



## POLYMETALLIC NODULE RESOURCE CLASSIFICATION WORKSHOP

*The International Seabed Authority, in collaboration with the Ministry of Earth Sciences of India, convened an international workshop on polymetallic nodule resource classification in Goa, India, from 13 to 17 October 2014. The workshop reviewed the work being undertaken in the collection and classification of resource data and current practice in mineral development by contractors in the exploration for polymetallic nodules. Special attention was paid to the national reporting standards for exploration results and resource classification. This initiative represented the efforts being made by contractors involved in the exploration for polymetallic nodules to meet the requirements outlined in the standard clauses of exploration contracts regarding the collection of resource data. The workshop also reviewed current practice in land-based mineral development; identified special aspects of polymetallic nodule deposits that should be addressed in resource reporting standards; and identified issues arising from differences in national reporting standards to which the Authority should respond. The outputs from the workshop included a draft template to provide guidance to the Authority regarding relationships with mineral information standards organizations, including potential cooperation with the (Committee for Mineral Reserves International Reporting Standards) CRIRSCO's work.*

### BACKGROUND

Since the adoption of the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area in July 2000, the Authority has signed thirteen 15-year exploration contracts. Six of these contracts will expire in 2016 and a seventh in 2017.

The Regulations (Sections 9 and 11) stipulate that each contractor, upon expiration of its contract, is required to submit to the Authority: (i) annual reports covering its programme of activities; (ii) all data and information; and (iii) copies of geological, environmental, geochemical and geophysical data acquired in the course of its programme of activities among other specifications.

Sections 9 and 11 also mandate the application of internationally accepted standards and practices in the assessment and reporting of mineral resources.

Past reviews of resource assessment work reported in the annual reports of contractors showed considerable variations, with no uniform standards.

The Nodule Resource Classification workshop was convened to address this situation prior to the expiration of exploration contracts for polymetallic nodules.

### OBJECTIVE

The main objective of the workshop was to ascertain the status of work undertaken by contractors for polymetallic nodule exploration in the Area, with a view to standardizing the exploration and resource data required of contractors and to develop guidelines for the classification of mineral resources.

### MINING TECHNOLOGY FOR THE CLASSIFICATION OF POLYMETALLIC NODULE RESOURCES IN THE AREA

Dr Caitlyn Antrim, Director, Center for Leadership and Global Diplomacy, Virginia, spoke on International Standards for Resource and Economic Evaluation: Applications for Deep Seabed Mining. She provided: an initial framework of standards as required by different stakeholders; a history of resource

classification; the role of 'competent' or 'qualified persons'; and the evaluation of a project. Dr Antrim said that the CRIRSCO template would ensure that mineral reserve and resource reports required of contractors to the Authority to comply with international reporting standards.

In her second presentation, Dr Caitlyn Antrim informed the participants about public reports and studies in the mineral industry under two categories: i) technical reports, and ii) integrated economic assessments. The latter included a technical and economic scoping study on the potential viability of mineral resources, feasibility studies, and an engineering study using the best design approach. She said the studies may be placed in the public domain to allow access by investors and regulators. Terms of access would be governed by national reporting laws and international codes. These same rules would also apply to a seabed miner wanting to be a part of the mining industry.

Mr Ted Brockett, President, Sound Ocean Systems Inc., Redmond, Washington described nodule collector sub-systems under the Ocean Management Inc. (OMI) pilot test programme during 1977, and its use in collaborative tests by contractors. He stated that OMI favoured hydraulic designs, and that the key to successful mining tests was the reliability of the collector.

## EMERGING INTERNATIONAL STANDARDS FOR MINERAL RESOURCE EVALUATION

Mr Michael Stanley, Sector Lead, Energy and Extractive Industries, World Bank Group, addressed the information needs of the financiers, investors and resource managers serving the industry. He said that there continued to be a global structural shift on what defines sustainable mining and locations. The key challenge going forward was the capacity of the financiers and investors to assess investment opportunities and sector governance, with emphasis on environmental / social performance. For the purpose of resource planning, he said a resource classification system with the ability to measure socio-economic performance was needed.

Ms Charlotte Griffiths, Senior Economic Affairs Officer, UN Economic Commission (UNEC) for Europe, talked about the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources (UNFC), describing how it worked and its application to seabed mineral resources. She said that UNFC is a global generic, principle-based system. It is based on three fundamental criteria, represented by three axes - the social and economic axis, the project feasibility axis and the geological knowledge axis.

Dr David MacDonald, Vice President, Segment Reserves BP Exploration, United Kingdom & Expert Group on Resource classification of the UNEC for Europe, elaborated on the UNFC system. His presentation was on Resource Classification – a universally acceptable and internationally applicable scheme for the classification and reporting of fossil energy and mineral reserves and resources. He said that the UNFC was based on a set of definitions for different categories. A list of specifications gave detailed application guidelines based on these definitions with a series of bridging documents that acted as guidelines for existing specifications for different commodities. He stated that the UNFC system used generic specifications as the minimum standard for reporting and its categories deduced the estimates that were required by CRIRSCO for disclosure.

Mr Pat Stephenson, Past Co-Chair, CRIRSCO & Director, AMC Mining Consultants, Vancouver, elaborated on the CRIRSCO Classification Code, an international coordination and advisory body in the area of Mineral Resource/Reserve classification and reporting. Mr Stephenson said that the indicated and inferred boundary was the most important determination in the CRIRSCO system, as it dictated what could be converted to mineral reserves. He further said that the CRIRSCO International Reporting Template (IRT) initiated in 2003, and its



**CAPTION:** Workshop panellists.

**A** - (L-R) Michael Stanley, Caitlyn Antrim, Ted Brockett. **B** - (L-R) Pat Stephenson, David MacDonald, Mathew Nimmo



*Workshop Participants*

recent version in 2013, endeavoured to promote best practice in mineral resource and reserve estimation and classification. Materiality, transparency and competency were the three principles that underlined national reporting standards in all the CRIRSCO countries that used the CRIRSCO template. These principles provided extensive guidelines with the ‘competent or qualified person’.

In his second presentation, Mr Pat Stephenson spoke about best practices in two categories – (i) public reporting of exploration results and Mineral Resources/Reserves, and (ii) estimation, classification and monitoring of Mineral Resources/Reserves – general and specific guidelines from CRIRSCO and its member organizations.

Mr Matthew Nimmo, Principal Geologist, Golder Associates Pty Ltd, Australia, expanded on the concept of the ‘Competent Person’ in mine-site evaluation and the responsibilities for study design, management and findings. He also addressed the issue of Identification of special aspects of polymetallic nodule deposits of the Area that should be addressed in reporting standards.

Mr Paul Kay, Manager, Offshore Minerals Resources Advice & Promotion, Geosciences, Australia examined the identification of any issues arising from differences in national reporting standards to which the Authority should respond.

## OVERVIEW

In view of the increasing commercial interest in the resources of the Area, participants in the workshop recognized the need for a classification system for the mineral resources of the Area. They considered that existing resource and reserve classification systems designed for land-based minerals would provide a useful basis for a system to enable contractors with the Authority to standardize the classification of, and reporting on, polymetallic nodule resources into proven, probable and possible reserves of metals.

Participants reviewed the international reporting template of the CRIRSCO and clarified the concept of “mineable areas”, noting that resources of the mineable areas corresponded to the “mineral resources” category of the template, including inferred, indicated and measured categories. It was also noted that the terms

“proven, probable and possible reserves” corresponded to the template categories of measured, indicated and inferred mineral resources and, if the pre-feasibility or feasibility studies supporting the conversion of resources to reserves had been applied by the contractor to proven and probable reserves. Materials that did not qualify as mineral reserves or resources under the CRIRSCO system might be classified within appropriate categories of the United Nations Framework Classification.

Participants noted that, in the application of the modifying factors listed in the template, the categories of weather, transportation, underwater topography and international benefit-sharing should be considered.

From the practice of the current contractors in the exploration for polymetallic nodules, participants noted that most contractors were already following existing classifications. These included those of the Committee for Mineral Reserves International Reporting Standards, the United Nations Framework Classification, or other national systems (such as the Canadian National Instrument 43-101, the Russian system or the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves). It was also noted that contractors would be ready to use the resource classification system recommended by the Authority in the context of their contractually mandated reports to the Authority. As a result, participants in the workshop recommended that contractors use the standards of the CRIRSCO for resource classification, as modified by the Committee to reflect the different resources, for reporting on seabed mineral resources and reserves.

Participants also recommended that such guidelines should not refer to cut-off values, as they would depend on geological, technological and economic factors that should be defined by the contractors.

On the basis of the classification systems for land-based mineral resources, it was concluded that, at present, no contractor had identified reserves of the metals of interest in polymetallic nodules, particularly in light of the fact that no tests of the collector device for mining the nodules had been conducted at the depths of the deposits. It was recommended that the

Authority support collaboration among contractors to test their collector devices and to conduct pilot mining tests and environmental impact assessments. It was noted that this would help to reduce costs and risks to each contractor and to move polymetallic nodule resources from inferred resources to reserves of the metals of interest. As a follow-up to the workshop, each contractor was requested, on a voluntary basis, to complete and return a survey regarding collector systems to the Secretariat.

## RECOMMENDATIONS

Participants broke up into three working groups.

Working Group 1 was tasked with addressing state of the art collector devices and collaboration among contractors testing their collectors with a view to identifying where standardization was required within the Clarion Clipperton Fracture Zone (CCFZ) and the Central Indian Ocean Basin (CIOB). There was general consensus among group members to continue discussion of potential collaborative efforts associated with pilot mining tests and environmental impact studies (benthic impact experiments) associated with collectors, as it was too early to identify where standardization was required with regard to collector systems.

Working Group 2 was charged to (i) address guidelines for the estimation of mineral resources and reserves as per international reporting standards; (ii) the steps required to implement them for the deep seabed mineral resources; and (iii) to help the contractors to standardize the classification of polymetallic nodule resources into proven, probable and possible reserves of metals. The group began by reviewing the draft revision of the CRIRSCO International Reporting Template and added clarity to the concept of “mineable areas”, applying the definition used by the UN Ocean Economics and Technology Branch of that area where nodule

abundance and grade is above a pre-determined cut-off and the topography is of acceptable nature. The group found that resources of the mineable area correspond to the ‘mineral resources’ category of the CRIRSCO template, including inferred, indicated and measured categories.

Working Group 3 was tasked to determine the volume of work required by each contractor to complete the resource classification exercise for their respective areas and how long the work would take. The group agreed that most contractors were already following existing systems and recommended that the Authority prepare guidelines for resource classification as soon as possible. The working group also advised that in their discussions the contractors agreed to use the resources classification scheme issued by the Authority in their practice and in their reports to the Authority (annual, after five-year periods and upon the expiry of the contract)

## PARTICIPANTS

**Speakers:** Dr Caitlyn Antrim, Mr Ted Brockett, Dr Michael Stanley, Ms Charlotte Griffiths, Dr David MacDonald, Mr Pat Stephenson, Mr Matthew Nimmo, Dr Paul John Kay

**ISA contractors:** Mr Masatsugu Okazaki and Mr Tadayuki Ishiyama, Deep Ocean Resources Development (DORD); Mr Tomasz Abramowski, InterOceanMetal Joint Organization (IOM); Mr John Parianos, Tonga Offshore Mining Limited (TOML); Mr Jacques Paynjon, Global Sea Mineral Resources NV (GSR); Drs Jincai Jin, Ning Yang, Kechao Zhu, Ming Kong, Ning Yang, & Cheng Bing Song, China Ocean Mineral Resources Research and Development Association (COMRA); Dr Yves Fouquet, L’Institut français de Recherche pour l’Exploitation de la Mer (Ifremer); Drs Tae Kyeong Yeu, Sang Bum Chi, Chan Min Yoo, Kong Ming, Sup Hong, Ki Seong Hyeong, Government of the Republic of Korea; Drs Shyam Prasad and S. K. Singh, Government of India

**Legal and Technical Commission Members:** Dr Russell Howorth, Dr M. Sudhakar, Dr Pedro Madureira, Dr Georgy Cherkashov

**MOES:** Dr S. K. Das, Dr S. Rajan, Dr S. W. A. Naqvi, Dr Shyam Prasad, Mr S. Jaisankar, Dr T. R. P. Singh, Dr John Kurian, Dr M. P. Wakdikar

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For complete copies of the workshop presentations, visit <http://bit.ly/1VzDwoK>



*The International Seabed Authority is an autonomous international organization established under the 1982 United Nations Convention on the Law of the Sea and the 1994 Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea. The Authority is the organization through which States Parties to the Convention shall, in accordance with the regime for the seabed and ocean floor and subsoil thereof beyond the limits of national jurisdiction (the Area) established in Part XI and the Agreement, organize and control activities in the Area, particularly with a view to administering the resources of the Area.*