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"International Seabed Area – Common heritage of mankind exploration and exploitation of non-living resources"

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UNITAR

Ladies and gentlemen, it is indeed an honour for me to address this august gathering on development and ocean affairs, and the law of the sea 20, years after the adoption of the Convention.

My presentation this morning is on the international seabed area and its resources otherwise known as the common heritage of mankind. Specifically steps being taken by the International Seabed Authority and others in exploration for, and exploitation of non-living resources in the area.

As you are all well aware, Article 136 of the UN Convention on the Law of the Sea declares the Area (marine areas beyond the limits of national jurisdiction) and its resources the common heritage of mankind.

In my presentation I will try to summarize the state of knowledge of marine minerals of the Area at the time of the Third Conference, the present state of knowledge and steps that have been taken since the establishment of the International Seabed Authority to transform the common heritage into an asset that yields benefits for the international community as a whole.

From my perspective, without commercial exploitation of the mineral resources of the Area, there will neither be benefits from these resources nor proceeds for the international community to share. The focus of my talk is the process of converting mineral resources into reserves of metal, thereby creating opportunities for contractors to invest in deep seabed mining and enabling the international community to utilize the surpluses generated from these activities for the welfare of mankind as a whole.

My presentation will also highlight some of the landmark actions that have been taken by the international community in clarifying the institutional factors necessary to convert polymetallic nodules of the seabed into reserves of metal.

Oceans have been the subject of scientific inquiry for hundreds of years. But significant study of the mineral occurrences of the deep ocean floor has only recently started to take place. The existence of metal bearing lumps, now known as polymetallic nodules, was established in 1873 during the voyage of the HMS Challenger. But man's knowledge of the ocean floor and its potential mineral wealth had to await the development of sophisticated research equipment capable of probing the great ocean depth. This began in the 1940's and since then, new theories on the evolution of global marine mineral occurrences, in particular the theory of Plate tectonics coupled with platforms for conducting research have generated a large amount of data on marine mineral occurrences and their environment of deposition. These efforts have been mostly through the efforts of academic and governmental scientific organizations around the globe.

New scientific discoveries confirmed the widespread occurrence of the deep-sea polymetallic nodules. Encouraged by theses findings, several groups of private, semi-private and public enterprises became active in the search for deposits of these minerals. This marked the transition from purely scientific research in these mineral occurrences to commercial interest in the metal bearing lumps. The initial groups of innovators, whose primary objective for undertaking the search for deep-sea bed polymetallic nodules mineral nodules was to determine their commercial viability, faced formidable obstacles.

Firstly, information about the minerals and their environment of deposition was inadequate. It still is. Secondly, technology for mining them was non-existent and thirdly very little was known about the adaptability of processing technologies for land-based ores to processing these minerals.

It is estimated that the cost of the work undertaken by these innovators in the period leading up to and during the Third Conference on the Law of the Sea, in particular in identifying potential deposits and in research and development of technology for mining and processing seabed polymetallic nodules, was almost half a billion dollars. These initial undertakings were carried out primarily by four multinational consortia composed of companies from the USA, Canada, the United Kingdom, the Federal Republic of Germany, Belgium, the Netherlands, Italy, Japan and two groups of private companies and agencies from France and Japan. There were also three publicly sponsored entities from the Union of Soviet Socialist Republics, India and China.

During the Third United Nations Conference on the Law of the Sea the only marine minerals known to occur in the area were the ubiquitous polymetallic nodules, so named because they contained nickel, copper, cobalt and manganese in grades that appeared very competitive when compared with land-based sources of these metals. In addition, given the fact that deposits of polymetallic nodules occurred as a mono-layer on the sea floor, it was felt that recovering or mining them from depths of up to 6 km from the ocean surface would not only be feasible, but could yield substantial returns to investors. Models of the economic returns from ventures to recover these minerals were developed suggesting rates of return as much as and higher than land-based mining for these metals. In part, based on this thinking, the concept of the parallel system which was adopted by the conference was introduced to ensure that developing countries would be afforded the opportunity to participate in mining these resources in the future. The end result of this process was the decision to establish the Enterprise, which is an international organization to undertake mining on behalf of the developing countries.

The projections on the profitability of nodule mining that were generated during the Conference resulted in a situation where, without the benefit of a test to determine the commercial viability of a nodule mining operation, regulations were drafted into the Convention based on what has turned out to be very optimistic scenarios. There are a large number of provisions contained in Part XI of the Convention that were based on these projections that have been set aside by the Implementation Agreement on Part XI. These include payment of an annual fixed fee by a contractor from the date of allocation of an exploration area, the share of the Authority resulting from the proceeds of a contractor, and an obligation for members to provide the Enterprise with the funds necessary to explore and exploit one mine site.

During the deliberations of the Third Conference, scientific knowledge regarding the genesis of marine minerals was that the ocean basins were big bathtubs or passive containers.

Marine metal and non-metal, non-fuel mineral deposits were considered to be primarily derived from erosion of continental rocks and carried to the sea by rivers, as solids in the form of sediments, or in dissolved phases. Such a view adequately explained the marine minerals known at that time. Polymetallic nodules were thought to have formed from dissolved chemicals that were transported by rivers to the ocean. The theory of plate tectonics that was discovered in the 70's has completely transformed knowledge of marine mineral resources, particularly with regard to deposits that have been found in the deep ocean basins and in the Area. The theory shifted emphasis away from the continents as the sole source of material for marine minerals. According to this theory, the earth's outer most layer, the lithosphere, which is about 100 km thick, is segmented into some 10 major plates and numerous minor plates. The boundaries between plates delineated by earthquakes produced by motions between the plates, mostly lie beneath the oceans. Boundaries where plates are separating, otherwise known as divergent plate boundaries, is a submerged mountain range known as the mid ocean range is manifested. This submerged mountain range, the largest geographic feature on earth, extends for approximately 60,000 km and is the location of significant hydrothermal activity that we now discover leads to the formation of various kinds of mineral resources.

It is recalled the Resolution II of the Third UN Conference on the Law of the Sea which was adopted with the Convention on the Law of the Sea, had the intent of protecting the substantial investment made by the initial group of innovators in the development of seabed mining technology, equipment and expertise. Deep seabed mining of polymetallic nodules in the area is at best an nascent industry that requires a unique type of mineral occurrence in a relatively unknown environment to be converted into a source of metal in order for it to be considered established.

At the end of the resumed third session of the Seabed Authority in August 1997, the Assembly approved exploration contracts for seven Pioneer Investors. Is it to be recalled that the Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea had registered the Pioneer Investors starting in 1987. This most recent event by the Assembly of the International Seabed Authority, that is, approving exploration contracts, marked the latest and institutionally, perhaps one of the most significant steps in the conversion of these mineral occurrences, into reserves of metal.

The term mineral has several connotations. As used by a mineralogist it refers to a naturally occurring solid and organic substance that can be described by chemical formula. As used by a minerals economist it refers to a commercially traded commodity derived from a naturally occurring non-living organic or inorganic solid, liquid or gaseous substance that is useful or believed to be potentially useful to man. The perceived potential use for a mineral is an important part of the concept. First, estimates of resources do not represent permanently fixed quantities. They may change over time, as uses are found for naturally occurring substances previously thought to be worthless, and as technologies are devised to recover valuable products from deposits once considered too lean, refractory or inaccessible to have any potential use. I make this point because under the Convention and the Authority's exploration code for polymetallic nodule deposits, every contractor has to provide the Authority with a total application area that contains two sites of equal estimated commercial value. One of these sites is allocated to the applicant while the other is designated as a reserved area where the operating arm of the Authority (The Enterprise) can undertake exploration or exploration on behalf of, or in association with, developing countries. A very important part of the Authority's mandate is to

undertake assessments of the metal contents of the polymetallic nodules in the Area, based on the data and information available to it. In this regard, the Authority undertook a study to assess the metal resources of polymetallic nodule deposits that are found in the reserved areas of the Clarion-Clipperton Fracture Zone (CCZ) based on the data and information that had been received from the six pioneer investors who had prospected these sites. The study suggested that billions of tons of the copper, manganese, cobalt and nickel are to be found in these deposits. However, there is as yet no technology that has been proven for their commercial recovery. Additionally, the land-based mines that supply these metals appear to be more than adequate. So while polymetallic nodules sit at the bottom of the ocean *in situ*, as the common heritage of mankind, until they can be recovered at a profit, we are not in the position to benefit at all from them.

There are a number of factors that will contribute to the establishment of deep-sea polymetallic nodules as reserves of nickel, copper, cobalt and manganese. These are the legal framework, the economics that I have talked about and the existence of the technology. On our part, the Seabed Authority, work has been completed on the legal framework for exploration, which has been adopted and is being applied. There is no framework that has been devised for exploitation, the belief being that we are still quite a good distance in time away from exploitation and we do not want to make the same mistake that was made in the Convention of putting together regulations and rules regarding exploitation in the absence of proven technology.

Since our establishment, a number of other factors have come to light. As I have pointed out, even the occurrence of minerals in the Area, was a problem. The knowledge that we had 20 years ago was such that the only known deep-sea marine minerals were polymetallic nodules. What we have been trying to do at the Authority since its establishment is, for example, to take a look at all the possible mineral resources that are known to occur in the international area. We convened a workshop on marine mineral resources of the Area and were informed that in addition to polymetallic nodules, there were crusts that could be found in the area that were very rich in cobalt. In fact ferromanganese crusts as they are referred to, are literally a pure ore of manganese. They contain in many cases over 50% manganese. We have also been informed about other mineral resources referred to as polymetallic sulphides. Indeed along with these sulphide deposits that occur at the margins of diverging plate boundaries at the mid oceanic ridge that I earlier mentioned, we also found all these amazing life forms. These are life forms that subsist on hydrogen sulphide, without the benefit of oxygen and light. Finally we have also been informed that there are no marine mineral resource deposits that do not have some form of biodiversity associated with them.

Another thing we therefore did was to convene a meeting of experts, a workshop again to look at the biodiversity around a number of these mineral occurrences. In particular polymetallic nodule deposits and polymetallic sulphide deposits. Polymetallic sulphides deposits were considered in the meeting because there has been a request to the Authority to establish a legal framework for the exploration for deep-sea polymetallic sulphides deposits. We have also realized the need for standardization in the way that relevant data are gathered. For example, in the resource assessment study where seven Pioneer Investors used their own methods to try to establish what deposits they could find (sampling, data on nodule coverage etc) and the value of the deposits that they found, nothing was standardized. The way samples were picked up, the way samples were preserved, and the way samples we analyzed were all very different.

A big problem that has been encountered is the difficulty of comparing information that comes from different sources. We intend to address this subject in the very near future because it makes it impossible to provide a central database where anybody who is interested in deep seabed polymetallic nodules can access and find comparable information.

A similar problem exists with some of the work being undertaken by the Authority in relation to the protection and preservation of the biodiversity at polymetallic nodule deposits. In the Legal and Technical Commission's efforts to establish environmental guidelines for Contractors to follow to monitor the impacts of activities on the flora and fauna around nodule deposits, it became apparent that standardization was lacking. For example, the names that had been given to the same animal species are completely different. In order for the Authority to be able to protect the environment from nodule mining there is a need for this kind of standardization. We are now trying to develop a project where all contractors will use a standardized taxonomy.

These are some of the activities that we are engaged in. We are also engaged in as I said, developing a new legal framework for prospecting and exploration for deep seabed polymetallic sulphides. We are discovering some problems here because unlike polymetallic nodules that from a mining perspective are mono-layer deposits and are amenable to discovery and estimation without recourse to drilling, in the search for suitable polymetallic sulphides deposits a third element of the deposit is required which is depth. Current knowledge of these deposits indicates that prospective economic deposits are 3,000/4,000 km below the ocean surface and extend to significant depths below the seabed. Estimates of their commercial value will therefore require that such deposits be drilled to determine the extent of their tonnage. To now require a potential contractor to drill a number of such deposits during prospecting for the purpose of providing the Authority with two deposits of equal estimated commercial value appears to be an enormous front-end expense without the prospect of a quick return on investment. Such a requirement could make mining deep seabed polymetallic sulphides mining uncompetitive with any land based mining operation. These are some of the issues that we have to address in developing this legal framework; different ways of maintaining the common heritage of mankind and assuring that there are sites of equivalent commercial value for later generations and developing countries to come and mine.

I wish to thank you very much.