations have made it clear that relevant work experience is one of the most important considerations in hiring new employees. To help prepare students to be competitive and effective

upon graduation, the Authority is working closely with interested parties in the marine fields to develop an internship and associate expert programme that would be closely tied to the academic and professional background of students.

C. Regional sensitization seminars on activities in the Area

108. Since 2007, the Authority has developed a programme of regional sensitization seminars on marine minerals and other issues relevant to its work. The purpose of these seminars is to inform government officials, marine policymakers and scientists at national and regional institutions of the work of the Authority, and to promote the participation of scientists from institutions in developing countries in marine scientific research being undertaken in the Area by international research organizations. Typically, the seminars include presentations by experts on the type of minerals to be found in the Area, resource evaluation, the protection and preservation of the marine environment from activities in the Area, and the process and status of the legal regimes established for recovery of seabed minerals, as well as presentations on relevant regional issues with respect to the law of the sea.

109. To date, three such seminars have taken place: in Manado, Indonesia (March 2007); Rio de Janeiro, Brazil (November 2008); and Abuja, Nigeria (March 2009). A fourth seminar took place in Madrid from 24 to 26 February 2010, and a fifth seminar (for the Caribbean region) will be held in Jamaica in September 2010.

110. As a direct spin-off from the sensitization seminar held in Rio de Janeiro, the Government of Brazil decided to initiate a project to integrate all the information available in Brazil and abroad on the geology and mineral resources of the Equatorial and South Atlantic Ocean, an area where relatively little mineral prospecting has taken place so far. This project, which will be carried out in collaboration with other interested countries in the Equatorial and South Atlantic and the Authority, involves the creation of a single geographic information system which will help to identify areas of occurrence of mineral resources with economic value and will also assist in developing and improving techniques for geophysical and geological reconnaissance of mineral resources. The project also envisions capacity-building and marine scientific research.

D. Conservation and sustainable use of marine biological diversity in the Area

111. The Area, as defined in the Convention, exists as a particular part of ocean space beyond the limits of national jurisdiction. It is subject to the specific legal regime of the Area under the Convention and the 1994 Agreement. One of the chief characteristics of this legal regime is the importance given to the need to protect the marine environment from harmful effects and to conserve its natural resources. Article 209 of the Convention (located in Part XII of the Convention) requires that international rules, regulations and procedures shall be established in accordance with Part XI of the Convention, and re-examined from time to time as necessary, to prevent, reduce and control pollution of the marine environment from activities in the Area. This provision appears alongside article 208, which imposes on coastal States the duty to adopt laws and regulations to prevent, reduce and control pollution of the marine environment arising from or in connection with seabed

activities subject to their jurisdiction. Such laws, regulations and measures shall be no less effective than international rules, standards and recommended practices which are to be developed through competent international organizations or diplomatic conferences (article 208, paras. 3 and 5). Article 145 of the Convention, which is located in Part XI and gives effect to the general obligation under article 209, requires the Authority, *inter alia*, to ensure effective protection for the marine environment from harmful effects of activities in the Area. More specifically, article 145 requires the Authority to adopt rules, regulations and procedures for “the prevention, reduction and control of pollution and other hazards to the marine environment” and for “the protection and conservation of the natural resources of the Area and the prevention of damage to the flora and fauna [i.e., the biodiversity] of the marine environment”. It can be seen that the interrelationship between the relevant provisions of Parts XI and XII of the Convention means that these represent important responsibilities and duties for the Authority, which need to be considered as an integral part of the overall framework for ocean governance within the jurisdictional competences established by the Convention.

112. The international community has expressed in several ways (binding instruments and soft law) and forums that the protection of the environment is also a fundamental component of sustainable development. In April 2002, at the sixth meeting of the Conference of the Parties to the Convention on Biological Diversity, 123 States committed themselves to actions to “achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on earth”. In the Johannesburg Declaration on Sustainable Development, the World Summit on Sustainable Development observed the continuing loss of biodiversity and resolved to protect biodiversity “through decisions on targets, timetables and partnerships”. In the Johannesburg Plan of Implementation, the World Summit agreed to action to significantly reduce the rate of biodiversity loss globally by 2010. Various approaches and tools for the conservation and sustainable use of marine biodiversity are referred to in the Johannesburg Plan of Implementation, including the application of an ecosystem approach by 2010 (para. 30 (d)), the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012, and the development of national, regional and international programmes for halting the loss of marine biodiversity (para. 32 (c) and (d)).

113. As far as marine biological diversity beyond areas of national jurisdiction is concerned, the General Assembly of the United Nations has, in successive resolutions, called upon States and relevant international organizations at all levels to urgently consider ways to integrate and improve, on the basis of the best scientific information available, including the application of precaution as set out in principle 15 of the Rio Declaration on Environment and Development, the management of risks to vulnerable marine biodiversity within the framework of the Convention, consistent with international law and the principles of integrated ecosystem-based management. Most recently, in operative paragraph 153 of resolution 64/71, the General Assembly reaffirmed “the need for States to continue and intensify their efforts, directly and through competent international organizations, to develop and facilitate the use of diverse approaches and tools for conserving and managing vulnerable marine ecosystems, including the possible establishment of marine protected areas, consistent with international law, as

reflected in the Convention, and based on the best scientific information available, and the development of representative networks of any such marine protected areas by 2012". In the sixteenth preambular paragraph of the same resolution, the Assembly also recognized that "there is a need for a more integrated approach and to further study and promote measures for enhanced cooperation, coordination and collaboration relating to the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction".

114. Both the Convention and the annual resolutions of the United Nations General Assembly on oceans and the law of the sea emphasize the fact that activities in the oceans are interrelated and need to be considered as a whole. Better cooperation and coordination between international organizations with mandates over activities in the oceans is therefore essential, not only to ensure consistency of approach, but also to ensure comprehensive protection of the marine environment in all zones of maritime space within and beyond national jurisdiction in the manner envisaged by articles 208 and 209 of the Convention. It is important, therefore, that the responsibilities and activities of the Authority are considered in the broader context of developments within the law of the sea as a whole, while the activities of other competent bodies are conducted in such a manner as to fully respect the legal regime of the Area.

115. The measures taken by the Authority to date with respect to the Area are fully consistent with the sentiments expressed by the General Assembly. In the first instance, the Authority manages risks to deep sea biodiversity by adopting regulations governing activities in the Area and by monitoring the activities of contractors who are carrying out such activities. In addition, the Authority has taken steps to ensure that the measures it proposes are compatible with the international rules and recommended standards developed or in the process of being developed for other marine areas beyond national jurisdiction. This includes: the consideration by the Legal and Technical Commission of a proposal to designate specific areas within the Pacific nodule province for the purposes of conserving representative habitats and biodiversity; the development of closer cooperative arrangements with the OSPAR Commission in connection with the coordination of management measures to safeguard biodiversity in the North-East Atlantic; and cooperation with the Convention on Biological Diversity in the development of criteria for the identification of ecologically and biologically significant areas and applicable standards for biodiversity-inclusive environmental impact assessment. At a more general level, one of the key objectives behind the Authority's work since its establishment has been to promote more open science within the marine scientific research communities working in the Area for the benefit of all mankind, by encouraging scientific research, especially on the impacts of mining activities on the environment, and ensuring the public availability of as much material as possible, thus laying a basis for developing States members of the Authority to better understand what is available and develop their capacity to participate in such science.

116. Over the period covered by the present report the Authority continued to enhance its cooperative relationship with the Secretariat of the Convention on Biological Diversity. In particular, the Authority participated in two important workshops convened by that organization and mandated by the Conference of the Parties to the Convention on Biological Diversity in their decision COP IX/20. These were an expert workshop on ecological criteria and biogeographic

classification systems for marine areas in need of protection, held in Ottawa from 29 September to 2 October 2009, and a workshop on scientific and technical aspects relevant to environmental impact assessment in marine areas beyond national jurisdiction, held in Manila from 18 to 20 November 2009. The participation of the Authority ensured that, in developing recommendations, the workshops took into account the particular legal and scientific characteristics of the Area and the particular measures under development by the Authority. At the same time, the outcomes of the workshops, as well as the other work undertaken by the Convention on Biological Diversity with respect to marine areas beyond national jurisdiction, are important in informing the work of the Legal and Technical Commission and in ensuring that measures taken with respect to the Area, and measures taken for other marine areas beyond national jurisdiction, are compatible.

117. The secretariat was also invited to participate as a member of the steering committee for the Global Ocean Biodiversity Initiative (GOBI), which began in late 2008 as a collaboration between the German Federal Agency for Nature Conservation (BfN), the International Union for Conservation of Nature (IUCN), the UNEP World Conservation Monitoring Centre (UNEP-WCMC), the Marine Conservation Biology Institute (MCBI), the Census of Marine Life (CoML), Ocean Biogeographic Information System (OBIS) and the Marine Geospatial Ecology Lab (MGEL) of Duke University. GOBI is an international partnership advancing the scientific basis for conserving biological diversity in the deep seas and open oceans. It aims to help countries, as well as regional and global organizations, to use existing and develop new data, tools and methodologies to identify ecologically significant areas in the oceans, with an initial focus on areas beyond national jurisdiction. GOBI is facilitated by IUCN with core support from BfN. The work under this initiative builds on the scientific criteria adopted by the parties to the Convention on Biological Diversity in 2008 to identify ecologically and biologically significant areas in the global marine realm. It ultimately aims to help countries to meet the goals adopted under the Convention on Biological Diversity and at the 2002 World Summit on Sustainable Development to reduce the rate of biodiversity loss by, inter alia, applying ecosystem approaches, and establishing representative marine protected area networks by 2012.

118. Projects and initiatives of this nature are important because they help to encourage cooperation and coordination between the different bodies with different responsibilities with respect to the Area, the high seas and activities carried out in these maritime spaces. Such cooperation and coordination is essential in order to ensure effective protection of the marine environment as a whole, because different bodies have different levels of expertise and regulatory power. Moreover, the nature of the activities themselves, whether prospecting and exploration for minerals, marine scientific research or other uses of the high seas, frequently overlap and, more importantly, the impacts of such activities on the marine environment also overlap. In this regard it is important to note that all of the mineral resources currently under consideration by the Authority have specific biodiversity associated with them that is thought to either facilitate their formation or concentration.

119. The cooperative efforts currently under way could all be strengthened further, including, for example, through the development of clearing-house mechanisms for the exchange of scientific data and information on capacity-building programmes such as the Endowment Fund. Two particular areas that require urgent attention are:

- (a) Better standardization of data;
- (b) Better databases and collaboration between databases.

120. Without standardization, it is not possible to compare studies and databases from different sources. The Authority has addressed standardization through its workshops and environmental recommendations, but there would be great benefits to standardizing data on a larger scale. The need for data standardization is exemplified by the discipline of taxonomy. In environments where there has been relatively little scientific study, for example, the deep sea beyond national jurisdiction, many new species are discovered on each research cruise. Often the scientists involved do not have sufficient resources to produce taxonomic descriptions of these new species, and so they are assigned to putative species. While these putative species are useful for individual studies, they cannot be used to make comparisons between studies without standardization.

121. Effective coordination requires that data is available to all. One way to achieve this is by establishing databases. These databases should include not only information about the environment, but also about who is actively investigating that environment, in order to facilitate further collaboration.

XVIII. Database development

122. The secretariat maintains a Central Data Repository, which is comprised of the following core data sets: a sea floor massive sulphides database; a cobalt-rich ferromanganese crusts database; a polymetallic nodules database; a web-based geographical information system (GIS); the library catalogue; a bibliographic database; and a seabed patents database. The value of this programme is that it provides a location where all members of the Authority can have access to all non-proprietary data which have been provided to the Authority. The Central Data Repository is also important as a source of information from which to create a baseline for the purposes of environmental impact assessment.

123. The Central Data Repository is continuously being updated to reflect the latest available data that contractors, researchers and owners are willing to share with the Authority. Obtaining data for the databases is an ongoing programme that requires continuous effort. This involves communication with active researchers and contractors and regular monitoring of published scientific literature. It is also essential to review the database structure and content on a regular basis to ensure that it meets the requirements of the Authority. In addition to identifying sources of data, quality control and quality assurance is also a major consideration. This includes addressing the issue of standardization of data so that information from different sources is comparable. The methods of standardization vary depending on the type of data and the compatibility of the sampling methods used. For example, in areas where multiple data entries have been provided by different sources for a single point, data averaging can be implemented as long as a common baseline is established for the data sets.

124. The sea floor massive sulphide database has recently been updated with additional data from M/S Ambrose Associates, Ottawa, Ontario, Canada. The updated database contains data on 680 occurrences, more than doubling the size of the original 2001 data set available in the Central Data Repository. These additional

data include: 206 entries for polymetallic massive sulphides, compared to 112 in 2001; 156 entries for low-temperature hydrothermal mineralization, compared to 75 in 2001; 125 entries for hydrothermal plume signals, compared to 20 in 2001; and 102 entries for near-field metalliferous sediments, compared to 77 in 2001. The geochemical database for sulphides now has over 5,000 analyses covering more than 100 sites. The data have been compiled from more than 1,300 references. The database will be continually updated with new reports of sulphide occurrences as and when they are available.

125. One major project that the secretariat proposes to carry out during the 2011-2013 programme of work is to digitize and enter into the Central Data Repository all reports, maps and contractors' reviews from 2001 to date, and to generate a safe archive for these documents. This is a major task because the volume of reports is significant and data security must be taken into account.

126. The bibliographic database contains references to scientific papers that may be useful to anyone interested in the resources that the Authority regulates or the areas in which they occur. The database was initially created using free, open-source software. Sufficient interest was shown in the online database that it was decided to expand and enhance it. Initially, only scientific papers relevant to polymetallic nodules were included in the database, but it has now been expanded to include references concerning polymetallic sulphides and cobalt-rich crusts. The most recent update of the database content was conducted using a commercial computer programme that makes maintenance and analysis of the database more efficient. Therefore, work is currently under way to include any data records from the initial database into the new management software. Once migration to the new software is complete, options for better integration of the database within the Authority's website will be investigated. The initial, fully searchable database containing approximately 2,500 references along with their abstracts and links to the full text where available, will remain online until an alternative online user interface for the improved database is finalized. The database will require regular updating and will be expanded to include additional publications as appropriate.

127. The seabed patents database is at present contained on two CD-ROMs that are web-accessible. This searchable database was created more than 10 years ago and is slow and cumbersome, as an entire CD-ROM has to be loaded to obtain a single search result. To facilitate a more functional system providing a suitable user experience, the database needs to be restructured and updated. This will be undertaken during 2010 and the database will thereafter be updated on an annual basis.

XIX. Concluding remarks

128. A number of conclusions emerge from the material covered in the present report. The first, and most obvious, is that the pace at which commercial seabed mining is progressing continues to be extremely slow. It remains the case that the efforts of the current contractors with the Authority are primarily directed at long-term geological and environmental studies, financed through government funding by sponsoring or participating States, rather than commercially driven research and development. Investment in mining technology in particular remains at a very preliminary stage. In these circumstances, it appears unlikely that any of the present

contractors will move to commercial exploitation of polymetallic nodules in the near future.

129. On the other hand, a second conclusion that may be drawn is that it is apparent that private sector investment in research on and prospecting for marine mineral deposits continues, both in areas under national jurisdiction and in the Area, indicating a strong interest in seabed minerals as a future source of metals. It is significant that several of these private sector interests have not only made use of the databases and other resources available at the Authority, but have also expressed interest in collaborating with the Authority through its workshops and other initiatives. This is an encouraging sign for the Authority and its member States, because it suggests that the commercial sector is developing confidence in the legal regime for the orderly development of the resources of the Area that has been put in place over the past 13 years. Thus, despite the disappointing results of the early precedents for a deep seabed mining industry, and the highly risk-averse nature of the mining sector in general, there is potential for a marine mineral mining industry to emerge as a genuine alternative to land-based mining.

130. In order to further encourage private sector participation in the development of the minerals of the Area, however, there is a need to begin to consider the sector of the mining code related to exploitation of polymetallic nodules. Investments that originate from the private sector will inevitably be guided largely by financial considerations, including the impacts of national taxation, payments to the Authority and debt financing. While efforts are being undertaken by the Legal and Technical Commission to guide contractors on the reporting of actual and direct exploration expenditures, it is clear that, in the end, these expenditures along with net revenues obtainable by the mining operation form part of a system that informs future contractors for exploitation of their returns.

131. There are a number of ways in which the Authority can usefully contribute to the future development of such an industry. One is to conduct an objective economic evaluation of the options for land and marine-based supplies of minerals. Another is to encourage the development of fair and equitable policies and regulations for exploitation of marine mineral both in the Area and in areas under national jurisdiction. In this regard, it will be recalled that in previous sessions of the Authority, several developing States members had called for assistance in the development of national legislation regarding exploration for and exploitation of marine minerals, noting that most States lacked such legislation and that the international regime formed a valuable precedent for appropriate regulatory measures that, among other things, ensured adequate protection for the marine environment. The current programme of regional sensitization seminars is a step in the right direction in terms of giving effect to these concerns.

Annex

Members of the Advisory Panel for the International Seabed Authority Endowment Fund for Marine Scientific Research in the Area

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