

Sea Bed Mining: A Million Dollar Game!

Earth's last mineral frontier—the 37 million square miles of Ocean floor, is being scanned for economic exploitation. As metallic minerals of land are getting exhausted, attention is focussed on Ocean. It is anticipated that a rich repository of non-ferrous minerals in the shape of Polymetallic Nodules are widely scattered on the deep sea bed. These nodules generally contain copper, nickel, manganese, cobalt—which are termed as strategic minerals. Especially nickel is in conspicuous demand of arsenal unit in the Defence sector.



Geologists fitting the Boomrang Grabs
(pic. Anand Sharma)

Beyond territorial water—international water is considered as *Res Nullius* or water belonging to no one. With edge-over technology, developed countries are developing ocean floor and enlarging its monopoly on *Res Communis* or water belonging to everybody. But finally, India, the lone champion of developing world's cause had established its say, being the first developing country having recovered Polymetallic Nodules successfully from the depth of 5 KM facing heavy odds of Indian Ocean Basin. Consecutively, Eleventh Session of 3rd United Nations Law of Sea Conference had recognised India as 'Pioneer Investor'. This status conferred on India should be counted as major diplomatic triumph in international arena. Thus in future India will be in a position

to challenge the 'Developed' monopolies of 'First'.

India, an aspirant for Frontier technology, got a go in sea mining with big money involvement. It is to be noted to become 'Pioneer Investor' one has to fulfil a financial criteria. Law says 'The entity have spent 30 Million Dollars in pioneer activities and no less than 10 percent of that amount in the location, survey and evaluation of a specific site'. The justifiability of this big deal, for a country like India is to be seen in 21st Century.

Polymetallic Nodules are spherical concretions with 3 to 10 centimeter diameter and carpet the wide ranging sea-bed. These porous metals are very economically significant and contain copper, nickel, manganese cobalt. Strategically nickel and copper stands foremost. On an average Nodules contain total of 2.49% of nickel and copper.

The Nodules are estimated to grow at the rate of approximately 3 millimeters per million a year and the surrounding sediments are estimated to accumulate at the rate of about 3 metre per million a year.

Mr. Gopinath, Chairman of Centre for Management in Agriculture (CMA) noted in his foreword to Manjula Shyam's book: *Metals from the Seabed*: "Sea-bed involves frontier technology, a technology critical to meet the expected World demand for nickel, copper, cobalt and manganese in the 21st century".

India, aspirant for frontier technology and going for the first generation sea-bed mining, may experience grave financial implications on domestic economy. Massachusetts Institute of Technology (MIT) had come out with white sheet of estimated cost for first generation mining. Research and Development prospecting and exploration should cost around 559.45 million Dollars prior to commencing of commercial recovery. Furthermore, annual expanses will be 100.50 million dollars.

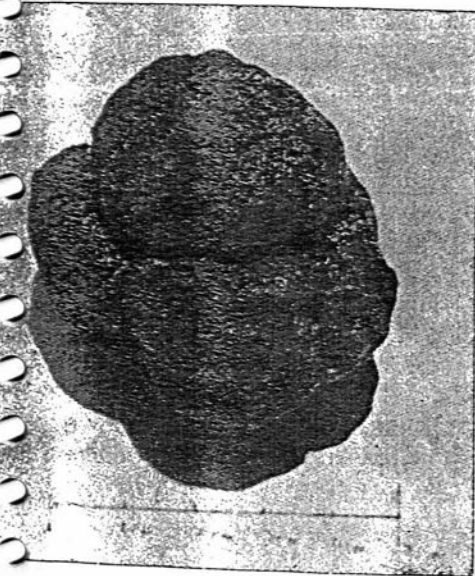
On the other hand, Archen Study criticized MIT's prophecy and verdicted that in today's fluctuative market where international currency becoming dearer, capital cost will be around 967.9 Million Dollars.

Considering this hypothetical study, one questions whether India will be able to stand its economical burden? In alternate dimension a sound technical hitch is noticed on exploration angle, and its market feasibility. Can nodules be mined out on surface reliably and will quantity-wise suit financially? It all depends on commercial nodules' pick-up 'performance' to achieve desired production.

an optimistic story. Deposit part of Indian Ocean is around 5.6 KM in depth measuring about 7 million KM which has rich Nodules deposits.

Gaveshani, the Research vessel led India's pioneering expedition in oceanographic mineral exploration in 1981. After this breakthrough, India hired two more sophisticated Research vessels which were in operation till recent past. *Fernella*—the British ship and another Norwegian ship *Skandi Surveyor*, had played the role of scanning the high-sea beds. It is unofficially learnt that rent and maintenance of each ship was to the tune of one lakh rupees per day.

Now, the Indian *Sagarkanya* has ushered in Geological sector whose cost is said to be more than one lakh rupees per day. These research expeditions roll round the year with zone to zone probing.



Polymetallic Nodule (pic. Anand Sharma)

Nickel is of strategic importance for manufacturing weapons and transport equipment. India is importing Nickel weighing around 6,075 metric tons amounting to Rs. 255,924,000 per annum. If India gets the commercial breakthrough (which India should), Indian foreign exchange reserve will be less disturbed, and Oceanic look-out will be a healthy nostalgia in 21st Century.

Ms. Manjula R. Shyam of the Institute of Management pointed out, 'the thick terrigenous sediments of the Arabian Sea and Bay of Bengal are virtually devoid of Nodules because of high rate of sedimentation'. From India's access point of view Central Indian Ocean Basin tells



(Polymetallic Nodule (pic. Anand Sharma)

Vessels cross equator and go-up to 15 South of latitude for oceanographic probing. For a single mission of 45 days around 550 grabbing operations can take place to explore different zones. Capacity of the vessel is said to be 3 to 5 tons of picked-up nodules. For grabbing operations Boomerang grabs are generally used, single boomerang grab is costing around Rs. 50 thousand. A single Boomerang Grabber can yield upto 12 grabs.

The boomerang grabber shoots down the fathomless sea with the help of iron bricks weighing around 20 Kg. On touching the sea-bed brick lets loose itself. These iron bricks are costing Rs. 240/- in each grabbing operation. Hypothetically speaking by 22nd Century, if the brickloosening process goes on, sea-bed will be layered with vast mass of iron bricks.

Research vessels engaged in ocean mining have discovered that Indian Ocean basin have peculiar topographical phenomena like odd ridges beneath deep sea which cause the loss of boomerang and other materials like hi-powered camera etc.

All unearthed nodules are sent to the lab of CSIR and it is understood that the results are encouraging regarding processed Polymetallic Nodules. A Geological Research Scholar of Delhi University Mr. Arijit Dey, who has accompanied 7th Skandi Surveyor tells 'India can be self-reliant in strategic Minerals and the indigenous frontier technology—Indian Scientific community can pave the path'.

It is to be seen whether UN Law for Sea Conference can create a conducive international environment to facilitate the flow of safe under-sea currency (multi National investment) for mining in International waters.

It is heartening that the eleventh session of the Third UN Conference had concluded on positive note. Convention adopted thereon

stands significant for India as it provides coastal jurisdiction over 12 miles territorial sea and 200 miles Exclusive Economic Zone.

Fulfilling the financial criteria, India has established its sound footing. India learnt from past from not a being Pioneer in Scientific field like, telecom, space science where still India has to fight tooth and nail for the favourable position in Geo-stationary orbit or a short wave band occupation. India won't experience these odds in oceanic sphere. Still India has to shoulder an onerous economic battle.

The UN Law for Sea Conference tells : "Pioneer Investor will pay to the preparatory commission a registration fee of \$ 250,000 and another \$ 250,000 to the Authority when it applied for a mining work". Furthermore, every registered pioneer investor will have to pay an annual fixed fee of one million dollars from the time when the pioneer area was allocated and plan of work is approved.

Does it all stand economically viable at this juncture, when priority is to be given to other development projects? Keeping pace with modern technological progress, Dr. Dutta of CSIR says "Mining (Sea-Bed) technology is not far off". He further voiced "We are in right direction".

—GAUTAM CHATTOPADHYAY
&
—ARIJIT DEY

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