WORKSHOP ON

POLYMETALLIC NODULE MINING TECHNOLOGY- CURRENT STATUS AND CHALLENGES AHEAD

PROVISIONAL AGENDA

Jointly organised by

The International Seabed Authority (ISA)

&

The Ministry of Earth Sciences of the Government of India.

NATIONAL INSTITUTE OF OCEAN TECHNOLOGY, CHENNAI INDIA
18 to 22 February 2008

MONDAY 18 FEBRUARY 2008

8:30 – 10:00 am	Registration
10:00 – 10:15 am	Welcoming remarks - *Dr. S. Kathiroli, Director, National Institute of Ocean Technology, on behalf of Ministry of Earth Sciences, Government of India*
10:15 – 10:45 am	Welcoming remarks and Workshop Objectives - *Ambassador Satya N. Nandan, Secretary-General, International Seabed Authority*
10:45 – 11:15 am	Inaugural Address of Chief Guest, - *Padmashree Dr. H.K.Gupta, Former Secretary, Department of Ocean Development (Now Ministry of Earth Sciences), Government of India*
11:15 – 11:45 am	**COFFEE BREAK**

The economic, technical and legal framework for the development of polymetallic nodule resources in the Area.

TECHNICAL FRAMEWORK

11:45 – 12:30 pm	Analysis of exploration technologies developed in the 1970s and 1980s - *Dr. Charles Morgan, Oceanographer, Planning Solutions, Inc. Honolulu, Hawaii, USA*
12:30 – 1:15 pm	Analysis of mining technologies developed in the 1970s and 1980s - *Mr. James McFarlane, Vice-President Sound Ocean Systems Inc. Redmond, Washington, USA (formerly with Ocean Management Inc.)*
1:15 – 2:30 pm	**LUNCH BREAK**
2:30 – 3:15 pm	Model mining units of the 1970s (production requirements, area requirements and vertical integration) - *Dr. Tetsuo Yamazaki, Senior Researcher, National Institute of Advanced Industrial Science and Technology, Japan*

ECONOMIC CONSIDERATIONS

3:15 – 4:00 pm	Project economics and cost models (Flipse 1980), Nyhart (1980), Hillman (1981), Ingham (1985) and MIT) and updates based on current metal markets. - *Ms. Caitlyn L. Antrim, Director, Center for Leadership and Global Diplomacy, Virginia, USA*
4:00 – 4:30 pm	COFFEE BREAK

LEGAL FRAMEWORK

4:30 – 5:15 pm	Economic/technical considerations underpinning the pioneer regime and the Regulations on prospecting and exploration for polymetallic nodules in the Area. - *Mr. Baidy Diene, Deputy Secretary-General of the Agency for Management and Cooperation between Senegal and Guinea-Bissau, Member of the Legal and Technical Commission*

Tuesday 19 February 2008

CURRENT STATUS OF TECHNOLOGY DEVELOPMENT

This part of the workshop will address the status of each contractor's efforts to develop a cost effective configuration of technology for exploration, mining and nodule processing. Contractors will be requested to provide estimates of production costs based on their selected configurations and production scales, and to identify those areas of activity where collaboration could enhance project viability. During this part of the workshop an effort will be made to identify cost minimizing technologies for each stage of nodule development since the 1970s, as well as impediments to the process. It also seeks to identify applicable technologies from offshore oil and gas development as well as space technologies.

CONTRACTOR EFFORTS

9:30 – 10:15 am.	1. "Status of India's mining programme" - *Dr. M.A. Atmanand, Scientist, National Institute of Ocean Technology, India, and*

10:15 – 11:00 am	"Processing of sea nodules: Status and commercial evaluation of India's programme" *- Dr. P.K. Sen, Professor, IIT, Kharagpur, India*
11:00 – 11:30 am	**COFFEE BREAK**
11:30 – 12:15 pm.	"An overview of the Interoceanmetal Joint Organization's (IOM) deep-sea technology development (mining and processing)" *- Dr. R. Kotlinski, Director-General, Interoceanmetal Joint Organization, Szczecin, Poland*
12:15 – 1:00 pm	KORDI - Status of technology development (Mining and Processing), newly developed cost saving technologies, proposed scales of nodule production and processing, current estimates of the production costs of mining and processing, and possible areas of collaboration. *-Dr Sup Hong, Dr.-Ing. Ocean Engineering Research Dept. Maritime & Ocean Engineering Research Inst., KORDI*
1:00 – 2:30 pm	**LUNCH BREAK**
2:30 – 3:15 pm	The concept of the instrumental and technical support of the mining and processing of polymetallic nodules produced from the Russian exploration area. (Yuzhmorgeologiya) *- Dr. Valery M. Yubko, Deputy Director of Geology, State Scientific Centre, Federal State Unitary Geological Enterprise, Russian Federation*
3:15 – 4:00 pm	COMRA – Status of technology development (Mining and Processing), newly developed cost saving technologies, proposed scales of nodule production and processing, current estimates of the production costs of mining and processing and possible areas of collaboration. *- Dr. Wang Fei, President, COMRA, Beijing, People's Republic of China*
4:00 – 4:30 pm	**COFFEE BREAK**

4:30 – 5:15 pm	BGR - Status of technology development (Mining and Processing), newly developed cost saving technologies, proposed scales of nodule production and processing, current estimates of the production costs of mining and processing, and possible areas of collaboration. *- Carsten Rühlemann, Representative, Bundesanstalt für Geowissenschaften und Rohstoffe, Hannover, Federal Republic of Germany*

Wednesday 20 February 2008

OTHER TECHNOLOGICAL DEVELOPMENTS

9:30 – 10:15 am	"From space robotics to deep seabed mining" *- Dr. Piotr Jasiobedzki, MDA Space Missions, Brampton, Ontario, Canada*
10:15 – 11:00 am	"Status of lift systems for polymetallic nodule mining." *- Dr. John Halkyard, John Halkyard and Associates Offshore Engineering Consultants, Houston, Texas, USA*
11:00 – 11:30 am	**COFFEE BREAK**
11:30 – 12:15 pm	"Advances in collector technologies and possible applications in deep seabed nodule mining" *- Dr. Jon Machin, Vice-President, Perry Slingsby Systems Inc, USA*
12:15 – 1:00 pm	"Advances in processing nickel laterites and sulphides ores and possible applications in nodule mining" *- Mr. Julian Malnic, CEO, Direct Nickel pty Ltd, Sidney, Australia*
1:00 – 2:30 pm	**LUNCH BREAK**
2:30 – 3:15 pm	Nautilus Minerals – "Technology development for seafloor polymetallic sulphides mining: Applications from oil and gas, and dredging technology" *- Mr. Michael Johnston, Vice President, Nautilus Minerals Inc.*

3:15 – 3:45 pm	COFFEE BREAK
3:45 – 4:30 pm	Advances in riser technology and possible applications in deep sea nodule mining - *Ms. Tricia Hill, Sales Manager, Gulf of Mexico, Wellstream International Limited, Houston, Texas, USA.*

WORKING GROUPS DELIBERATIONS

Working Groups will be formed to examine possible areas of collaboration among contractors and technology developers from the oil and gas services industry for nodule development in the area. These areas of collaboration will include mining (estimated to comprise about 30 per cent of the capital and annual operating costs), processing (estimated to comprise 50 per cent of capital and annual operating costs) and transport (estimated to comprise 20 per cent of capital and annual operating costs)

Working Group 1, on mining technology could address, *inter alia*, the collector device, power generation and riser technology.

Working Group 2, on processing technology could address resource requirements for 3 and 4 metal plants with a view to ascertaining possible cost cutting methods to reduce the overall cost of processing including, the feasibility of designing a processing plant so that at modest incremental investment it can be converted to process land-based nickel laterite ores, the feasibility of designing the processing plant to operate on blended nodules and laterite ores, and the feasibility of converting an existing nickel laterite facility to accept nodules.

Working Group 3 on the current economics of a polymetallic nodule mining venture could provide a cost model for the state of affairs of such a venture, including the scenarios of a non-integrated venture comprising a nodule mining venture in its own right and a nodule/laterite processing venture to receive nodules from a nodule miner.

4:30 – 6:00 pm	Formation of Working Groups, selection of Working Group Chairmen and initial meeting of working groups

Thursday 21 February 2008

9:30 – 11:00 am	Working Groups meet
11:00 – 11:30 am	COFFEE BREAK

11:30 – 1:00 pm	Plenary
1:00 – 2:30 pm	**LUNCH BREAK**
2:30 – 3:30 pm	Working Groups finalize recommendations
3:30 – 4:00 pm	**COFFEE BREAK**
4:00 – 5:15 pm	Working Groups report on recommendations to Plenary.
5:15 – 5:45 pm	Concluding remarks *- Ambassador Satya N. Nandan, Secretary-General, International Seabed Authority*
5:45 – 6:15 pm	Concluding remarks *- Ministry of Earth Sciences, Government of India*

Friday 22 February 2008

9.00 - 11 am	Visit to Ocean Research Vessel Sagar Kanya
11.00 am - 2.00 pm	Visit to Ocean Research Vessel Sagar Nidhi
2.00 pm - 6.00 pm	Visit to Mahabalipuram
6.30 pm to 8.30 pm	Dinner