

# ISA Contract for Exploration – Public Information Template

 सत्यमेव जयते	Type of resource: Polymetallic Nodules
	Name of Contractor: Govt. of India/Ministry of Earth Sciences
	Contract Start: 25th March 2002
Sponsoring State: India	Contract End: 24th March 2022
	Location: Central Indian Ocean Basin

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## Introduction

The information contained in this ISA Contract for Exploration – Public Information Template is made available to the public in response to the request by the Council of the ISA to make contracts publicly available, subject to restrictions on confidential information, industrial secrets and proprietary data.

The content of the present template is in accordance with the Regulations on Prospecting and Exploration for [*Polymetallic Nodules in the Area*] [*ISBA/19/C/17*] (the “Regulations”).

## 1. Contract Information

Annex III of the Regulations.

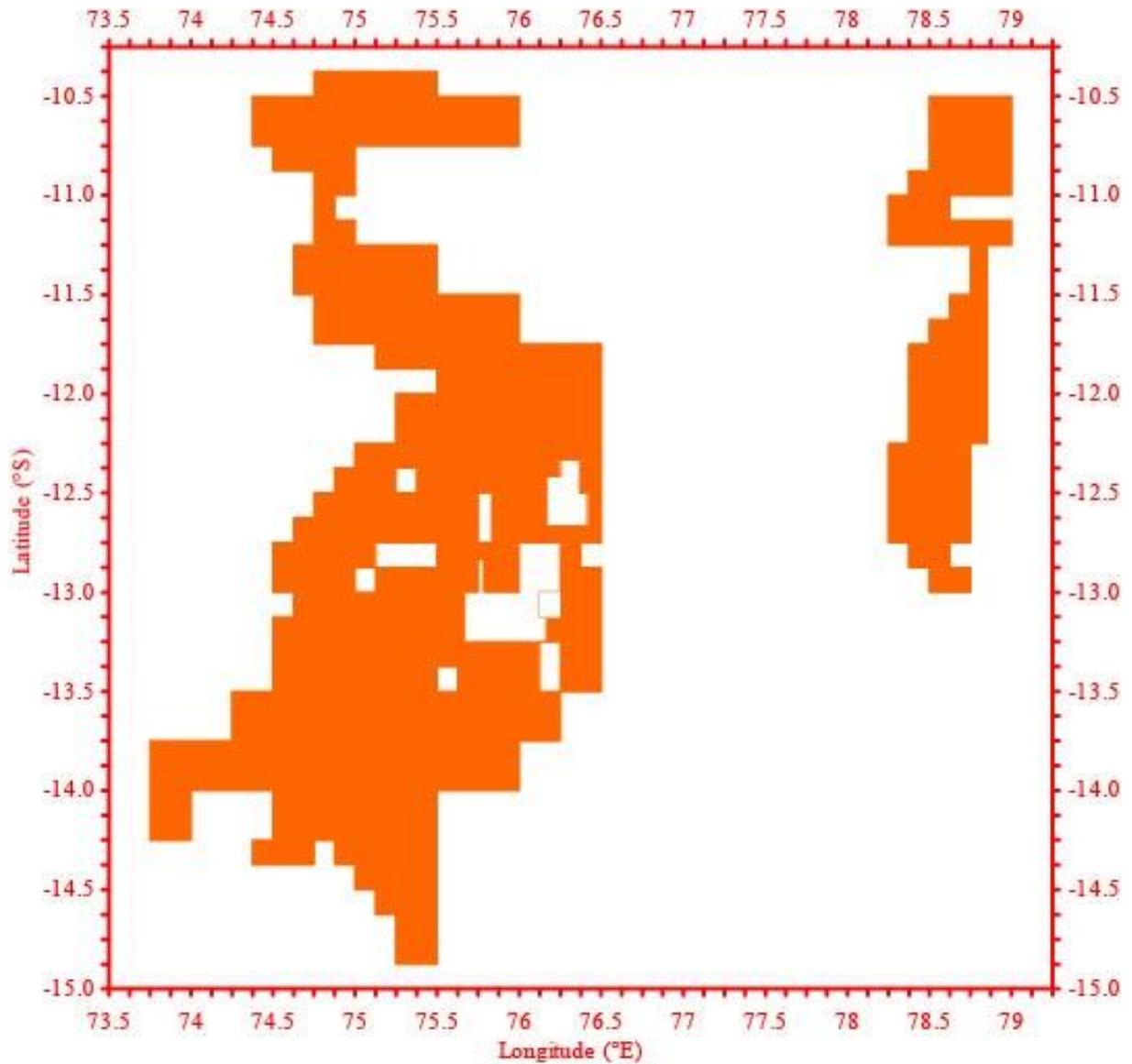
<b>Type of resource</b>	Polymetallic Nodules
<b>Name of Contractor</b>	Govt of India/ Ministry of Earth Sciences
<b>Contract Start</b>	25th March 2002
<b>Contract End</b>	24th March 2022
<b>Location</b>	Central Indian Ocean Basin
<b>Contract Area (km<sup>2</sup>)</b>	75,000

## 2. Coordinates and Illustrative Chart of the Exploration Area

Schedule 1 of Annex III of the Regulations:

The Indian Contract Area for nodule exploration is in the Central Indian Ocean Basin (CIOB) and is bounded within the coordinates:

Longitude	Latitude	Map Corner
73.5°E	10.25°S	Northwest
79.25°E	10.25°S	Northeast
79.25°E	15.0°S	Southeast
73.5°E	15.0°S	Southwest



### 3. Plan of Work

Summary of Plan of Work for Exploration including the Programme of Activities for the first and/or the current 5-year period (Regulation 18).

#### **SURVEY AND EXPLORATION**

The primary objectives are to make a fresh resource evaluation of the contract area, refine the identification of the First Generation Mine (FGM), upgrade the accuracy of the estimates of nodule resources of the revised FGM through additional sampling, and obtain high resolution bathymetry of selected blocks and intensive exploration for the Impact Reference Zone (IRZ).

#### **Year 1:**

- Processing and analysis of the data collected in the previous cruise in the IRZ. The bathymetry and acoustic survey data using AUV, or a similar system, collected in the earlier year will be used to prepare detailed sea floor topographic maps of the IRZ and compared with the earlier bathymetry data.

#### **Year 2:**

- Fresh evaluation of nodule resources in the contract area as well as local blocks based on all the data available until the end of the 15-year contract period (March 2017).

#### **Year 3:**

- Revisiting the identification of FGM: The earlier exercise of identification of the FGM was conditioned by contiguity of blocks. On reconsideration, this requirement seems unnecessary and restrictive. Consequently, the best blocks will be selected based on the previous parameters but the FGM may be an aggregate of multiple nodule fields rather than a single contiguous nodule field. The selection of the revised FGM will be based on the updated block-wise resources estimate.
- Additional sampling in the revised FGM to complete a sampling grid of 6.25 km x 6.25 km in the FGM area (approx. 7,800 sq.km).

#### **Year 4:**

- Analysis and processing of the data and samples collected during sampling campaigns in the FGM.
- Updating estimates of nodule resources in the FGM area along with an analysis of the nodule resource estimates to determine the level of accuracy.
- Assist planning of mining collector operation and collection of relevant data by the mining technology group.

#### **Year 5:**

- Executing near seabed survey in two blocks of 6.25 km x 6.25 km within the revised FGM. This will include high resolution bathymetry and acoustic/optical measurements using AUV/ROV or a similar system.
- Conducting comparative studies of distribution of topographic slopes determined from the near seabed survey and those from the earlier surveys. Extrapolation of the results to the revised FGM.

- Estimating possible non-mineable areas within the FGM based on extrapolated topographic slope distribution.

### **ENVIRONMENTAL STUDIES**

The objective of environmental studies during this extension period is to make an evaluation of likely environmental impact due to the operation of test mining system in the Impact Reference Zone (IRZ) based on the baseline data collected from IRZ and Preservation Reference Zone (PRZ) in the year 2015 and all previous data after artificial disturbance. Subsequently, environmental data will be collected immediately after a test mining operation which will be monitored periodically.

#### **Year 1:**

- Evaluation of environmental data collected from the IRZ and PRZ.
- Preparation for collection of additional baseline environmental data as per Authority guidelines.

#### **Year 2:**

- In-situ measurement of currents and other hydrographic conditions with deep-sea moorings.
- Measurement of time series data on flux and composition from upper water column to deep-sea by deploying sediment traps.
- Analyses for background water column chemistry including metals and other elements likely to be released from nodules during test mining.

#### **Year 3:**

- Determining the distribution of megafauna using suitable techniques such as ROV and Deep Tow survey.
- Analysis of satellite imagery data from Indian Remote Sensing Satellites for measuring the chlorophyll and primary productivity in the upper water column.
- Investigations of the benthic faunal community and biodiversity (number of species and indexes) would be carried out as per the Authority's recommendation ISBA/19/LTC/8, including the revisions, if any, from 2017.

#### **Year 4:**

- Interpretation of newly-acquired data, re-analyses of previously acquired and published data would be carried out for comprehensive oceanographic studies to understand the nature of the water column and sea floor.
- Preliminary assessment of the likely impact of collector operation on the seafloor based on data collected/evaluated for the IRZ and PRZ as well as past data related to artificial disturbance.
- Preparatory work for environmental data collection during the proposed collector test.

#### **Year 5:**

- Collection of environmental data immediately after conducting collector test in the IRZ and their analysis.

- An environmental impact assessment (EIA) will be made of all potential site-specific, mining-related, direct or indirect ecological and environmental impacts.

#### **DEVELOPMENT OF MINING TECHNOLOGY**

The objective is to design, develop and demonstrate an underwater mining system capable of collecting and crushing nodules at a depth of 5,500 m at a polymetallic nodule site in the contract area. As a preparatory step to achieve such an objective, experimental trials will be undertaken at shallower depth.

##### **Year 1:**

- Trials of pumping nodule-slurry up a vertical riser with a positive displacement solids pump, at shallow depths of 200-300 m to assess pumping characteristics and riser behaviour.

##### **Year 2:**

- Studies of seabed soil at a few locations at the IRZ using an in-situ soil tester to assess the seabed conditions.
- Trials of seabed locomotion of an experimental under-carriage at a depth of up to 3,000 m on soft seabed soil to test crawler performance and underwater integrity-reliability.

##### **Year 3:**

- Trials of dummy load deployment at 200 – 500 m from ORV Sagar Nidhi to assess deployment options and resultant loads on the riser systems.
- Integrated laboratory trials of optimised nodule collecting, conveying and crushing systems.

##### **Year 4:**

- Demonstration of the test mining systems at a depth of 3,000 m in CIOB.

##### **Year 5:**

- Demonstration of the underwater mining system comprising crawler, collector and crusher at a depth of 5,500 m in the contract area.

#### **DEVELOPMENT OF EXTRACTIVE METALLURGY**

The aim of metallurgy programme is to maximise the value added whilst minimising the waste streams consisting of the hydro and pyrometallurgical process routes for the recovery of Cu, Ni, Co and Mn bearing products. The Contractor proposes to achieve this through the following three major activities.

- Activity I: Development of integrated ammoniacal-acid leaching process for the recovery of Cu, Ni, Co, Mn and Fe bearing products.
- Activity II: Incorporation of (i) recycled ammonia produced through electrochemical salt splitting in the ammonia-ammonium sulphate-SO<sub>2</sub> leaching process and (ii) electro-washing of residues obtained during processing of polymetallic nodules.
- Activity III: Development of optimal process parameters including reagent consumptions for reduction roasting process using natural gas followed by metal recovery/ residues treatment.

**Year 1:**

- Conceptualization of integrated flow sheet.
- Testing of ammonium sulphate splitting with synthetic solution in 50 L scale.

**Year 2:**

- Conducting experiments for optimizing leaching, purification, solvent extraction and EMD parameters for integrated process.

**Year 3:**

- Conducting experiments for optimizing leaching, purification, solvent extraction and EMD parameters for integrated process continued.
- Testing of electro-washing in 5 kg scale.

**Year 4:**

- Testing with actual solution for ammonium splitting and studies on integration into the original process.
- Conducting pilot scale study on reduction roasting (20 kg per day).

**Year 5:**

- Setting up of a facility for pilot scale testing of ammonium-sulphate salt splitting for the proposed integrated flow sheet.
- Conducting smelting studies for matte formation from the reduced nodules generated from natural gas reduction of pilot scale roasting.

## 4. Programme of Activities

Section 4.1 of Annex IV of the Regulations and Schedule 2 of Annex III of the Regulations.

### I. Agreed 5-year Programme of Activities

5-year Programme of Activities	Extension	
General Objective	Objective	Description
<p><b>Survey &amp; Exploration</b></p> <p>The primary objectives of the proposed programme of activities are: to make a fresh resource evaluation of the contract area, refine the identification of the First Generation Mine (FGM), upgrade the accuracy of the estimates of nodule resources of the revised FGM through additional sampling, and obtain high resolution bathymetry of selected blocks and intensive exploration for the Impact Reference Zone (IRZ).</p>	<p>Processing and analysis of the data collected in the IRZ.</p>	<p>The bathymetry and acoustic survey data using AUV, or a similar system, collected in the earlier year will be used to prepare detailed sea floor topographic maps of the IRZ and compared with the earlier bathymetry data.</p>
	<p>Evaluation of nodule resources in the contract area and the FGM.</p>	<p>Fresh evaluation of nodule resources in the contract area as well as FGM based on all the data available until the end of the 15-year contract period (March 2017).</p>
	<p>Revisiting the identification of FGM.</p>	<p>The earlier exercise of identification of the FGM was conditioned by contiguity of blocks. On reconsideration, this requirement seems unnecessary and restrictive. Consequently, the best blocks will be selected based on the previous parameters but the FGM may be an aggregate of multiple nodule fields rather than a single contiguous nodule field.</p> <p>Additional sampling in the revised FGM to complete a sampling grid of 6.25 km x 6.25 km in the FGM area and processing of the same.</p> <p>Executing near seabed survey in two blocks of 6.25 km x 6.25 km within the revised FGM. This will include high resolution bathymetry and acoustic/optical measurements using AUV/ROV or a similar system.</p>

	Comparative studies of distribution of topographic slopes.	Conducting comparative studies of distribution of topographic slopes determined from the near seabed survey and those from the earlier surveys. Extrapolation of the results to the revised FGM.
<p><b>Environmental Studies</b></p> <p>The objective of environmental studies during this extension period is to make an evaluation of likely environmental impact due to the operation of test mining system in the Impact Reference Zone (IRZ) based on the baseline data collected from IRZ and Preservation Reference Zone (PRZ) in the year 2015 and all previous data after artificial disturbance. Subsequently, environmental data will be collected immediately after a test mining operation which will be monitored periodically.</p>	Collection of additional baseline environmental data.	<p>Collection of following additional baseline environmental data as per Authority guidelines</p> <ul style="list-style-type: none"> <li>• In-situ measurement of currents and other hydrographic conditions with deep-sea moorings.</li> <li>• Time series data on flux and composition from upper water column to deep-sea by deploying sediment traps</li> </ul> <p>Environmental data collection during and immediately after conducting the proposed collector test.</p>
	Interpretation and analysis of data	<p>Analyses for background water column chemistry including metals and other elements likely to be released from nodules during test mining.</p> <p>Determining the distribution of megafauna using suitable techniques such as ROV and Deep Tow survey.</p> <p>Analysis of satellite imagery data from Indian Remote Sensing Satellites for measuring the chlorophyll and primary productivity in the upper water column.</p> <p>Investigations of the benthic faunal community and biodiversity (number of species and indexes) would be carried out.</p> <p>Interpretation of newly-acquired data, re-analyses of previously acquired and published data would be carried out for comprehensive oceanographic</p>

		studies to understand the nature of the water column and sea floor.
	Assessment of the likely impact of collector operation on the seafloor	Preliminary assessment of the likely impact of collector operation on the seafloor based on data collected/evaluated for the IRZ and PRZ as well as past data related to artificial disturbance.
	Environmental impact assessment (EIA) of all potential site-specific, mining-related, direct or indirect ecological and environmental impacts.	An environmental impact assessment (EIA) will be made of all potential site-specific, mining-related, direct or indirect ecological and environmental impacts.
<p><b>Development of Mining Technology</b></p> <p>The objective is to design, develop and demonstrate an underwater mining system capable of collecting and crushing nodules at a depth of 5,500 m at a polymetallic nodule site in the contract area. .As a preparatory step to achieve such an objective, experimental trials will be undertaken at shallower depth.</p>	Shallow water nodule-slurry pumping trials up a vertical riser with a positive displacement solids pump.	Undertaking actual pumping trials with pre-crushed Man-nodules to assess the pumping characteristics, flow dynamics, secondary breakdown of crushed nodules and riser behaviour due to internal flow and external ocean state conditions.
	Studies of seabed soil using an in-stu soil tester.	Deploying an in-situ soil tester at a few locations at the IRZ to assess the seabed soil conditions, in design and optimisation of the seabed mining system.
	Trials of seabed locomotion of an experimental under-carriage.	Intermediate depth testing of the seabed mining system at a depth of 3000 m on soft seabed soil for assessing performance, remote control and system reliability.
	Trials of dummy load deployment	Undertaking deployment testing with dummy loads at 200 - 500 m depth from ORV Sagar Nidhi.to assess the subsea hydrodynamic characteristics to assess the various configuration options and resultant dynamic loads.
	Integrated lab trials of optimised nodule collecting, conveying and crushing systems.	Lab trials in a soft soil mud tank to simulate the seabed conditions in testing nodule harvesting and resultant mechanical and electric power loads.
	Demonstration of the test mining system at a depth of 3000 m.	Intermediate depth trials of the nodule harvesting and pumping system with the seabed mining

		machine in system checks and reliability assessment.
	Demonstration of the underwater mining system at a depth of 5500 m in the contract area.	Actual trials of underwater mining system comprising of crawler, collector and crusher at the contract area for nodule collection and first level of pumping as a crushed nodule slurry.
<b>Development of Extractive Metallurgy</b>  The objective of the extractive metallurgy programme is maximization of value addition with minimization of waste streams consisting of the hydro and pyrometallurgical process routes for the recovery of Cu, Ni, Co and Mn bearing products.	Development of integrated ammoniacal - acid leaching process for the recovery of Cu, Ni, Co, Mn and Fe bearing products.	Conceptualization of integrated flow sheets containing ammoniacal and acid leaching process routes, and experimentation of optimization of critical unit operations for integration.
	Incorporation of (i) recycled ammonia produced through electrochemical salt splitting in the ammonia-ammonium sulphate-SO <sub>2</sub> leaching process and (ii) electro-washing of residues obtained during processing of polymetallic nodules.	Electrochemical salt splitting cell development for obtaining ammonia from ammoniacal process liquor and setting up of up-scaled facility for the same. Electrowashing cell development in lab scale and 5 kg scale for washing of residues.
	Development of optimal process parameters including reagent consumptions for reduction roasting process using natural gas followed by metal recovery/ residues treatment.	Upscale study on reduction roasting of nodules followed by smelting studies from the reduced nodules.

## II. Results achieved during reported year [2019]: [3]

Year	No.	Agreed Objectives	Objective: Completed, Modified, Postponed or Replaced
<b>Survey &amp; Exploration</b>			
Year 3	2019	Revisiting the identification of FGM: The earlier exercise of identification of the FGM was conditioned by contiguity of blocks. On reconsideration, this requirement seems	Completed. A revised FGM (RFGM) was identified. The RFGM has 6 clusters of blocks in the western part of the Indian Contract Area. There are 53 blocks in the identified RFGM.

		<p>unnecessary and restrictive. Consequently, the best blocks will be selected based on the previous parameters but the FGM may be an aggregate of multiple nodule fields rather than a single contiguous nodule field. The selection of the revised FGM will be based on the updated block-wise resources estimate.</p> <p>Additional sampling in the revised FGM to complete a sampling grid of 6.25 km x 6.25 km in the FGM area (approx. 7,800 sq.km).</p>	<p>Partially Completed. Ongoing. About 176 nodule sampling stations at a grid of 6.25 km x 6.25 km has been identified in RFGM. About 30 stations have been sampled . The remaining stations in the RFGM will be sampled in subsequent years.</p>
<b>Environmental Studies</b>			
Year 3	2019	<p>Determining the distribution of megafauna using suitable techniques such as ROV and Deep Tow survey.</p> <p>Analysis of satellite imagery data from Indian Remote Sensing Satellites for measuring the chlorophyll and primary productivity in the upper water column.</p> <p>Investigations of the benthic faunal community and biodiversity (number of species and indexes) would be carried out as per the Authority's recommendation ISBA/19/LTC/8, including the revisions, if any, from 2017.</p>	<p>Ongoing. A preliminary analysis of megafauna in the entire nodule area has been surveyed using Deep Tow system previously. However, a systematic study on the distribution of megafauna in the IRZ and PRZ will be conducted along with the trial of the nodule collector system in IRZ and PRZ.</p> <p>Completed. Analysis of satellite imagery data was carried out for the parameters on SST, chlorophyll and primary productivity.</p> <p>Completed. A multi-disciplinary cruise for environmental baseline studies for the IRZ and PRZ was conducted and required samples have been collected for investigation of the benthic faunal community and biodiversity. Analysis is underway.</p>
<b>Development of Mining Technology</b>			

Year 3	2019	<p>Trials of dummy load deployment at 200 - 500 m depth from ORV Sagar Nidhi.</p> <p>Integrated lab trials of optimised nodule collecting, conveying and crushing systems.</p>	<p>Completed as per the modified needs: Numerical studies of hydrodynamic loads during deployment were carried out and the results were incorporated in undertaking mining system i.e. actual load, deployments at depths of 3400 and 5000 m using umbilical cable, in locomotion trials of the seabed mining system.</p> <p>Completed: Lab testing of the nodule collector were carried out in a soft soil equivalent concrete tank with artificial and real manganese nodules spread over the surface. Numerical studies have been undertaken with regard to nodule crushing and optimization of the crusher parameters.</p>
<b>Development of Extractive Metallurgy</b>			
Year 3	2019	<p>Experiments for optimizing leaching, purification, solvent extraction and EMD parameters for integrated process continued.</p> <p>Testing of electrowashing in 5 kg scale</p>	<p>Completed. Experiments pertaining to optimization of unit operations for integrated process such as leaching, purifications, solvent extraction and EMD preparation were carried out.</p> <p>Completed. Electrowashing process was tested in 5 kg scale.</p>

## 5. Training Programme

Schedule 3 of Annex III of the Regulations.

### I. Training Programme

Type of training	Training Program
<b>Institutions</b>	NIOT, NIO/INCOIS & IMMT
<b>Duration</b>	03 months
<b>Scope</b>	Train 10 scientists from developing States and/or personnel of the Authority
<b>Fields</b>	Marine sciences and environment, mining technology development and extractive metallurgy development.
<b>Qualification required</b>	Master's degree in science or graduate degree in engineering, with 02 years work experience, proficient in English and of age 30-40 years.
<b>Financing</b>	Full funding by the Govt. of India

### II. Trainings conducted up to reported year [2019]: [year]

Start year	End Year	Name of Trainee	Nationality	Gender	Type of Programme	Details	Duration
1993	1994	Mr. Khalid Abdullah Kadi	Saudi Arabia	Male	Training	Mining Geology	10 Months
		Mr. Kwame Odame Boamah	Ghana	Male		Exploration Geophysics	

### III. Completed Trainings per Year

	[Name of the programme described in the Contract]
Year 1	-
Year 2	-
Year 3	-
Year 4	To be conducted
Year 5	-

## 6. Standard clauses

Annex IV of the Regulations.

### Section 1

#### Definitions

1.1 In the following clauses:

(a) “exploration area” means that part of the Area allocated to the Contractor for exploration, described in schedule 1 hereto, as the same may be reduced from time to time in accordance with this contract and the Regulations;

(b) “programme of activities” means the programme of activities which is set out in schedule 2 hereto as the same may be adjusted from time to time in accordance with sections 4.3 and 4.4 hereof;

(c) “regulations” means the Regulations on Prospecting and Exploration for Polymetallic Sulphides in the Area, adopted by the Authority.

1.2 Terms and phrases defined in the Regulations shall have the same meaning in these standard clauses.

1.3 In accordance with the Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, its provisions and Part XI of the Convention are to be interpreted and applied together as a single instrument; this contract and references in this contract to the Convention are to be interpreted and applied accordingly.

1.4 This contract includes the schedules to this contract, which shall be an integral part hereof.

### Section 2

#### Security of tenure

2.1 The Contractor shall have security of tenure and this contract shall not be suspended, terminated or revised except in accordance with sections 20, 21 and 24 hereof.

2.2 The Contractor shall have the exclusive right to explore for polymetallic sulphides in the exploration area in accordance with the terms and conditions of this contract. The Authority shall ensure that no other entity operates in the exploration area for a different category of resources in a manner that might unreasonably interfere with the operations of the Contractor.

2.3 The Contractor, by notice to the Authority, shall have the right at any time to renounce without penalty the whole or part of its rights in the exploration area, provided that the Contractor shall remain liable for all obligations accrued prior to the date of such renunciation in respect of the area renounced.

2.4 Nothing in this contract shall be deemed to confer any right on the Contractor other than those rights expressly granted herein. The Authority reserves the right to enter into contracts with respect to resources other than polymetallic sulphides with third parties in the area covered by this contract.

### **Section 3**

#### **Contract term**

3.1 This contract shall enter into force on signature by both parties and shall remain in force for a period of fifteen years thereafter unless:

(a) The Contractor obtains a contract for exploitation in the exploration area which enters into force before the expiration of such period of fifteen years; or

(b) The contract is sooner terminated,

provided that the term of the contract may be extended in accordance with sections 3.2 and 17.2 hereof.

3.2 Upon application by the Contractor, not later than six months before the expiration of this contract, this contract may be extended for periods of not more than five years each on such terms and conditions as the Authority and the Contractor may then agree in accordance with the Regulations. Such extensions shall be approved if the Contractor has made efforts in good faith to comply with the requirements of this contract but for reasons beyond the Contractor's control has been unable to complete the necessary preparatory work for proceeding to the exploitation stage or if the prevailing economic circumstances do not justify proceeding to the exploitation stage.

3.3 Notwithstanding the expiration of this contract in accordance with section 3.1 hereof, if the Contractor has, at least 90 days prior to the date of expiration, applied for a contract for exploitation, the Contractor's rights and obligations under this contract shall continue until such time as the application has been considered and a contract for exploitation has been issued or refused.

### **Section 4**

#### **Exploration**

4.1 The Contractor shall commence exploration in accordance with the time schedule stipulated in the programme of activities set out in schedule 2 hereto and shall adhere to such time periods or any modification thereto as provided for by this contract.

4.2 The Contractor shall carry out the programme of activities set out in schedule 2 hereto. In carrying out such activities the Contractor shall spend in each contract year not less than the amount specified in such programme, or any agreed review thereof, in actual and direct exploration expenditures.

4.3 The Contractor, with the consent of the Authority, which consent shall not be unreasonably withheld, may from time to time make such changes in the programme of activities and the expenditures specified therein as may be necessary and prudent in accordance with good mining industry practice, and taking into account the market conditions for the metals contained in polymetallic sulphides and other relevant global economic conditions.

4.4 Not later than 90 days prior to the expiration of each five-year period from the date on which this contract enters into force in accordance with section 3 hereof, the Contractor and the

Secretary-General shall jointly undertake a review of the implementation of the plan of work for exploration under this contract. The Secretary-General may require the Contractor to submit such additional data and information as may be necessary for the purposes of the review. In the light of the review, the Contractor shall make such adjustments to its plan of work as are necessary and shall indicate its programme of activities for the following five-year period, including a revised schedule of anticipated yearly expenditures. Schedule 2 hereto shall be adjusted accordingly.

## **Section 5**

### **Environmental monitoring**

5.1 The Contractor shall take necessary measures to prevent, reduce and control pollution and other hazards to the marine environment arising from its activities in the Area as far as reasonably possible applying a precautionary approach and best environmental practices.

5.2 Prior to the commencement of exploration activities, the Contractor shall submit to the Authority:

- (a) An impact assessment of the potential effects on the marine environment of the proposed activities;
- (b) A proposal for a monitoring programme to determine the potential effect on the marine environment of the proposed activities; and
- (c) Data that could be used to establish an environmental baseline against which to assess the effect of the proposed activities.

5.3 The Contractor shall, in accordance with the Regulations, gather environmental baseline data as exploration activities progress and develop and shall establish environmental baselines against which to assess the likely effects of the Contractor's activities on the marine environment.

5.4 The Contractor shall, in accordance with the Regulations, establish and carry out a programme to monitor and report on such effects on the marine environment.

The Contractor shall cooperate with the Authority in the implementation of such monitoring.

5.5 The Contractor shall, within 90 days of the end of each calendar year, report to the Secretary-General on the implementation and results of the monitoring programme referred to in section 5.4 hereof and shall submit data and information in accordance with the Regulations.

## **Section 6**

### **Contingency plans and emergencies**

6.1 The Contractor shall, prior to the commencement of its programme of activities under this contract, submit to the Secretary-General a contingency plan to respond effectively to incidents that are likely to cause serious harm or a threat of serious harm to the marine environment arising from the Contractor's activities at sea in the exploration area. Such contingency plan shall establish special procedures and provide for adequate and appropriate equipment to deal with such incidents and, in particular, shall include arrangements for:

- (a) The immediate raising of a general alarm in the area of the exploration activities;
- (b) Immediate notification to the Secretary-General;
- (c) The warning of ships which might be about to enter the immediate vicinity;
- (d) A continuing flow of full information to the Secretary-General relating to particulars of the contingency measures already taken and further actions required;
- (e) The removal, as appropriate, of polluting substances;
- (f) The reduction and, so far as reasonably possible, prevention of serious harm to the marine environment, as well as mitigation of such effects;
- (g) As appropriate, cooperation with other contractors with the Authority to respond to an emergency; and
- (h) Periodic emergency response exercises.

6.2 The Contractor shall promptly report to the Secretary-General any incident arising from its activities that has caused, is causing or poses a threat of serious harm to the marine environment. Each such report shall contain the details of such incident, including, inter alia:

- (a) The coordinates of the area affected or which can reasonably be anticipated to be affected;
- (b) The description of the action being taken by the Contractor to prevent, contain, minimize and repair the serious harm or threat of serious harm to the marine environment;
- (c) A description of the action being taken by the Contractor to monitor the effects of the incident on the marine environment; and
- (d) Such supplementary information as may reasonably be required by the Secretary-General.

6.3 The Contractor shall comply with emergency orders issued by the Council and immediate measures of a temporary nature issued by the Secretary-General in accordance with the Regulations, to prevent, contain, minimize or repair serious harm or the threat of serious harm to the marine environment, which may include orders to the Contractor to immediately suspend or adjust any activities in the exploration area.

6.4 If the Contractor does not promptly comply with such emergency orders or immediate measures of a temporary nature, the Council may take such reasonable measures as are necessary to prevent, contain, minimize or repair any such serious harm or the threat of serious harm to the marine environment at the Contractor's expense. The Contractor shall promptly reimburse the Authority the amount of such expenses. Such expenses shall be in addition to any monetary penalties which may be imposed on the Contractor pursuant to the terms of this contract or the Regulations.

## **Section 7**

### **Human remains and objects and sites of an archaeological or historical nature**

The Contractor shall immediately notify the Secretary-General in writing of any finding in the exploration area of any human remains of an archaeological or historical nature, or any object or site of a similar nature and its location, including the preservation and protection measures taken. The Secretary-General shall transmit such information to the Director-General of the United Nations Educational, Scientific and Cultural Organization and any other competent international organization. Following the finding of any such human remains, object or site in the exploration area, and in order to avoid disturbing such human remains, object or site, no further prospecting or exploration shall take place, within a reasonable radius, until such time as the Council decides otherwise after taking account of the views of the Director-General of the United Nations Educational, Scientific and Cultural Organization or any other competent international organization.

## **Section 8**

### **Training**

8.1 In accordance with the Regulations, the Contractor shall, prior to the commencement of exploration under this contract, submit to the Authority for approval proposed training programmes for the training of personnel of the Authority and developing States, including the participation of such personnel in all of the Contractor's activities under this contract.

8.2 The scope and financing of the training programme shall be subject to negotiation between the Contractor, the Authority and the sponsoring State or States.

8.3 The Contractor shall conduct training programmes in accordance with the specific programme for the training of personnel referred to in section 8.1 hereof approved by the Authority in accordance with the Regulations, which programme, as revised and developed from time to time, shall become a part of this contract as schedule 3.

## **Section 9**

### **Books and records**

The Contractor shall keep a complete and proper set of books, accounts and financial records, consistent with internationally accepted accounting principles. Such books, accounts and financial records shall include information which will fully disclose the actual and direct expenditures for exploration and such other information as will facilitate an effective audit of such expenditures.

## **Section 10**

### **Annual reports**

10.1 The Contractor shall, within 90 days of the end of each calendar year, submit a report to the Secretary-General in such format as may be recommended from time to time by the Legal and Technical Commission covering its programme of activities in the exploration area and containing, as applicable, information in sufficient detail on:

- (a) The exploration work carried out during the calendar year, including maps, charts and graphs illustrating the work that has been done and the results obtained;

- (b) The equipment used to carry out the exploration work, including the results of tests conducted of proposed mining technologies, but not equipment design data; and
- (c) The implementation of training programmes, including any proposed revisions to or developments of such programmes.

10.2 Such reports shall also contain:

- (a) The results obtained from environmental monitoring programmes, including observations, measurements, evaluations and analyses of environmental parameters;
- (b) A statement of the quantity of polymetallic sulphides recovered as samples or for the purpose of testing;
- (c) A statement, in conformity with internationally accepted accounting principles and certified by a duly qualified firm of public accountants, or, where the Contractor is a State or a State enterprise, by the sponsoring State, of the actual and direct exploration expenditures of the Contractor in carrying out the programme of activities during the Contractor's accounting year. Such expenditures may be claimed by the contractor as part of the contractor's development costs incurred prior to the commencement of commercial production; and
- (d) Details of any proposed adjustments to the programme of activities and the reasons for such adjustments.

10.3 The Contractor shall also submit such additional information to supplement the reports referred to in section 10.1 and 10.2 hereof as the Secretary-General may from time to time reasonably require in order to carry out the Authority's functions under the Convention, the Regulations and this contract.

10.4 The Contractor shall keep, in good condition, a representative portion of samples and cores of the polymetallic sulphides obtained in the course of exploration until the expiration of this contract. The Authority may request the Contractor in writing to deliver to it for analysis a portion of any such sample and cores obtained during the course of exploration.

10.5 The contractor shall pay at the time of submission of the annual report an annual overhead charge of \$47,000 (or such sum as may be fixed in accordance with section 10.6 hereof) to cover the Authority's costs of the administration and supervision of this contract and of reviewing the reports submitted in accordance with section 10.1 hereof.

10.6 The amount of the annual overhead charge may be revised by the Authority to reflect its costs actually and reasonably incurred.

## **Section 11**

### **Data and information to be submitted on expiration of the contract**

11.1 The Contractor shall transfer to the Authority all data and information that are both necessary for and relevant to the effective exercise of the powers and functions of the Authority in respect of the exploration area in accordance with the provisions of this section.

11.2 Upon expiration or termination of this contract the Contractor, if it has not already done so, shall submit the following data and information to the Secretary-General:

- (a) Copies of geological, environmental, geochemical and geophysical data acquired by the Contractor in the course of carrying out the programme of activities that are necessary for and relevant to the effective exercise of the powers and functions of the Authority in respect of the exploration area;
- (b) The estimation of mineable deposits, when such deposits have been identified, which shall include details of the grade and quantity of the proven, probable and possible polymetallic sulphide reserves and the anticipated mining conditions;
- (c) Copies of geological, technical, financial and economic reports made by or for the Contractor that are necessary for and relevant to the effective exercise of the powers and functions of the Authority in respect of the exploration area;
- (d) Information in sufficient detail on the equipment used to carry out the exploration work, including the results of tests conducted of proposed mining technologies, but not equipment design data;
- (e) A statement of the quantity of polymetallic sulphides recovered as samples or for the purpose of testing; and
- (f) A statement on how and where samples of cores are archived and their availability to the Authority.

11.3 The data and information referred to in section 11.2 hereof shall also be submitted to the Secretary-General if, prior to the expiration of this contract, the Contractor applies for approval of a plan of work for exploitation or if the Contractor renounces its rights in the exploration area to the extent that such data and information relates to the renounced area.

## **Section 12**

### **Confidentiality**

Data and information transferred to the Authority in accordance with this contract shall be treated as confidential in accordance with the provisions of the Regulations.

## **Section 13**

### **Undertakings**

13.1 The Contractor shall carry out exploration in accordance with the terms and conditions of this contract, the Regulations, Part XI of the Convention, the Agreement and other rules of international law not incompatible with the Convention.

13.2 The Contractor undertakes:

- (a) To accept as enforceable and comply with the terms of this contract;

- (b) To comply with the applicable obligations created by the provisions of the Convention, the rules, regulations and procedures of the Authority and the decisions of the relevant organs of the Authority;
- (c) To accept control by the Authority of activities in the Area as authorized by the Convention;
- (d) To fulfil its obligations under this contract in good faith; and
- (e) To observe, as far as reasonably practicable, any recommendations which may be issued from time to time by the Legal and Technical Commission.

13.3 The Contractor shall actively carry out the programme of activities:

- (a) With due diligence, efficiency and economy;
- (b) With due regard to the impact of its activities on the marine environment; and
- (c) With reasonable regard for other activities in the marine environment.

13.4 The Authority undertakes to fulfil in good faith its powers and functions under the Convention and the Agreement in accordance with article 157 of the Convention.

## **Section 14**

### **Inspection**

14.1 The Contractor shall permit the Authority to send its inspectors on board vessels and installations used by the Contractor to carry out activities in the exploration area to:

- (a) Monitor the Contractor's compliance with the terms and conditions of this contract and the Regulations; and
- (b) Monitor the effects of such activities on the marine environment.

14.2 The Secretary-General shall give reasonable notice to the Contractor of the projected time and duration of inspections, the name of the inspectors and any activities the inspectors are to perform that are likely to require the availability of special equipment or special assistance from personnel of the Contractor.

14.3 Such inspectors shall have the authority to inspect any vessel or installation, including its log, equipment, records, facilities, all other recorded data and any relevant documents which are necessary to monitor the Contractor's compliance.

14.4 The Contractor, its agents and employees shall assist the inspectors in the performance of their duties and shall:

- (a) Accept and facilitate prompt and safe boarding of vessels and installations by inspectors;
- (b) Cooperate with and assist in the inspection of any vessel or installation conducted pursuant to these procedures;

- (c) Provide access to all relevant equipment, facilities and personnel on vessels and installations at all reasonable times;
- (d) Not obstruct, intimidate or interfere with inspectors in the performance of their duties;
- (e) Provide reasonable facilities, including, where appropriate, food and accommodation, to inspectors; and
- (f) Facilitate safe disembarkation by inspectors.

14.5 Inspectors shall avoid interference with the safe and normal operations on board vessels and installations used by the Contractor to carry out activities in the area visited and shall act in accordance with the Regulations and the measures adopted to protect confidentiality of data and information.

14.6 The Secretary-General and any duly authorized representatives of the Secretary-General, shall have access, for purposes of audit and examination, to any books, documents, papers and records of the Contractor which are necessary and directly pertinent to verify the expenditures referred to in section 10.2 (c).

14.7 The Secretary-General shall provide relevant information contained in the reports of inspectors to the Contractor and its sponsoring State or States where action is necessary.

14.8 If for any reason the Contractor does not pursue exploration and does not request a contract for exploitation, it shall, before withdrawing from the exploration area, notify the Secretary-General in writing in order to permit the Authority, if it so decides, to carry out an inspection pursuant to this section.

## **Section 15**

### **Safety, labour and health standards**

15.1 The Contractor shall comply with the generally accepted international rules and standards established by competent international organizations or general diplomatic conferences concerning the safety of life at sea, and the prevention of collisions and such rules, regulations and procedures as may be adopted by the Authority relating to safety at sea. Each vessel used for carrying out activities in the Area shall possess current valid certificates required by and issued pursuant to such international rules and standards.

15.2 The Contractor shall, in carrying out exploration under this contract, observe and comply with such rules, regulations and procedures as may be adopted by the Authority relating to protection against discrimination in employment, occupational safety and health, labour relations, social security, employment security and living conditions at the work site. Such rules, regulations and procedures shall take into account conventions and recommendations of the International Labour Organization and other competent international organizations.

## **Section 16**

### **Responsibility and liability**

16.1 The Contractor shall be liable for the actual amount of any damage, including damage to the marine environment, arising out of its wrongful acts or omissions, and those of its employees, subcontractors, agents and all persons engaged in working or acting for them in the conduct of its operations under this contract, including the costs of reasonable measures to prevent or limit damage to the marine environment, account being taken of any contributory acts or omissions by the Authority.

16.2 The Contractor shall indemnify the Authority, its employees, subcontractors and agents against all claims and liabilities of any third party arising out of any wrongful acts or omissions of the Contractor and its employees, agents and subcontractors, and all persons engaged in working or acting for them in the conduct of its operations under this contract.

16.3 The Authority shall be liable for the actual amount of any damage to the Contractor arising out of its wrongful acts in the exercise of its powers and functions, including violations under article 168, paragraph 2, of the Convention, account being taken of contributory acts or omissions by the Contractor, its employees, agents and subcontractors, and all persons engaged in working or acting for them in the conduct of its operations under this contract.

16.4 The Authority shall indemnify the Contractor, its employees, subcontractors, agents and all persons engaged in working or acting for them in the conduct of its operations under this contract, against all claims and liabilities of any third party arising out of any wrongful acts or omissions in the exercise of its powers and functions hereunder, including violations under article 168, paragraph 2, of the Convention.

16.5 The Contractor shall maintain appropriate insurance policies with internationally recognized carriers, in accordance with generally accepted international maritime practice.

## **Section 17**

### **Force majeure**

17.1 The Contractor shall not be liable for an unavoidable delay or failure to perform any of its obligations under this contract due to force majeure. For the purposes of this contract, force majeure shall mean an event or condition that the Contractor could not reasonably be expected to prevent or control; provided that the event or condition was not caused by negligence or by a failure to observe good mining industry practice.

17.2 The Contractor shall, upon request, be granted a time extension equal to the period by which performance was delayed hereunder by force majeure and the term of this contract shall be extended accordingly.

17.3 In the event of force majeure, the Contractor shall take all reasonable measures to remove its inability to perform and comply with the terms and conditions of this contract with a minimum of delay.

17.4 The Contractor shall give notice to the Authority of the occurrence of an event of force majeure as soon as reasonably possible, and similarly give notice to the Authority of the restoration of normal conditions.

## **Section 18**

## **Disclaimer**

Neither the Contractor nor any affiliated company or subcontractor shall in any manner claim or suggest, whether expressly or by implication, that the Authority or any official thereof has, or has expressed, any opinion with respect to polymetallic sulphides in the exploration area and a statement to that effect shall not be included in or endorsed on any prospectus, notice, circular, advertisement, press release or similar document issued by the Contractor, any affiliated company or any subcontractor that refers directly or indirectly to this contract. For the purposes of this section, an “affiliated company” means any person, firm or company or Stateowned entity controlling, controlled by, or under common control with, the Contractor.

## **Section 19**

### **Renunciation of rights**

The Contractor, by notice to the Authority, shall have the right to renounce its rights and terminate this contract without penalty, provided that the Contractor shall remain liable for all obligations accrued prior to the date of such renunciation and those obligations required to be fulfilled after termination in accordance with the Regulations.

## **Section 20**

### **Termination of sponsorship**

20.1 If the nationality or control of the Contractor changes or the Contractor’s sponsoring State, as defined in the Regulations, terminates its sponsorship, the Contractor shall promptly notify the Authority forthwith.

20.2 In either such event, if the Contractor does not obtain another sponsor meeting the requirements prescribed in the Regulations which submits to the Authority a certificate of sponsorship for the Contractor in the prescribed form within the time specified in the Regulations, this contract shall terminate forthwith.

## **Section 21**

### **Suspension and termination of contract and penalties**

21.1 The Council may suspend or terminate this contract, without prejudice to any other rights that the Authority may have, if any of the following events should occur:

(a) If, in spite of written warnings by the Authority, the Contractor has conducted its activities in such a way as to result in serious persistent and wilful violations of the fundamental terms of this contract, Part XI of the Convention, the Agreement and the rules, regulations and procedures of the Authority; or

(b) If the Contractor has failed to comply with a final binding decision of the dispute settlement body applicable to it; or

(c) If the Contractor becomes insolvent or commits an act of bankruptcy or enters into any agreement for composition with its creditors or goes into liquidation or receivership, whether compulsory or voluntary, or petitions or applies to any tribunal for the appointment of a

receiver or a trustee or receiver for itself or commences any proceedings relating to itself under any bankruptcy, insolvency or readjustment of debt law, whether now or hereafter in effect, other than for the purpose of reconstruction.

21.2 The Council may, without prejudice to Section 17, after consultation with the contractor, suspend or terminate this contract, without prejudice to any other rights that the Authority may have, if the Contractor is prevented from performing its obligations under this contract by reason of an event or condition of force majeure, as described in Section 17.1, which has persisted for a continuous period exceeding two years, despite the Contractor having taken all reasonable measures to remove its inability to perform and comply with the terms and conditions of this contract with a minimum of delay.

21.3 Any suspension or termination shall be by notice, through the Secretary-General, which shall include a statement of the reasons for taking such action. The suspension or termination shall be effective 60 days after such notice, unless the Contractor within such period disputes the Authority's right to suspend or terminate this contract in accordance with Part XI, section 5, of the Convention.

21.4 If the Contractor takes such action, this contract shall only be suspended or terminated in accordance with a final binding decision in accordance with Part XI, section 5, of the Convention.

21.5 If the Council has suspended this contract, the Council may by notice require the Contractor to resume its operations and comply with the terms and conditions of this contract, not later than 60 days after such notice.

21.6 In the case of any violation of this contract not covered by section 21.1 (a) hereof, or in lieu of suspension or termination under section 21.1 hereof, the Council may impose upon the Contractor monetary penalties proportionate to the seriousness of the violation.

21.7 The Council may not execute a decision involving monetary penalties until the Contractor has been accorded a reasonable opportunity to exhaust the judicial remedies available to it pursuant to Part XI, section 5, of the Convention.

21.8 In the event of termination or expiration of this contract, the Contractor shall comply with the Regulations and shall remove all installations, plant, equipment and materials in the exploration area and shall make the area safe so as not to constitute a danger to persons, shipping or to the marine environment.

## **Section 22**

### **Transfer of rights and obligations**

22.1 The rights and obligations of the Contractor under this contract may be transferred in whole or in part only with the consent of the Authority and in accordance with the Regulations.

22.2 The Authority shall not unreasonably withhold consent to the transfer if the proposed transferee is in all respects a qualified applicant in accordance with the Regulations and assumes all of the obligations of the Contractor and if the transfer does not confer to the transferee a plan of work, the approval of which would be forbidden by Annex III, article 6, paragraph 3 (c), of the Convention.

22.3 The terms, undertakings and conditions of this contract shall inure to the benefit of and be binding upon the parties hereto and their respective successors and assigns.

### **Section 23**

#### **No waiver**

No waiver by either party of any rights pursuant to a breach of the terms and conditions of this contract to be performed by the other party shall be construed as a waiver by the party of any succeeding breach of the same or any other term or condition to be performed by the other party.

### **Section 24**

#### **Revision**

24.1 When circumstances have arisen or are likely to arise which, in the opinion of the Authority or the Contractor, would render this contract inequitable or make it impracticable or impossible to achieve the objectives set out in this contract or in Part XI of the Convention or the Agreement, the parties shall enter into negotiations to revise it accordingly.

24.2 This contract may also be revised by agreement between the Contractor and the Authority to facilitate the application of any rules, regulations and procedures adopted by the Authority subsequent to the entry into force of this contract.

24.3 This contract may be revised, amended or otherwise modified only with the consent of the Contractor and the Authority by an appropriate instrument signed by the authorized representatives of the parties.

### **Section 25**

#### **Disputes**

25.1 Any dispute between the parties concerning the interpretation or application of this contract shall be settled in accordance with Part XI, section 5, of the Convention.

25.2 In accordance with article 21, paragraph 2, of Annex III to the Convention, any final decision rendered by a court or tribunal having jurisdiction under the Convention relating to the rights and obligations of the Authority and of the Contractor shall be enforceable in the territory of any State Party to the Convention affected thereby.

### **Section 26**

#### **Notice**

26.1 Any application, request, notice, report, consent, approval, waiver, direction or instruction hereunder shall be made by the Secretary-General or by the designated representative of the Contractor, as the case may be, in writing. Service shall be by hand, or by telex, facsimile, registered airmail or electronic mail containing an authorized signature to the Secretary-General at the headquarters of the Authority or to the designated representative. The requirement to provide any information in writing under these Regulations is satisfied by the provision of the information in an electronic document containing a digital signature.

26.2 Either party shall be entitled to change any such address to any other address by not less than ten days' notice to the other party.

26.3 Delivery by hand shall be effective when made. Delivery by telex shall be deemed to be effective on the business day following the day when the "answer back" appears on the sender's telex machine. Delivery by facsimile shall be effective when the "transmit confirmation report" confirming the transmission to the recipient's published facsimile number is received by the transmitter. Delivery by registered airmail shall be deemed to be effective 21 days after posting. An electronic document is presumed to have been received by the addressee when it enters an information system designated or used by the addressee for the purpose of receiving documents of the type sent and it is capable of being retrieved and processed by the addressee.

26.4 Notice to the designated representative of the Contractor shall constitute effective notice to the Contractor for all purposes under this contract, and the designated representative shall be the Contractor's agent for the service of process or notification in any proceeding of any court or tribunal having jurisdiction.

26.5 Notice to the Secretary-General shall constitute effective notice to the Authority for all purposes under this contract, and the Secretary-General shall be the Authority's agent for the service of process or notification in any proceeding of any court or tribunal having jurisdiction.

## **Section 27**

### **Applicable law**

27.1 This contract shall be governed by the terms of this contract, the rules, regulations and procedures of the Authority, Part XI of the Convention, the Agreement and other rules of international law not incompatible with the Convention.

27.2 The Contractor, its employees, subcontractors, agents and all persons engaged in working or acting for them in the conduct of its operations under this contract shall observe the applicable law referred to in section 27.1 hereof and shall not engage in any transaction, directly or indirectly, prohibited by the applicable law.

27.3 Nothing contained in this contract shall be deemed an exemption from the necessity of applying for and obtaining any permit or authority that may be required for any activities under this contract.

## **Section 28**

### **Interpretation**

The division of this contract into sections and subsections and the insertion of headings are for convenience of reference only and shall not affect the construction or interpretation hereof.

## **Section 29**

### **Additional documents**

Each party hereto agrees to execute and deliver all such further instruments, and to do and perform all such further acts and things as may be necessary or expedient to give effect to the provisions of this contract.