TRAINING PROGRAMME FOR THE MANAGEMENT AND CONSERVATION OF MARINE RESOURCES

CENTRE FOR FOREIGN POLICY STUDIES
DALHOUSIE UNIVERSITY

INTERNATIONAL OCEAN INSTITUTE
MALTA

July 1, 1984

Dr. B. Sen
Secretary General
Asian-African Legal Consultative Committee
27 Ring Road Lajpat Nagar-IV
New Delhi 110024
India

Dear Dr. Sen:

Forgive me for reacting so late to your kind letter of June 11, which reached me only a few days ago, and for not having acknowledged immediately receipt of your cable and of the material concerning the AALCC for our Training Programme. Life has been unduly hectic, and I have been travelling to Europe and to Australia.

We'll miss you here at the training programme, but I am sure Dr. Jagota will take care of the situation, utilizing the material you sent us.

I have studied your paper on JEFERAD -- but shall have to study it again before finalising the new Austrian working paper. On behalf of the Austrian Delegation I wish to thank you most warmly for this paper which contains a number of highly useful suggestions and serves to clarify a number of points.

My first impressions are as follows:

1. Perhaps some points in our first working paper were not quite clear and therefore have given rise to some misunderstandings. It was indeed our intention that nothing in the proposal should conflict with, or contradict, anything in Resolutions I and II or in the Convention itself. We fully agree with you that the PREPCOM cannot take any decision or make recommendations of a binding nature to the Enterprise on matters which the Enterprise is to decide for itself when it comes into existence. In our view,

DEPARTMENT OF POLITICAL SCIENCE
DALHOUSIE UNIVERSITY
HALIFAX, N.S. CANADA
B3H 4H6

JEFERAD should terminate its activities at the time the Convention comes into force. It is entirely up to the Enterprise, and, of course to the partners of JEFERAD, to decide whether a new joint venture should be formed, in which the Enterprise would assume the function of the majority partner.

2. While I completely agree with you that the PREPCOM has absolutely no power to revise the Convention -- not even one comma of it -- I nevertheless do believe that the new scientific discoveries do open new perspectives which will have to be taken into account sooner or later. The possibility that mining of deep sea minerals, including nodules and crusts, may take place in areas under national jurisdiction, may cause serious problems, and while the Convention undoubtedly provides that all mineral resources are the common heritage of mankind, rules and regulations and all of Annex III refer exclusively to the nodules. There is nothing we can do about that at this stage, but at least we should be aware of it, and it may affect the PREPCOM's policy with regard to scientific research which the Authority will have to engage in, and which the PREPCOM therefore will have to prepare for. The point is not of direct relevance for JEFERAD, except that it may affect R&D.

3.We agree with you that the adoption of Resolution II necessitates a departure from the normal practice on the functions of a Preparatory Commission. It imposes in fact operative functions on the PREPCOM, which is quite unusual if not unique in the history of preparatory commissions. We also agree with you that there is an ambiguity in the expression "taking all measures necessary for early entry into effective operation of the Enterprise." Undoubtedly, this phrase can be interpreted in a wider or in a narrower sense. You appear in favor of interpreting it in a narrow sense. You state "There would appear to be no provision in Resolution II to support any capacity to enter into contracts." In this case, however, the PREPCOM will be unable to enter into service contracts with companies or suppliers to arrange for the exploration of the two reserved

sites, and preparations for the Enterprise will not keep pace with the activities of the Pioneers. This is really the crux of the matter. If it is decided that the PREPCOM has operative capacity with regard to the Pioneers, but no operative capacity with regard to the future Enterprise, it cannot fulfil its mandate of keeping the development of the reserved area for the Enterprise and the development of the pioneer activities at the same pace. There must be a way out of this dilemma.

4. We agree with you that the Commission has no powers to borrow. Whether it would not be competent to receive any funds beyond what is provided for in Resolutions I and II, is again,perhaps, a matter of interpretation. We have been thinking, lately, of the possibility of working through the Revolving Fund, administered by UNDP and the World Bank to assist developing countries in the exploration of their hard mineral and geothermal energy resources. The required amount -- 20 to 30 million dollars a year for five years -- could be contributed to that Fund, and the Fund could contribute it to JEFERAD; or, if this Fund does not have the competence to do this, a similar Fund, with legal personality, could be established and, perhaps, become the formal partner of JEFERAD. As far as the PREPCOM is concerned, one could take up your idea of a "special committee."

5. The main point is that the international community in whatever form must come up with some money. in your version it is the Pioneer Investors who must put up the whole money. So there is no incentive. The incentive for them should be that participation in JEFERAD reduces their investments, and they all lack capital for R&D at this time. So we MUST provide some funding. That really is the trick. The Fund seems to be one possibility. It would bypass the question whether the PREPCOM is or is not competent to raise funds itself.

6. The other point is that your proposal does not offer to developing countries the possibility of participating in JEFERAD -- unless they themselves come up with money. And

this, again, would quite considerably reduce the usefulness of the proposal. In our proposal, the developing countries benefit from the funds provided through the international community -- whether by the PREPCOM or by the Revolving Fund -- and they can participate directly in the mangement of this high-tech undertaking.This is an advantage that should not get lost.

These, I think, are the main points. We will take care of them in our new working paper.

The informal consultation on JEFERAD has been scheduled for August 2-3 at the Palais in Geneva -- just preceding the meeting of the 77, which have already placed a discussion on this subject on their agenda.

However, it is to be expected that the PREPCOM will move very slowly during this summer session -- unless the German problem, which is crucial for a solution of the problem of overlapping claims, has been solved. Nobody expects this to happen before August, although it, hopefull will happen before the end of the year.

We very much hope it will be possible for you to be in Geneva on August 2.

I am convinced that our two proposals are strictly complementary. Yours deals with the period following the coming into force of the Convention. Ours deals with the period of the PREPCOM. It leads up to, and prepares for, yours.

Thanking you again for your important contribution to the elaboration of our proposal, I remain,

Very cordially yours,

Elisabeth Mann Borgese

Delegation of the Kingdom
of the Netherlands to the
Third UN-Conference
on the Law of the Sea

Resumed Eighth Session
New York

August 6, 1979, a.m.

STATEMENT BY MR. H. GAJENTAAN

IN WORKING GROUP OF 21

(FIRST COMMITTEE MATTERS)

Mr. Chairman,

During the last few months my delegation has listened with great attention to the various comments made on the suggestion by my delegation in this Group at the Geneva Session last April. As you recall we suggested at that time to provide within the parallel system of exploration and exploitation for an optional right for the Enterprise to enter into a joint-venture arrangement with a contractor, with a participation up to 20%; and for a similar optional right for the contractor in the reserved area in case the Enterprise would decide to exercise its option.

Let me express my delegation's appreciation to our colleagues in this room who have shown their interest in our suggestion and that have joined us in constructive discussions on the subjects. At the time of the presentation of our suggestion we were very much aware that it would not immediately spark off enthousiasm in all circles, but we have found the considered responses to our suggestion both encouraging and provoking further thought. In that regard we are grateful both to our supporters and our critics. We have taken note of the intervention by the distinguished delegate of Peru on behalf of the Group of 77, indicating that the consideration of the Netherlands proposal in the Group of 77 has not yet been completed, and that the Group of 77 has not yet reached a definitive position on it. My delegation is ready to enter into further informal discussion for further clarification of our suggestion.

Let me now, Mr. Chairman, address some of the specific comments made during this meeting - as well as during the discussions we have had recently.

A major criticism has been the allegation that by writing in the Treaty provisions for an optional right for the Enterprise to enter into such joint-ventures we would in fact undermine the parallel system of exploration and exploitation . Nothing could be further from our intentions and we reject this contention very strongly.

In our view the working of the parallel system could only be strengthened through an optional right for joint ventures as we have suggested. First of all, the exercise of the optional right by the Enterprise would be possible only <u>after</u> the signing of the contract within the framework of Annex II of the present text. I would like to emphasize this point since the presentation of our suggestion has apparently given rise to misunderstandings on this point. It would thus mean that the exercise of the optional right would in no way limit the application of the relevant

provisions of Annex II regarding the qualification of applicants, the approval of plans of work submitted by them, the selection of applicants and the reservation of sites. Our suggestion would fully leave intact that parallel system in which the interests of States and private operatios.

Secondly, by providing the Enterprise with an optional right to enter into a joint venture arrangement after the signing of the contract between the Authority and the private company or state enterprise, the Enterprise would be given an early - indeed an immediate - opportunity to participate in a cooperative effort in activities for the exploration and exploitation of the resources of the Area. It would enable the Enterprise as a significant partner in a joint venture arrangement to have access through direct participation to seabed mining activities, and to acquire the necessary insight end experience in the technical, financial and managerial fields. It could thus more rapidly become a full and competitive operatir in seabed mining activities on the assumption that agreement is reached at this Conference on the financing of the Enterprise. In that way, our suggestion will strengthen the parallel system with its two branches, to which all of us are committed.

I would expect that the Enterprise would exercise its option right in the early stages of the Convention in all or at least in a significant number of operations, but that it will prefer to operate independently once it has acquired know-how and experience in ocean mining. Thus, if I am right in this, the parallel system will come fully into its own at that stage, with the Enterprise and private companies, as well as joint ventures between them, engaged in mining activities, in healthy competition between them.

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Mr. Chairman:

The Austrian Delegation has listened with keen interest to the distinguished Delegate of the Netherlands, on April 20 in the Working Group of 21 and now again, on his timely, conceptually bold and flexible proposal, and I should like to congratulate him on his initiative. At this moment, when the Conference is faced with serious difficulties in finding a modus operandi acceptable to both the industrialized and the developing countries and, at the same time, ensuring that the Enterprise can function on an equal footing with the Contractors -- the Netherlands' proposal may indeed open the way towards a solution, a way out of our deadlock.

As was pointed out by various delegations, the idea of a unitary joint-venture system is not new to this Conference. The Delegations of Nigeria, Sri Lanka and others have introduced it into our debates on various occasions. I may remind you that a proposal in this direction was also made by my own Delegation, albeit it during an informal working session in the Spring of 1977. The text of this proposal is available in the Report of Informal Consultations in Geneva Annex 6, which was distributed by the Secretariat.

I should like to summarize here very succinctly the advantages of a unitary joint venture system, with particular reference to the version proposed by the Netherlands.

It should be stressed at the outset that the Netherlands proposal introduces a unitary system only to the extent that the Enterprise exercises its option for joint venture with the Contractor in the non-reserved area and the Contractor exercises his option to enter into a joint venture with the Enterprise in the reserved area. To the extent that these options are not exercised, the parallel system is retained. This means that the changes required in the ICNT are relatively minimal. They could, conceivably, be contained in an additional single Article 151 bis and some changes in Annexes II and III. If the Conference could agree on financial terms, terms and conditions of technology transfer, etc., all these paragraphs and articles could be included in the Text and remain the basis for the parallel system. Should, however, the Conference fail to agree on these detailed provisions, we need not despair: for we could then assume that Enterprise and Contractors would fall back on exercising the option for joint ventures. The availability of the option cools the burning importance of the provisions for financial arrangements and technology transfer.

It should also be stressed at the outset that the Netherlands proposal does not detract one iota from the rights and aspirations of the Enterprise as conceived by the Developing countries. It merely adds to these rights. The Enterprise retains its full rights to operate by itself, but in addition it has the right to share in all seabed production operations. Theoretically, it has this option also under the ICNT; practically, however, it was not assured that there would be State or private partners for the Enterprise for joint ventures. The Netherlands proposal assures that the option can be exercised.

Let us assume now that the options are exercised: What are the advantages of the system? I should like to develop the following 9 points:

1. The system ensures that the Enterprise can initiate its operations at the same time as the private sector. It is the only system that gives this assurance.

2. The problem of the financial terms of contracts becomes far simpler. They can be solved in accordance with standard commercial practice: The share of the produce, the share of profits, and the share of decision-making power are proportionate to the Enterprise's investment share, which, according to the Netherland's proposal, would be up to 20 percent in the non-reserved, and at least 80 percent in the reserved, areas, that is, an average of 50 percent, if all options were exercised.

3. The system thus maximizes financial benefits for the Enterprise and the Authority (in the optimal case, 50 percent of the total seabed production); at the same time, it is financially advantageous to States and companies since it reduces their investment up to 50 percent average while providing for the kind of flexible profit and risk sharing system which the industrialized countries have been advocating during our discussions here.

4. The system solves the problems of technology transfer which is automatically assured in a joint venture.

5. Joint ventures may cover one or more or all stages of an integrated operation, from Research & Development through Prospectint, Exploration, Exploitation, Processing and Marketing. The untractable problem of calculating the ANP (attributable net proceeds) is thus avoided under a joint venture system.

6. The banking system, which caused a great many difficulties, some of which have not even been fully discussed at this Conference, is greatly simplified under the Netherlands' proposal. Under the ICNT it was indeed difficult to decide at what point the two mine sites under consideration could be deemed to be of equal commercial value, and what this value was to be. The question of who was to be responsible for the costs of exploration up to the point of this decision had indeed not been solved satisfactorily to all parties. Under the Netherlands' proposal this difficulty is avoided. In practice, the banking system, under the Netherlands' proposal would work as follows: For each Contract A, in which the Enterprise has the option for a 20 percent participation, there is a Contract B, in which States and companies have an option for an equal participation up to 20 percent. Exploration, in each case, is to be carried out by the joint venture.

7. The problem of discrimination between the Enterprise and States and companies with regard to taxation is avoided. All joint ventures will be treated in the same way, without discrimination.

8. The most important and basic advantage of the system is that the established industry is built into it on the basis of cooperation rather than competition. The Netherlands' proposal introduces this principle in a most flexible way, without shaking the basis of the parallel system. It opens options. Commercial practice and experience themselves will decide to what extent these options will be exercised.

9. The problems of the Review Conference, therefore, lose much of their pungency and become far more tractable. For if the system of exploration and exploitation is built in such a way that the most efficient form of cooperation is allowed to emerge during the first 20 years, the task of the Review Conference will be greatly facilitated. Rather than a consolation prize for those who did not really want to accept the parallel system in the present Convention, the Review Conference will be a normal occurence, faced with the normal tasks of consolidating the system and making minor improvements, not of basically changing the system, under the two-edged sword of Damocles of a moratorium.

The Conference owes a debt of gratitude to the Delegation of the Netherlands for this proposal and we are looking forward to deliberations on it in the resumed session.

Delegation of the Kingdom
of the Netherlands to the
Third UN-Conference on the
Law of the Sea

Eighth Session
Geneva

STATEMENT BY PROFESSOR W. RIPHAGEN
IN THE WORKING GROUP OF 21
ON FIRST COMMITTEE MATTERS
ON APRIL 20, 1979

Mr. Chairman,

At the outset I must make it clear that I speak now for the Netherlands only. I should also make it clear that what I am going to say is not a proposal in any formal sense of the word, but only a suggestion, thrown out with the purpose of possibly helping our Group to reach an overall consensus. For that same purpose this suggestion is, so to speak automatically withdrawn if it should appear not to be helpful.

Mr. Chairman, our discussions uptil now seem to center around the position of the Enterprise and its actual possibilities to operate speedily and effectively. We have discussed at length the financial and technological means to be put at its disposal.

It is within this context that my Delegation feels that perhaps some thought might be given to the <u>way</u> in which the Enterprise might start to operate.

Basing ourselves on the assumption that we have found a solution for the financing of the Enterprise - and my Delegation at least is hopeful that such a solution will be found - the next question is obviously what the Enterprise is going to do with the money put at its disposal.

Now this is clearly a matter for the Enterprise itself to decide upon. It could start on its own <u>or</u> it might wish first to participate in the operations of private contractors or state enterprises willing to engage in seabed mining.

Now the second branch of this alternative would seem to my Delegation the best choice, but again this is a matter for the Enterprise itself to decide. However, <u>if</u> the Enterprise should decide that the best way to start its work would be to participate in the operations of private companies or state enterprises, we should, in the opinion of my Delegation build into the Law of the Sea Convention some guarantee that the Enterprise can in actual fact realize that wish.

With this purpose in view, my Delegation ventures to suggest that possibly the following system might be introduced in the Convention.

At the time of the granting by the Authority of a contract with respect to activities for exploration and exploitation, the Enterprise should be offered the option to enter into a joint venture arrangement with the applicant. To avoid undue uncertainties for the applicant the Enterprise should exercise its optional right within a limited time-period.

If the Enterprise decides to exercise its optional participation right and enters into such arrangement with the contractor, the latter should subsequently have a similar and equivalent optional right for entering into a joint-venture arrangement with the Enterprise in the exploration and exploitation of the corresponding reserved area.

The participation by either party in such joint-venture arrangement should not exceed 20%. This leaves open the possibility for participation with a lower percentage, which, then, should be applied in both areas. If the Enterprise would, for instance, choose to participate to only 10% in a particular joint-venture arrangement, it would follow that the contractor would have an optional participation right for a joint-venture arrangement in the corresponding reserved area to the same extent, i.e. 10%.

A share of 20% in a seabed mining project makes the Enterprise a significant partner in the joint-venture arrangement. The Enterprise may, for example, participate in each of the existing 5 consortia at a percentage of 20. This, of course, is only theory - for it does not go without saying that the Enterprise will spend all its money at once. By participating in one or two consortia only, the Enterprise will be able to gain access to technology and the skill to operate it. After it has gained enough experience, the Enterprise can make a choice between the different technologies for its own operation.

The draft convention should provide for the optional right as such, while the modalities of any such joint arrangements could be negotiated - in the operating agreement - by the parties (i.e. Enterprise and contractor) at the appropriate time. It should, however, be mentioned that the contractual arrangements either way would be on normal commercial terms, giving both parties the same rights and obligations in the same manner as would apply in joint-venture arrangements entered into between commercial undertakings.

The exercise of such optional participation rights, to the extent of this participation, results in a unitary system of exploration and exploitation. It would, however, not eliminate the parallel system inasmuch as it may be expected that the Enterprise would not wish to exercise <u>all</u> options offered to it. When the Enterprise opts for participation, there is a unitary system coming into existence; when the Enterprise decides <u>not</u> to opt for that, the parallel system shall be applied to that extent.

The basic structure of any system of exploration and exploitation should be conducive to the direct participation of the Enterprise in seabed mining operations from the outset, to acquire adequate insight in the technical, financial and managerial means that are essential in a mining project.

The specialized technology that is going to be used in future operations is nowadays concentrated in a few seabed mining consortia. For the Enterprise to get access to the relevant technology there are in essence two possibilities: firstly, the Enterprise could participate, as a partner, in an already established consortium. This means that the share of each party in the consortium will be diminished in relation to the share of the Enterprise. Secondly, the Enterprise could create a joint arrangement with a consortium and establish thereby a new consortium, in which the Enterprise has a share and the existing consortium as a whole has a share.

Taking into account the unanimously accepted objective that the Enterprise should be enabled to explore and exploit the Area for the benefit of all, the system in the draft Convention should be supplemented, so as to ensure this objective.

It is in order to guarantee to the Enterprise the effective realisation of these possibilities of participation that we make the suggestions as outlined here, thereby trying to offer a modest contribution to the success of our work in this Group.

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Austria, 2. Spec. Com.

9. April 84

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Mr. Chairman:

We are grateful for this opportunity to further clarify some points in connection with our proposal for a Joint Enterprise for Exploration Research and Development (JEFERAD), and to attempt, even though in a preliminary and necessarily incomplete manner, to react to the many interesting and useful questions that have been raised in the debate.

My Delegation would also like to express our gratefulness to you, Mr. Chairman, for having given the opportunity to the Secretary-General of the Asian African Legal Consultative Committee to introduce his Note on the Preparatory Work in Relation to the Enterprise, which also raises a number of highly relevant and helpful points.

Mr. Chairman, the questions that have been raised are basically of four types:

1. Operational questions
2. Financial questions
3. Legal questions
4. Structural questions.

Examples of the operations questions are: Will the industrial countries cooperate? Where is JEFERAD to obtain its technology? How will the selection of a site for JEFERAD be effected? Etc.

Financial questions concern, above all, the possible sources of financing for JEFERAD, and the amount of financing required.

The most important legal questions are:

1. Does the PrepCom have the legal competence to establish JEFERAD?
2. What will be the legal capacity/personality of JEFERAD?
3. What law will apply to the operations of JEFERAD?

Mr. Chairman, it would be difficult to answer, at this time, the operational and financial questions. We have given some indication of the amounts required and the modalities to be explored, in our paper. What I should like to make quite clear here at the outset is that, in our opinion, an undertaking like JEFFRAD should not have any mandatory financial implications for States Signatories of the Convention. In other words, the required funds should be found outside the budget of the Commission, from outside sources. Whether it is or is not possible to find these funds is a question that cannot be answered at the theoretical or academic level. It can only be answered through a feasibility study carried out by a group of experts: or a working group concerning the operational and financial aspects: Participants who go to potential contributors and find out whether these funds -- 20 to 30 million dollars per year for five years -- can be found or not; persons who go to and talk with industrial companies and find out whether they will cooperate or not. We hope such a group can be appointed as soon as possible, and such a feasibility study can be carried out at the practical level.

However, we propose to proceed in two stages, step by step. First we should focus on the legal and structural questions which are equally important and which, clearly, require much work in depth.

Legal Competence of the Commission

Does the Commission have legal competence to establish JEFFRAD and to become part of it?

JEFFRAD, established through a resolution adopted by the Commission and an agreement between the participants, might take the form of a subsidiary organ of the Commission or of a new entity, subject to the Commission's control. In either case, this would imply the assumption of executive functions by the Commission similar to those it has concerning the pioneer activities under Resolution II. Its role, in a way, would be that of the International Seabed Authority or the Enterprise, as if they had been provisionally established.

It could be argued that no such executive functions have been

conferred on the Commission by Resolution I or II. The functions of the Commission, it could be argued, are preparatory in nature. The effective carrying out of exploration or training activities

being the responsibility of the pioneer investors.

In our view this would be too narrow and restricted a view of the legal competence of the Commission. It would disturb the balance established in Resolution II between the protection of the interests of pioneer investors, and the protection of the interests of the potential Enterprise "to carry out activities in the Area in such a manner as to keep pace with States and other entities."

You yourself, Mr. Chairman said, as early as September 9, 1983 in your opening address to this Special Commission:

> Resolution II establishes, for all practical purposes, an interim regime for exploration, research and development, for pioneer investors, be they States or entities. The Enterprise has no resolution II. It may, as a result, be necessary for us to create the same type of interim regime for the Enterprise so that it can perform exploration, research and development activities pari passu with States and entities."

Let me now briefly consider some of the aspects of the AALCC paper.

The paper points out the need for the Commission to "take practical measures in terms of para.12 of Resolution II." "the policies to be adopted and the possible mechanisms would therefore require to be chalked out by the Commission at an early stage." (p.4) And, again (p.8) "The matter which may be examined at first are the working mechanisms which could be envisaged in harnessing the assistance of the pioneer investors for the benefit of the Enterprise during the Preparatory Commission stage."

Mr. Chairman, we submit that JEPTRAI would be just such a mechanism.

"It is open to the Commission," the paper states "to request the pioneer investor to explore the area which it has offered or perhaps to enter into some kind of arrangement with all or some

of the pioneer investors for exploration of the reserved areas jointly in association with the Commission."

Mr. Chairman, we submit that JEPERAD would offer just this kind of arrangement.

And as the AALCC paper points out, such an arrangement would be beneficial not only to the future Enterprise, "There would also be the possibility that a pioneer investor which had explored the reserved area may derive certain benefits in the future as being considered for joint arrangements with the Enterprise for exploitation of that area."

I do not want to take too much time here to belabour the point. It is quite clear that the AALCC paper and the JEPERAD proposal are very much "on the same wave length," that JEPERAD could constitute one possible mechanism for the implementation of the AALCC concepts and that the AALCC paper contributes in important ways to the clafifying the legal basis of JEPERAD.

To sum up this first point:

In our view, Resolutions I and II give to the Commission executive and operative powers: explicitly, with regard to the pioneer investors, but if the parallel system is to be maintained, they must be interpreted to apply equally to operations to ensure the early entry of the Enterprise into effective operation, keeping pace with the pioneers during the period of operation of the Prep. Com. Para.6 of Resolution 1, furthermore, gives the Commission "such legal capacity as may be necessary for the exercise of its functions and the fulfilment of its purposes as set forth in this resolution.

Secondly, there is no prohibition in Resolutions I or II to the prepcom exercising these functions in the interests of the future Enterprise.

And, thirdly, there is no incompatibility between JEPERAD and the United Nations Convention on the Law of the Sea.

We fully realize, however, that there are a number of fine legal points that have to be clarified before a full-scale feasibility study could be undertaken. Let me mention just four:

1. There are some fine differences between civil and common law with regard to the question of the legal personality of the Prep.Com. Under common law, it could be argued, that the Commission

has no legal personality and, therefore, could not be a partner in a Joint Enterprise. xx Even if this view were accepted, however, the Commission could, by Resolution, recognize a joint enterprise like JEFFRAD, if it were established. There is nothing that could prevent the Commission, in the pursuit of its task, to solicit the necessary funds for such an enterprise, if it enhances the possibilities for the early entry into effective operation of the Enterprise. The Joint Venture agreement, on the other hand, could contain a provision that a certain number of members of its Joint Enterprise Committee should be appointed by the Prep.Com., and the Prep.Com, by Resolution, could respond to this request. This is a point that must be studied.

2. It would be useful to examine in detail the full compatibility between the JEFFRAD approach and the Convention and REAAI all aspects of Resolution II. For example: Would it be in accordance with Resolution II if JEFFRAD were established for one of the reserved sites rather than for two?

3. Whatwould be the legal status of JEFFRAD? In our view it should be established as a classical joint venture. These questions also should be examined in the light of Article 13 of Annex IV to the Convention. The question of the location of JEFFRAD, the details of host agreement with the State concerned, and the specific rights and obligations of the participants in the JEFERAD agreement will also have to be worked out. Obviously these must not be incompatible with the Convention, particularly Article 13 of Annex IV relating to the Enterprise.

4. If JEFERAD is established as a separate legal person it will have the capacity to enter into contracts for obtaining good and services, which will be commercial in nature.

Normally, the contract should be interpreted in accordance with its terms and conditions, and any disputes relating thereto should be referred to commercial arbitration which should apply the rules agreed to between the parties, failing which the UNCITRAL Arbitration Rules should apply. If such a dispute raises the question of the interpretation of the Agreement on JEFERAD or of the United Nations Convention on the Law of the Sea such a question should not be settled by commercial arbitration. In the Convention, such questions are to be referred to the Seabed Dispute Chamber of the International Tribunal for the Law of the Sea (See Articles 188 (2) (a) and (c) and 293, Annex III, article 21 and Annex IV, Article 38).

Since the Tribunal or its Chamber would not have been established before the entry into force of the Convention, it would be desirable, in order to avoid complications, for JEFERAD not to enter into commercial contracts with private parties in States other than the host State. The agreement with the host State should ensure the immunity of JEFERAD from local jurisdiction. All imported goods and services should be purchased through the participating States. The proper law for the settlement of any dispute should therefore be the laws specified in constituent agreement relating to JEFERAD between the participating States. All disputes should be resolved only by negotiations between the parties. The property and assets of JEFERAD should enjoy immunity from attachment, seizure or confiscation.

But all these matters need to be examined further.

Mr. Chairman: To facilitate progress in concrete and practical terms, my Delegation would like to propose to undertake consultations with other interested Delegations on an informal basis, aiming at the preparation of a paper clarifying the legal basis of JEFERAD and the mode of its establishment. This group of interested delegations would of course be open-ended, and consultations might include an intersessional meeting of the group, around the end of June, to discuss, and agree on, such a paper. We would like to present such a paper for discussion at the resumed session.

In conclusion, let me stress that my delegation fully shares the views expressed by some delegations, that there are four conditions that must be fully met, if JEFFRAD is to be established.

1. There must be agreement that JEFFRAD would be be favorable to the early entry into effective operation of the Enterprise. My delegation is convinced that this is indeed the case. We can, at this time, think of no other approach that would facilitate the early entry of the Enterprise into effective operation as efficiently as JEFFRAD.

2. JEFFRAD must assist the Enterprise to develop its independent capability for exploration and exploitation. We feel, there is already a consensus on the point that joint ventures are the most effective way of transferring this capability to the Enterprise. With JEFFRAD, this transfer would begin <u>now</u>, not in an indeterminate future.

3. JEFFRAD must facilitate a priority participation of the developing countries in ocean mining. Again, we submit, such participation, through JEFFRAD, could begin <u>now</u>, rather than in an indeterminate future.

4. JEFFRAD should be conceived in such a way as to assure the prevention of monopoly of the international seabed exploitation activities by a few countries and their companies. Mr. Chairman, we submit that public/private international cooperation in exploration, research and development is the most efficient way to guarantee the prevention of such monopolies.

We believe, Mr. Chairman, that JEFFRAD is not only compatible with the Parallel System, but essential for its realisation. and that it is equally beneficial to the future Enterprise, to developing countries and to the industrial States and their companies, alive. And it is this balance that holds the key to success.

JEFERAD

DELEGATION OF AUSTRIA

Mr. Chairman:

Thank you for giving us, once more, the opportunity to introduce our working paper early in the deliberations of this Special Commissions, thus giving our colleagues time to think about our suggestions and to react to them.

There are several new features in our Working Paper 2 to which I shall refer here only in a very summary fashion.

The paper examines two options for the effective implementation of para.12 of Resolution II, with regard to the exploration of reserved sites, the establishment of a scheme for training, and technology transfer and development. The first of these options is based on the Secretariat's original paper, Doc. LOS/PCN/SCON2/WP1, which now has to be complemented by LOS/PCN/SCN2/WP2. This latter document really spells out in great detail our scenario 1. Our scenario 2 is based on the Austrian proposal JEFERAD as contained in Doc. LOS/PCN/SCN2/L2.

In our new working paper we are examining some legal mechanisms for the establishment and funding of JEFERAD: in particular, the possibility of the use of the United Nations Revolving Fund for Natural Resources Exploration, administered by UNDP, for this purpose.

A first consideration of our proposal by the Fund evoked a very favorable response: It would appear quite feasible that the Fund assumes this responsibility, although, of course, the question needs to be studied by the Fund's legal experts, and this could be done only after the Commission takes a decision and makes a request.

In our working paper, some alternatives are also suggested.

Mr. Chairman, in introducing this pasper, we should take into account the many excellent, thoughtful and enriching comments, queries, and suggestions that have come to us during the inter-sessional period, during the informal consultations here in Geneva, preceding this Session, and from individual Delegates. We should also take into consideration the excellent memorandum prepared by the Secretariat of the Asian-African Legal Consultative Committee as well as the Secretariat's Working Paper 2 which, as I said, complements our scenario 1. We want to thank the Secretariat for this excellent and very useful study.

While we are deeply gratified by the generous response to our proposal, we find ourselves in a somewhat difficult position in introducing this new paper: If I were to answer to all the important points that have been raised, I would have to speak for at least two hours and this, I am afraid, would be an abuse of the patience of this Special Commission.

While we will deal with all the points raised in some other manner, I shall therefore concentrate here on just a few major issues.

Let me begin with the AALCC Memorandum. The Memorandum comes to the conclusion that, with regard to the legal competence of the Commission, "There would appear to be no provision in Resolution II to support any capacity to enter into contracts." "The Commission has no power to borrow and in our view it would not be competent to receive

any funds beyond what is provided for in Resolutions I and II. We consider that it would not be permissible for the PREPCOM to raise the share of capital by way of donations nor to allow any party to provide the share capital on its behalf even if such funds were forthcoming."

"The PREPCOM cannot take any decisions or make recommendations of a binding nature to the Enterprise on matters which the Enterprise is to decide for itself when it comes into existence. No such competence can be spelt out of the two resolutions."

Mr. Chairman, we would like to draw the attention of this Special Commission to the fact that this narrow interpretation of the powers of the Commission which, we know, is not shared by all Delegations, would put rather severe restrictions on the activities of the Commission, not only with regard to Scenario 2, but equally with regard to scenario 1. It would in fact prevent us from fulfilling our task of ensuring that all measures necessary for the early entry into effective operation of the Enterprise can be taken.

the AALCC Memorandum shares our aspirations and sympatizes with the goals of JEFERAD. To maintain these goals even within its restrictive view of the powers of the Commission, the Memorandum suggests an alternative: the establishment, that is, of as "registered partnership, composed by two or more pioneser investors, financed through normal commercial sources," which would assist the PREOCOM in the discharge of the functions under para.12 of Resolution II.

While this alternative proposal retains some of the advantages and realises some of the goals of JEFERAD, it lacks two of JEFERAD's most important advantages: Relying, for its share, on public international funding (from voluntary contributions), JEFERAD offers to developing countries the opportunity to participate as equals in exploratory, research and development activities during the interim period. The AALCC alternative, relying exclusively on normal commercial funding, does not offer this opportunity to developing countries. JEFERAD, through its financial contribution, offers a financial incentive to the industrialised countries -- an incentive that may be crucially important in attracting their participation. The AALCC alternative does not.

Mr. Chairman, there are many other points in the AALCC memorandum that deserve a detailed answer, but time does not permit it. Let me conclude this part by suggesting that, while we do not necessarily share the restrictive interpretation of the Commission's legal powers, we do feel the AALCC's view ought to be taken into serious consideration and the question of the establishment ought to be taken up by a Group of Experts, when the time comes.

Let me now turn to the Secretariat's WP2.

WP2 covers both the establishment and early years of the Enterprise, i.e., the first phase after entry into force of the Convention, and the preparatory measures to be taken now, particularly those relating to para 12 or Resolution II.

The first part should not cause any great difficulties. In fulfilling this first part of its mandate, the Commission functions like any normal preparatory commission. In the particular circumstances, however, it should not be forgotten that the Enterprise is not only made by rules and regulations but that it is going to be what we make it to be during the phase preceding the coming into force of the Convention. If we allow the gap between the industrialised States and the rest of the world community to grow during these intervening years, the chances for the success of the Enterprise will decrease accordingly.

WP2 -- and Scenario 1 -- raises some disturbing questions of timing in this respect. WP2 points out that it may be uneconomical to engage in training activities until about one year before the coming into force of the Convention. The argument in itself is quite sound: One cannot train for a situation that may materialise in as more or less uncertain future.

Similarly, WP2 points out that "If the Preparatory Commission involved itself on behalf of the Enterprise in activities of technology development at an early stage, the cost effectiveness of so doing could be queried. Moreover, if the Enterprise were to decide to lease or purchase proven technology there would be no need for the Commission, in the preparatory period, to involve it in technology development work."

Mr. Chairman, while these considerations are quite valid within the context of Scenario 1, we fear, nevertheless, that they imply inaction, and a deepening of the development gap. It is precisely this kind of consideration that reinforce our conviction that exploration, training, and technology development in the interim period, must be linked systemically in an action framework such as the one provided by JEFERAD: a framework that benefits developing and developed countries as well as the future Enterprise, without burdening the Enterprise with liabilities and debts.

Mr.Chairman: It seems to us, we are all moving in the same direction: The AALCC Memorandum, by proposing a Joint Enterprise for exploration, researach and development, albeit restricted to pioneer investors, on a strictly commercial basis; the Secretariat's WP2, by suggesting the possibility of a joint enterprise for the exploration of a reserved site, with all pioneer investors, albeit within an indeterminate time frame, and without the kind of incentives, or attractions, that our JEFERAD proposal would offer: and the Austrian working papers, with the proposal for the establishment of a Joint Enterprise for Exploration, Research and Development, under the auspices of the Prep.Com., for the interim period, until the coming into force of the Convention. We propose this should, and could, be done strictly within the terms of reference of Resolutions I and II, and in accordance with the Convention, and not, in any way, exceeding

the legal powers of the Prep.Com.

As far as we have been able to ascertain, Mr. Chairman, there exists, among our colleagues here, a minimalist interpretation of these powers, and a maximalist interpretation. We counsel prudence. Even within a minimalist interpretation, however,, the establishment of JEFERAD would be feasible through the UNDP Revolving Fund or through a Special Fund in Trust of the Secretary General, which could be established for this purpose by Resolution of the General Asasembly. And there may be other ways, which, we suggest, should be examined by a Group of Experts whose composition and terms of reference we suggest in our working paper. Funding, to the very modest extent required by our proposal, is feasible: as proven by the establishment, just now, of an International Centre for Genetic Engineering and Biotechnology, by UNIDO. If that Centre can be funded, why not ours? Marine technologies belong to the same type of high technologies as the biotechnologies: technologies which are transforming industrial societies and affecting the structure of international economic relations and, therefore urgently require new forms of scientific/industrial international cooperation. UNIDO is willing and ready to cooperate with us on the marine-industrial aspects of JEFERAD.

Mr. Chairman, as some of our colleagues have pointed out, the Preparatory Commission is, in a way, a pre-incarnation of the future Authority.

The pioneer investors are a pre-incarnation of the future contractors. The Certifying States are a pre-incarnation of the future Sponsoring States. What is missing is a pre-incarnation of the future Enterprise, and we need it, if the whole system is to work in the way it was intended -- that is, with both arms of the parallel system moving ahead at the same speed. JEFERAD, clearly, would constitute this pre-incarnation of the Enterprise and complete the system.

Mr. Chairman, one of our colleagues expressed some suspicion against JEFERAD. The bride is too fair, he said, or, as we put it in English, too good to be true. Certainly it would be dangerous to attempt something that is too good to be true.

But there is also the opposite danger: that is, to continue in debates on theory, to continue in inaction; to permit the Enterprise to remain a phantom, or a shadow, while very real things are happening in the very real world outside. Such a way of action, or non-action, Mr. Chairman, would be too true to be good.

FIRST COMMITTEE
Working Group

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INFORMATION NOTE ON JOINT VENTURES

Introduction

PART A — Some Legal and Institutional Aspects.

The purpose of this part of the paper is not to suggest how a joint venture can or should be created, but rather to describe the conventional manner in which a joint venture is established among States and to identify some of the major legal and institutional issues that need to be considered if such a venture is to be created.

Annex to Part A — Some examples of international Joint Ventures.

PART B — Some Operational Aspects (to be issued).

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Introduction

The conduct by the Authority of exploration and exploitation activities in the Area raises a series of legal issues which need to be clarified.

In order to present these issues correctly and as comprehensively as possible, it is necessary to start from certain premises which at this stage seem to have been accepted by the majority of countries.

These premises are:

1. The Authority will have the capacity to participate in the exploitation of the Area either acting alone or by using national, public or private enterprises for that purpose.
2. The convention will provide for this and will regulate co-operation between the contracting parties in a general fashion.
3. The establishment of this type of co-operation will depend in each case on an agreement between the parties to take the form of a contract concluded in accordance with the provisions of the convention.
4. Certain legal arrangements are considered by the majority of States to be unacceptable for application to exploitation activities in the Area.

Accordingly, it can be stated that, in principle, there are no reasons for imposing or excluding a priori a particular type of contractual arrangement between the Authority on the one hand, and States or public or private enterprises on the other. The proposals submitted to the First Committee on this point confirm this conclusion. They are phrased in such a way as to comprehend any contractual arrangement. It is possible to envisage many different types of contract between the Authority and States or enterprises for carrying out activities in the Area. Some of them entail the creation of a new entity with its own legal personality. That is what happens - although not always - when a joint venture is established. In the case of exploitation of the resources of the Area, the latter device raises difficult legal problems, owing to the fact that one of the parties to the joint venture is an international organization and that all or at least most of the activities are to be undertaken in an area governed by international law. There are no precedents for this situation which would enable us to solve such problems as that of determining the legal order to which the new subject of law belongs.

The problem is slightly different when the contract is confined to the establishment of a co-operation project between the Authority, on the one hand, and the State or enterprise on the other, where the rights and obligations of each of the contracting parties are specified, but their respective legal entities are maintained (the Authority, as a subject of international law, and the enterprise, established and governed by a specific national legal order, or the State).

The foregoing considerations may suggest that the best method of determining the most suitable formula to meet the objectives of the convention (rational exploitation, benefit of mankind, etc.) will be to seek to identify the content of the legal agreements by concentrating on the indispensible minimum provisions which should appear in them and refraining from laying down definitions or categories in advance.

It may be necessary to imagine contractual forms "sui generis" to cope with this new kind of development. In practice various types of contractual arrangements may not be as different as it may appear since they all have to deal with the important aspects of management, operation and sharing of proceeds or benefits.

PART A - SOME LEGAL AND INSTITUTIONAL ASPECTS

1. "Joint venture" is probably one of the most flexible forms of commercial co-operation. A survey of existing literature[1/] on the subject shows that a very wide spectrum of such arrangements exists ranging from temporary association of a simple contractual relationship to the creation of a permanent entity of complex structure and with juridical personality in the host country or in all contracting States. Various forms and types can be identified on the basis of different criteria or standpoints. Legally the term has been used in both national and international law.

2. In national law the term joint venture refers to a co-operative effort between a host government and one or more foreign entrepreneurs in creating an enterprise often for the exploration and exploitation of natural resources. The enterprise is usually incorporated under the national law of the host government. The foreign entrepreneur is generally expected to provide the finance, technology and/or management required for the undertaking; the national government provides the natural resources. The venture often takes the form of shareholding. The arrangements for distribution of shares, participation in management, sharing of benefits and the marketing product vary from country to country and even within the same country. There is no hard and fast rule. As a rule the arrangements depend on the requirements of each individual case (e.g. nature of the resource, availability of technology, etc.) and the bargaining power of the parties involved. Thus, for example, the risks may be shared by the partners or in other instances borne only by the foreign entrepreneur; the sharing of profit may be on an equal basis or a specially agreed percentage.

3. In international law, there seems no agreed definition of joint venture and the term covers, as already indicated, a very wide range of arrangements. While some tend to associate the concept with those arrangements having a structure of a more permanent

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1/ Among the literature available, the following may be cited: C. Fligler, Multinational Public Enterprises, International Bank for Reconstruction and Development, 1967; W. Friedman and G. Kalmanoff, Joint International Business Ventures, Colombia University Press, 1961; L. Franko, Joint Venture Survival in Multinational Corporations, Praeger, 1971; Van Meurs, Petroleum Economics and Offshore Mining Legislation, Elsevier Publishing Co., 1971, Chapter IX; United Nations, Manual on the Establishment of Industrial Joint Venture Agreements in Developing Countries, 1971 (E.71.II. B.23)

character, others include also a simple contractual relationship. In order to illustrate all the issues involved, the former type of joint venture will be discussed.

4. Joint ventures are often created by or pursuant to a treaty, convention or agreement between participating States for undertakings involving large investments, advanced technology or complicated management techniques (e.g. transportation, nuclear energy and mineral exploitation). As a rule, a new entity is thereby created. This new entity is usually incorporated or "registered" in the host country or in all the Contracting States. In some instances, a joint venture may be given some "international character". For example, the European Company for the Chemical Processing of Irradiated Fuels (Eurochemic) takes the form of a joint stock company registered in Belgium and is governed by the constituent Convention, the statute of the company, and "residually" by the law of the headquarters State. It shares are held by the contracting states and public entities (in France, Italy, Portugal and Spain) and mixed companies (in Sweden).

5. The constituent instrument (i.e. a treaty, convention or agreement) generally contains provisions on the objectives, applicable law, legal powers of the venture, rights and duties of the contracting parties, privileges and immunities, tax status, reporting procedure, supervision, decision-making processes, settlement of disputes and final clauses. The constituent instrument is usually subject to signature and ratification by the Contracting States. Detailed rules governing the operational aspects of joint venture, such as capital, distribution of shares, organization (e.g. the Assembly, Board of Directors and their respective powers and functions), patents, accounts, liquidation, are often contained in a statute annexed to the constituent instrument. The structure of a joint venture created under international law is not dissimilar to that of a company under national law. Indeed, the internal legal issues of a joint venture are identical to and as complex as those of a corporation. While a joint venture is created by States, subscription of shares is often open to public entities, private companies and individuals. The types of joint venture now existing normally carry out operations within the territories of the States that created them. Arrangements for shareholding, management, production and marketing of the product again vary from one case to another.

6. It might be useful in this connexion to draw some comparison between a service contract and a joint venture. A service contract, like a joint venture, is also constituted by an agreement between the parties, though the legal relationship changes from one between partners, to one between contractor and contractee. As partners, the risks and benefits are usually shared, whereas in a service contract, the contractor assumes all the risks and only when the service is accomplished receives a valuable consideration which may be cash or a share of the product of profit. The contractor supplies all necessary information, data technology and know-how as well as all the industrial properties necessary for fulfillment of the specified service.

7. Service contracts can be flexible and can be used either for a specific task (e.g. to design or construct a nodule recovery system or a processing plant), to accomplish a whole phase (e.g. evaluation) or to cover an entire operation (e.g. the production of X millions of tons of nodules from a designated mine site). The more specific the operation, the more knowledge and experience are expected on the part of the contractee, i.e. the Authority, since it would have to decide what was to be done at a particular stage and would have to supervise the implementation of the specific tasks in the light of the overall operation. Unlike a joint venture, a service contract does not entail creation of additional institutions (e.g. share-holder assembly, board of directors, managers, executives and auditors). The important element of training and transfer of technology can be embodied in the Contract as an obligation of the Contractor.

8. In both cases the Authority would be able to participate in all phases of the operation thus acquiring the necessary experience and management skills. In the case of joint venture, a carefully designed control and regulatory system is indispensable to ensure that the joint venture serves the intended purpose. Up to now, attempts to prevent multinational co-operation from extracting revenue have not been very successful. Presumably, the operation of such a joint venture would also require substantial outlays by way of overheads and administrative expenses which can be burdensome in the early stage when no income is expected.

9. So far no joint venture of a commercial nature has been created between an international organization on the one hand and a sovereign State, state enterprise or private company on the other. The following paragraphs illustrate some of the issues

involved and the types of solutions that have been used in joint ventures created among States. Some of these issues will need to be considered if joint ventures are envisaged for the exploration and exploitation of sea-bed mineral resources. Whenever appropriate, comments on the alternative methods are added with a view to facilitating further deliberations. A chart containing some examples of existing joint ventures is annexed to this paper.

Legal status and Contracting Parties

10. As already mentioned, existing joint ventures are created by States. Consideration will have to be given to the problems which may arise from joint ventures created by the Authority on the one hand and a State, state enterprise or private companies on the other, as contemplated by some of the proposals before the Committee. First, if this is the intention, it would ne necessary to confer the legal power upon the Authority. The powers and functions of the Authority are envisaged to be dealt with in article XXXI of the [draft] Convention on the sea-bed and the ocean floor beyond the limits of national jurisdiction[1/]. Second, what would be the legal status of such joint ventures and whether different legal status should be considered since the possible participants may differ from sovereign States to private companies. While different arrangements may be envisaged, the selection should be guided by the criteria of efficiency and practicality.

Juridical personality and legal capacity

11. Sometimes joint ventures are granted juridical personality under the national legislation of the parties concerned and sometimes, they are incorporated into one or more of the Contracting States. In such case, the venture has the same status and legal competence as any other private company of that State in which it is incorporated. In other instances, the joint venture is not incorporated in any states and the constituent instrument grants it legal power to conclude contracts, to acquire and dispose of movable

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1/ Official Records of the General Assembly, Supplement No.21 (A/9021, Vol.II, [Draft] Convention on the Sea-Bed and the Ocean Floor beyond the Limits of National Jurisdiction, Article XXXI, p.79 and Article 36, paras. 16 and 17, p.113).

and immovable property, to institute legal proceedings or to conduct business with any third parties, including States. In this case, such legal capacity is derived from the consent of the contracting States and is applicable in the territories of those States and of any other States recognizing such legal capacity. Two types of techniques have been used in granting juridical personality or legal capacity:

Type A: by one or more of the contracting States in accordance with its own legislation.

examples: Franco-Ethiopian Railway is an Ethiopian société anonyme and has juridical personality in Ethiopia.

Central African Power Corporation has juridical personality both in Zambia and Rhodesia.

Type B: by the constituent instrument itself.

example: Eurochemic, Latin American Forest Research and Training Institute.

Governing law

12. Three types may be considered:

Type A: governed by the national law of one or more of the contracting States thereby enjoying a status similar to other national enterprises.

example: The Central African Power Corporation is subject to both Zambian and Rhodesian law.

Type B: governed exclusively by the constituent instrument, and/or the statute.

example: Air Afrique is governed by the Treaty and its annexes; Central American Telecommunications Corporation is governed by the Agreement and Statutes.

Type C: governed by a constituent instrument which provides for the supplementary application of one national law.

example: Eurochemic is governed by the Convention, the Statutes annexed thereto, and "residually" by the law of the headquarters State, "insofar as the Convention and the Statutes do not derogate therefrom;"
The Franco-Ethiopian Railway is governed by the constituent instrument and supplementarily by the Ethiopian commercial code.

13. Two points relating to the application of any national law either on a complete or supplementary basis should be considered. First, a degree of control is thereby given to the national law. Alterations in that national legislation, whether in good or bad faith, would affect the venture. Provisions could be made in the constituent instrument, creating a treaty obligation on a contracting State so as to prevent changes in the national law from having an adverse effect on the venture. However, if the venture is created between the Authority and a private company and the State whose national law is referred to is not a party to the instrument, there is no legal means of preventing that State from altering its laws. Secondly, once the application of national law is permitted, even on a residual basis, there could be cases of conflict between the constituent instrument and national legislation.

14. A complete set of international commercial codes or company laws is not and cannot be expected at present; nor can a self-contained constituent instrument or statute. The application of national law might be necessary in some cases. If, however, national law is to be excluded for policy reasons, one way to avoid any lacuna would be to empower specifically an appropriate organ either within or outside the venture to provide the necessary rules and guidelines. In case of disagreement of any kind, proper dispute settlement procedure can be pursued.

Privileges and Immunities

15. Joint ventures even of a commercial nature operating in the territories of several States are usually given certain privileges and immunities, according to their purpose and functions. In general, these privileges and immunities relate to taxation, judicial processes, protection of property and assets, using of currencies, communications facilities and customs. The privileges and immunities granted to the Air Afrique and the European Company for the Chemical Processing of Irradiated Fuels (Eurochemic) illustrate some of the issues involved (see columns VII and VIII of the chart attached). In some instances waiver of privileges and immunities are included in the constituent instruments.1/

1/ It might be noted that a standard clause on waiver of privileges and immunities is included in all United Nations contracts with third parties for services or supply of goods. The provision reads as follows:

> "Any provision, whether in Agreement, project Document, or any other instrument ... by which the recipient Government confers benefits upon the contractor and his personnel in the form of facilities, privileges, immunities, or exemptions by reason of his performance of services for the United Nations ... may be waived by the United Nations where, in its opinion, the immunity would impede the course of justice and can be waived without prejudice to the successful completion of the project or to the interests of the United Nations ...".

16. The fact that existing joint ventures enjoy certain privileges and immunities particularly in the headquarters State, if not in all the contracting States, is designed to protect the interests of the venture: to reduce costs, to facilitate operation, to remove any possible pressure which might be brought to bear upon it, and to ensure that no advantages can be taken of the venture (e.g. imposing heavy taxes or import duties). It is in the interest of the Authority and the venture which it may create that the granting of certain privileges and immunities should be considered. Several methods can be used individually or jointly to give the necessary protection. A general provision could be made in the convention requiring all contracting States to grant the privileges and immunities necessary to ensure the proper function of the venture. Such a general provision would avoid the necessity of any detailed discussion at this stage and would give the Authority a free hand to negotiate later with the particular States where the activities of the venture are to take place. Reference is made in this connexion to article XXVII in the draft convention.1/ Whether joint ventures or any contractual arrangement by the Authority would be included under the present wording would appear open to interpretation.

17. A second method would be to include a similar general provision in the headquarters agreement, though in this case the application would be limited to the limitations of the headquarters State only. A third way, which has the similar restrictive effect, would be to have the necessary provisions incorporated in the instrument creating the venture. Difficulties arise when the contractor is a private company which is not in a position to grant any privileges and immunities.

Settlement of disputes

18. Under existing arrangements for joint ventures, provisions are generally made in the constituent instrument for settlement of disputes regarding the interpretation or application of the instrument. The methods range from specific tribunals, to arbitration and conciliation committees.2/

1/ See article XXVII Ibid.

2/ It might be of interest to note that the following wording is included in all United Nations service and supply contracts:

> "Any dispute arising out of the interpretation or application of the terms of this contract shall, unless it is settled by direct negotiation, be referred to arbitration in accordance with the rules then obtaining of the International Chamber of Commerce. The United Nations and the Contractor agree to be bound by any arbitration award rendered in accordance with this section as the formal adjudication of any disputes.".

19. The importance of having a fair and expeditious procedure for the settlement of disputes hardly needs any emphasis. It is particularly essential if it is intended that the operation of a joint venture is to be governed exclusively by a legal regime of its own (i.e. the Convention, the agreement or the statute of the venture). In view of the operational efficiency which would be required of a joint venture and of the nature of disputes which may arise therefrom (e.g. over the equipment used) and which may be different from those arising from the normal operation of the Authority (e.g. interpretation of the Convention), consideration should be given to the possibility of establishing a more expeditious and simplified procedure for settling disagreement arising from a joint venture.1/

1/ It might be of interest to note that in implementing the Treaty on the non-proliferation of nuclear weapons, the International Atomic Energy Agency has adopted a procedure for the settlement of disputes arising from a tripartite safeguard agreement. The relevant provisions are as follows:

> "1. The Government of ... and the Agency shall, at the request of either, consult about any question arising out of the interpretation or application of this Agreement.
>
> 2. The Government of ... shall have the right to request that any question arising out of the interpretation or application of this Agreement be considered by the Board of [Governors]. The Board shall invite the Government of ... to participate in the discussion of any such question by the Board.
>
> 3. Any dispute arising out of the interpretation or application of this Agreement, except a dispute with regard to a finding by the Board under ... or an action taken by the Board pursuant to such a finding, which is not settled by negotiation or another procedure agreed to by the Government of ... and the Agency shall, at the request of either, be submitted to an arbitral tribunal composed as follows: the Government of ... and the Agency shall each designate one arbitrator, and the two arbitrators so designated shall elect a third, who shall be the Chairman. If, within thirty days of the request for arbitration, either the Government of ... or the Agency has not designated an arbitrator, either the Government of ... or the Agency may request the President of the International Court of Justice to appoint an arbitrator. The same procedure shall apply if, within thirty days of the designation or appointment of the second arbitrator, the third arbitrator has not been elected. A majority of the members of the arbitral tribunal shall constitute a quorum, and all decisions shall require the concurrence of two arbitrators. The arbitral procedure shall be fixed by the tribunal. The decisions of the tribunal shall be binding on the Government of ... and the Agency.". (See for sample document INFCIRC/217 of 13 December 1974).

Institutional aspects

20. As mentioned, a joint venture in the conventional sense is often an independent entity and its structure is similar to that of a private corporation. In most cases the strategy and general policies of a venture are decided by a board of directors and then referred to management for implementation. However, when the venture is created by a group of States, a committee of the participating States either within or outside the venture is sometimes established to deal with policy questions and to supervise the overall operation. Eurochemic is a case in point.

21. A series of questions relating to the institutional aspects may be mentioned in order to facilitate further consideration of this subject. The first set of issues relates to the nature and character of the venture, for example whether shares are to be issued and if so, on what basis (e.g. whether State enterprises or private companies could hold shares), how shares are to be distributed and paid for (e.g. in cash or in terms of ownership of resources, security of tenure, technology, information or patents); how shares are to be registered and whether they are transferable.

22. The second set of issues relates to the management. These include the form of management in which the Authority or its member States will participate (e.g. participation in decision-making in general, daily operations or merely observation), the decision-making process (e.g. whether decisions are to be made by the Board of Directors, or a committee of the participating States), and the powers and functions of the various organs (e.g. shareholders general meeting, board of directors, managers, etc.).

23. The third set of issues relates to the sharing of benefits: for example, whether sharing is to be based on product (e.g. raw or processed manganese nodules) or proceeds; what the percentage of sharing between the Authority and the participating parties should be.

24. The fourth set of questions relates to transfer of technology: e.g. what are the training requirements, how the information is to be shared and how training costs are to be borne.

25. In addition, there are questions of supervision and inspection, accounts and liquidation.

Conclusion

26. The above survey shows that the substantive issues involved in the creation of a joint venture relate closely to the basic conditions of exploration and

exploitation, and to the legal powers and functions of the Sea-bed Authority - an issue which is yet to be considered. This inter-relationship should be recognized and be taken into account in future deliberations.

27. As already mentioned, there seems no agreed definition of joint venture in international law and in practice the term covers a very wide range of arrangements. In further deliberation, efforts may be concentrated on the substantive issues and the contents of the agreement envisaged, rather than on the formalistic aspects in order to formulate the kind of association that will best serve all interests.

SOME EXAMPLES OF INTERNATIONAL JOINT VENTURES

	AIR AFRIQUE	European Company for the Chemical Processing of Irradiated Fuels (Eurochemic)	Latin American Forest Research and Training Institute (LAFRTI)
I - PURPOSE	to operate air transport.	to carry out research and industrial activities relating to processing of irradiated fuels.	to conduct research in conservation utilization and development of forest resources.
II - CONSTITUENT INSTRUMENT AND PARTIES	Treaty 1961 and a Protocol is annexed thereto and signed by contracting parties and the French company to contain detailed provisions on operation, technical assistance, training and personnel and rates. Cameroon, Central African Republic, Chad, Congo, Dahomey, Gabon, Ivory Coast, Mauritania, Niger, Senegal and Upper Volta.	Treaty 1957. European Nuclear Energy Agency (ENEA) was created under EEC to further production and uses of nuclear energy and to promote establishment of joint undertaking for this purpose. Austria, Belgium, Denmark, France, Federal Republic of Germany, Italy, Norway, Netherlands, Portugal, Sweden, Switzerland, Turkey, Spain.	Agreement 1959 by Ecuador, France, Netherlands, Guatemala, Nicaragua, Panama, Peru and Venezuela.
III - ENTITY CREATED	A private société anonyme owned jointly by contracting States and a French company.	Joint-stock company, headquarters at Mol, Belgium. Shares held by governments, public entities and private enterprises.	An international institution with juridicial personality.
IV - ORGANS	General meeting of shareholders. Board of directors, General Manager.	General Assembly, Board of Directors.	Governing Council, Executive Committee, President and Director.

	Air Afrique	Eurochemic	LAFRTI
V - LEGAL CAPACITY	to enter into any agreements and carry out all such commercial and financial operations as may be useful for attaining its purposes.	any act connected with its purposes and in particular to conclude contracts, to acquire and dispose of movable and immovable property and to institute legal proceedings.	
VI - LEGAL CONTROL	Participating states established a Committee of Ministers of Transport to discuss their common policy on air transport and all matters relating to civil and commercial aviation. The Company is represented on the Committee but has no vote. The Committee gives directions to the Company.	The Company to report annually to member states through a Special Group of the Steering Committee of the ENEA. Any director or shareholder may submit to the Special Group any problems arising in connexion with the processing of fuel or allocation of products, etc.	
VII - PRIVILEGES AND IMMUNITIES	Aircraft and other equipment necessary for the company's operations are imported free of duty and turnover tax or any similar charge or fee. The Company has full authorization and every facility to enable it to transfer funds.	The Company's installations and archives inviolable; its property and assets and materials shipped to it or by it, immune from all administrative forms of requisition, exploration or confiscation. Only by order of a court can property and assets be seized or be subject to enforced execution. Company exempted from all customs duties and similar charges and from all import restrictions on raw materials, capital equipment and scientific and technical material, and from duties or restrictions on materials produced by the Company and exported to contracting states.	

	Air Afrique	Eurochemic	LAFRTI
VIII - TAX STATUS		Exempt in the headquarters state from all direct taxes which might be imposed regarding Company's property, assets and income; exempt from taxes of an exceptional or discriminatory nature levied by headquarters state; exempt at its constitution in the headquarters state from all fees and taxes whether fiscal or quasi-fiscal. Also exempted both in the headquarters state and in other member countries where its installations are located from fees and taxes upon the acquisition of immovable property and from registration fees.	
IX - SETTLEMENT OF DISPUTES	Any differences between the contracting states relating to interpretation or application of th Treaty not settled by consultation to be submitted to arbitration "in accordance with the customary rules of international law".	Any disputes to be examined by the Special Group of the Steering Committee of LNEA and, in the absence of a friendly settlement, may be submitted, by agreement, between governments concerned, to the tribunal created by the Convention of Dec. 20, 1957 on Security Control in the field of Nuclear Energy.	

Rev. 1

Article 153

System of Exploration and Exploitation

1. Activities in the Area shall be organized, carried out and controlled by the Authority on behalf of mankind as a whole in accordance with the provisions of this Article as well as other relevant provisions of this Part and its annexes, and the rules, regulations and procedures of the Authority.

2. Activities in the Area shall be carried out as prescribed in paragraph 3:

(a) by the Enterprise,

(b) in association with the Authority by States Parties or State Entities, or persons natural or juridical which possess the nationality of States Parties or are effectively controlled by them or their nationals, when sponsored by such States, or any other group of the foregoing which meets the requirements provided in this Part including annex II.

(c) through the Enterprise in the form of joint-venture arrangements in accordance with Articles 8 and 10 of Annex II,

The Enterprise shall have the option to decide whether or not to enter into any such joint venture arrangements with the Contractor.

3. Activities in the Area shall be carried out in accordance with a formal written plan of work drawn up in accordance with annex II and approved by the Council after review by the Technical Commission. In the case of activities in the Area carried out as authorized by the Authority by the entities specified in paragraph 2 (b) and (c), such a plan of work shall in accordance with article 3 of Annex II be in the form of a contract.

Article 8
Reservation of Sites

1. Each application, other than those proposed by the Enterprise or by any others for reserved sites, shall cover a total area which need not be a single continuous area but shall be sufficiently large and of sufficient value to allow two mining operations. The proposed operator shall indicate the co-ordinates dividing the area into two parts of equal estimated commercial value. Within forty-five days of receiving the data necessary to make the assessment of the value of the sites from the applicant the Authority shall designate the part which is to be reserved solely for the conduct of activities by the Authority through the Enterprise or in association with developing countries. The area designated shall become a reserved area as soon as the plan of work for the non-reserved area is approved and the contract is signed.

2. The Enterprise shall be given an opportunity to decide whether it wishes itself to conduct activities in each area reserved pursuant to this article.

3. In conducting activities in the areas reserved pursuant to this article the Enterprise may enter into joint arrangements with any entity qualified to conduct activities in the Area. In such joint arrangements appropriate provision shall be made for participation by developing countries, the nature and extent of such participation to be approved by the Authority. Such participation of the Enterprise shall not be less than sixyt-five percent in any case.

4. Nothing in this article shall be interpreted as preventing the Enterprise from carrying out activities in accordance with this annex in any part of the Area not included in a previously approved plan of work or a previously submitted plan of work which has not yet been finally acted on by the Authority.

Article 10

Joint Venture Arrangements

1. Without prejudice to article 8 of annex II contracts for the exploration and exploitation of the resources of the non-reserved area shall provide for joint venture arrangements between the Contractor and the Authority acting through the Enterprise for the exploration or exploitation of the resources of the Area in accordance with Article 153 (c).

In such joint ventures, participation of the Contractor shall not exceed sixty-five per cent.

2. Contractors entering into such joint arrangements with the Enterprise may receive financial incentives as provided for in the financial arrangements established in article 12.

3. If upon request and in accordance with article 8 and this article the pertinent negotiation fails within a reasonable time to reach an agreement on the terms and conditions of a joint venture arrangements, either party may refer any matter arising on their negotiation to conciliation in accordance with Annex IV. The Conciliation Commission shall within 30 days make recommendations to the parties which shall form the basis of further negotiations. Should the latter negotiations fail to reach agreement on the terms and conditions of the joint venture arrangement, the Enterprise or the Contractor may within 60 days refer the matter to the appropriate dispute settlement mechanism established in this Convention for its decision.

Article 5 Annex II

Transfer of Technology

1. In respect of transfer of technology, every applicant other than the Enterprise shall:

(a) Make available to the Authority a general description of the equipment and methods to be used in carrying out activities in the Area, as well as other relevant information about the characteristics of such technology, and information as to availability and necessibility. That description shall be submitted with the application and thereafter whenever a substantial technology change of innovation is introduced;

(b) Undertake to make available to the Enterprise, if he receives the contract, and on fair and reasonable commercial terms and conditions, the technology which is to be used by him in carrying out activities in the Area and which he is legally entitled to transfer. This shall be done upon the conclusion of the contract and if and when the Authority shall so request by means of licence or other appropriate arrangements which the Contractor shall negotiate with the Enterprise and which shall be set forth in a special agreement supplementary to the contract.

(c) In a case where the applicant finds that he will not be legally entitled to transfer to the Enterprise the technology to be used in carrying out the activities in the Area, the applicant shall not be granted the contract. In such a case the applicant may apply to enter into a joint venture arrangement with the Enterprise in accordance with articles 8 and 10 of annex II.

(d) Undertake the same obligations as those prescribed in paragraph (b) for the benefit of a developing country or group of developing countries which has applied for a contract under Articles 8 and 10 of Annex II, provided that activities under the contract sought by the developing country or group of developing countries

would not involve transfer of technology to a third country or the nationals of a third country;

OPTIONAL RIGHT

JOINT VENTURES

Possible draft articles in Annex II

(a) Within one month from the date when the Contract is signed, the Enterprise may require by notice in writing to the Contractor that negotiations be commenced forthwith with a view to concluding a joint venture agreement whereby the Enterprise shall participate in the Contract for a percentage not exceeding 20%.

(b) The joint venture agreement referred to in sub-paragraph (a) shall be on fair and reasonable commercial terms and conditions, in accordance with those customarily applied to joint ventures freely entered into between independent parties in the oceanmining industry. In case the Contractor is a partnership or juridical person in which two or more persons natural or juridical participate, the existing arrangements between them shall be followed to the extent possible in the joint venture agreement with the enterprise, unless the Parties otherwise agree.

(c) If the negotiations do not lead to agreement within 6 months, either party may refer the matter to conciliation in accordance with Annex IV. The Conciliation Commission shall within 60 days make recommendations to the parties which shall form the basis of further negotiations. Should the latter negotiations fail to reach agreement within 60 days, either party may thereafter refer to binding commerc arbitration in accordance with the Uncitral Arbitration Rules (or such other arbitration rules as may be agreed between the parties)

within 90 days the question whether the terms and conditions in despute are within the range of fair and reasonable commercial terms and conditions. In cases where the arbitral tribunal determines that the Contractor's offer is not within that range and the Contractor fails to revise its offer within a further period of 90 days to bring it within that range, the Tribunal shall make an award. In the event that the Contractor does not accept or fails to implement the arbitral award or the decision of the appropriate tribunal, the Contractor shall be liable to penalties in accordance with the provisions of Article 17.

(d) If the Enterprise has entered, or intends to enter, into a joint venture agreement with the Contractor pursuant to sub-paragraph (a), i shall give notice in writing to that Contractor of any plan of work to be submitted by it for the approval of the Authority in respect of proposed operations in the reserved area included in the application of that Contractor and such notice shall be given at least one month before the date on which the plan of work is so submitted.

(e) Within one month after receiving such notification, the Contractor may require that the Enterprise enters into negotiations with it with a view to concluding a joint venture agreement whereby the Contractor shall participate on the same commercial terms and conditions in the plan of work of the Enterprise for the same percentage as the Enterprise participates or intends to participate in the Contractor's contract. The conciliation and arbitration proceedings apply m.m.

(-3-)

(f) The Enterprise shall have the same rights and obligations which regard to access to information and technology, making available its personnel to the joint venture, representation in the organs of the joint venture, meeting the financial needs and enjoying the financial benefits as the other parties, it being understood that if there is no equality of rights and obligations between the existing parties, the Enterprise shall be entitled to claim a position not less favourable to it than that of the majority of the existing parties.

JEFERAD

AUSTRIAN WORKING PAPER 2

INTRODUCTION

Four Pioneer Investors have filed their applications for a mine site each. Four mine sites thus accrue to the Authority for the use of the future Enterprise (Para 2 (b), Res.II). Two of these sites must be selected and explored under the auspices of the Commission; appropriate technology must be acquired, and the necessary manpower must be trained, if the Commission is to fulfil its mandate of ensuring "that the Enterprise is able to carry out activities in the Area in such a manner as to keep pace with States and other entities." (Para. 12, Res.II).

In this working paper two scenarios are presented. It is assumed that one of the two sites will be covered by the Commission in accordance with Doc. LOS/PCN/SCN2/WPI; the other is assigned to JEFERAD, in accordance with Doc. LOS/PCN/SCN2/L.s. Advantages and problems arising from either approach are analysed and compared. The criteria and interpretations proposed in the memorandum prepared by the Asian African Legal Consultative Committee (AALCC) are applied to both scenarios. A revised JEFERAD proposal (JEFERAD II) concludes the working paper. The AALCC Memorandum and the Operational Procedures and Administrative Arrangements for the U.N. Revolving Fund for Natural Resources Exploration are reproduced in Annex I and II.

I.

Doc. LOS/PCN/SCN2/WP1 covers all aspects of the mandate of the Special Commission for the Enterprise. It stresses the inextricable links between organistional and operational aspects and between activities focusing on the preparatory phase (interim regime) and activities following the coming into force of the Convention (Convention regime).

The scope of the mandate and considerations on organising the work of the Special Commission for the Interim Period are stated as follows:

4. According to paragraph 8 of resolution I, the Special Commission for the Enterprise shall:

(a) Take all measures necessary for the early entry into effective operation of the Enterprise; and

(b) Perform the functions referred to in paragraph 12 of resolution II.

5. Resolution II clearly contemplates that one of the main purposes of the scheme for pioneer investors is to ensure that on the coming into force of the Convention the Enterprise "will be provided with the funds, technology and expertise necessary to enable it to keep pace with the States and other entities." (See the preamble to resolution II.)

6. The stated objective of paragraph 12 of resolution II is "to ensure that the Enterprise is able to carry out activities in the Area in such a manner as to keep pace with States and other entities." The paragraph does not actually refer to functions but to the undertakings of registered pioneer investors and certifying States. Thus, the mandate given in paragraph 8 of resolution I by reference to paragraph 12 of resolution II should be interpreted to mean that it is for the Special Commission for the Enterprise to deal with the questions relating to these undertakings in accordance with paragraph 12, the nature and purpose of which may be regarded as corresponding to "measures necesary for the early entry into effective operation of the Enterprise." Consequently, it would be for the Special Commission to make the arrangements for exploration and training referred to in that provision.

Para 4(a) is open to a wide range of interpretations, to which we shall return below.

Para 4 (b) clearly implies certain responsibilities of the Special Commission with regard to

. exploration of two mine sites for the Enterprise

. training of staff for the Enterprise

. transfer of technology to the Enterprise.

Exploration, in the present scenario, would be undertaken by pioneer investors, on the basis of service contracts. The cost of exploration -- some hundred millions of dollars -- would be passed on to the Enterprise which would have to reimburse the pioneer investors for "the costs so incurred plus interest thereon at the rate of 10 percent per annum" (Para.12 (a), Resolution II). It should be noted that the decisions of the future Enterprise are thus pre-empted in two ways by the decisions of the Prep.Com. which, in this way, are binding on the Enterprise.

1.Sites A and B have been selected by the PrepCom for exploration. Ex post facto, the Enterprise might have preferred to select sites C and D.

2. The Enterprise is obliged to expend funds for exploration by the decision taken by the Pre.Com. On the other hand, if the Prep.Com fails to be operative at all and exploration of the reserved sites is postponed to the time of theConvention Regime, the PrepCom clearly fails in the fulfilment of its responsibilities to ensure that the Enterprise is enabled to keep pace with the States and other entities.

With regard to <u>training</u>, the Prep.Com.'s responsibility is limited, in this scenario, to selecting personnel from

developing countries for such training. The training itself, under para.12 of Res.II, is the responsibility of the pioneer investors. One should, however, note a really fundamental question in this context, which the Prep.Com, certainly will have to deal with: What kind of training? Is the training required by a pioneer investor the same as that required by the Enterprise and the other organs of the authority? If it is different, how can the pioneer investor provide the type of training required by the Authority? To this we shall return below.

Paragrapah 5 of Doc. LOS/PCN/SCN.2/WP1 raises question with regard to funding: Where, exactly, is the line to be drawn between "raising funds," and "ensuring that, on the coming into force of the convention, the Enterprise will be provided with the funds...necessary to enable it to keep pace with the States and other entities"?

First of all, and in any case, the amount of funding has to be calculated, and this, as LOS/PCN/SCN.2/WP1 points out (paragraph 6) clearly is one of the tasks of the Special Commission.

The next step is to identify the potential sources of funding, in accordance with Art. 11 of Annex D. Such sources include (subparagraph (b)) voluntary contributions made by States Parties for the purpose of financing activities of the Enterprise, (subparagraph (e)) other funds made available to the Enterprise to enable it to commence operations as soon as possible and to carry out its functions.

It is possible that there will be a shortfall in the assigned contributions of States Parties to the Enterprise: If the assigned contributions were to be very high, it is possible that many States may postpone ratification. Recourse to subparagraphs (b) and (e) thus may become important.

A narrow interpretation of paragraph 8 of Resolution I precludes any fund raising activity on the part of the

Commission. [The AALCC Memorandum states, "We consider that it would not be permissible for the PREPCOM to raise the share capital by way of donations nor to allow any party to provide the share capital on its behalf even if such funds were forthcoming."]

Does "fund raising" consist only in the final act of transfering funds into an account for the future Enterprise, or does it include approaches to potential voluntary funders "to ensure that the Enterprise will be provided" with such funds?

Similar problems will arise with regard to the procurement of the required technology. The Prep.Com. may commission, and obtain from the Secretariat, excellent surveys on existing technologies, which may be kept up to date, year by year, until the coming into force of the Convention. Such surveys, although immensely useful, do not ensure, that, upon the entry into force of the Convention, the enterprise will be provided with the necessary technology to enable it to keep pacewith States and other entities. To ensure this, the Prep.Com. would have to obtain undertakings binding on Pioneer Investors or other procurers, as well as on the Enterprise.

It may seem paradoxical, although it is logical: The narrower the interpretation of para.8 of Res.I, the more the Prep.Com. will have to impinge on, or pre-empt the decision-making of the future Enterprise. The logic behind the apparent paradox is that action requires decision making based on legl competence. This may either be deemed to reside in the Prep.Com., on the basis that "the Commission shall have such legal capacity as may be necessary for the exercise of its functions and the fulfilment of its purposes as set forth in this resolution" (para.6, Res.I). In this case the Commission can act, to the best of its ability, to take all necessary steps to ensure the early entry into effective operation of the Enterprise. These necessary steps, in this interpretation, must include the provision of the necessary funds. [Upon the entry into force of the

Convention, the Enterprise is free to proceed on the basis of the Prep.Com.'s work,without financial liabilities contracted by the Prep.Com on its behalf prior to its coming into existence. The Enterprise is equally free to re-assess the situation as it may have crystallized at that time, decidethat the Prep.Com.'s measures were rendered obsolete by changed circumstances-- and chart a new course: again, without havingto pay for bills bequeathed by the Prep.Com.

The simple logical fact is that legal competence, or decision-making power must strictly correspond to the activities to be undertaken.

$$(1) \quad LC_{pr} \approx A_{pr}$$

where LC_{pr} = Legal Capacity of the Prep.Com. and
A_{pr} = the activities of the Prep.Com.

If the activities exceed the legal capacity or decision making power, the burden is shifted to the future Enterprise.

$$(2) \quad \text{If } A_{pr} > LC_{pr}$$

then $$A_{pr} \approx LC(PR_{0 \to 1} + E_{1 \to 0})$$

or $$(3) \quad LC_{(pr)(0)} \approx A_{(pr)(0)}$$

where PR = Prep.Com. and E = Enterprise.

If the Legal Capacity of the Prep.Com equals 0, its operational capacity with regard to the Enterprise equals 0. This, however, clearly was not the intention of Resolution II. It would defeat the mandate of the Special Commission "to ensure that the Enterprise keep pace with States and other entities." Hence there must be a way out of this dilemma.

II.

In scenario 2, the legal capacity of the Prep.Com, is interpreted in a broad sense -- comprehensive enough to enable the Prep.Com. "to take all necessary steps," and these necessary steps are interpreted to include the establishment of a Joint Enterprise on Exploration, Research and Development since this offers the most practical and systemic way to implement para.12 of Res. II and to fulfil the Prep.Com's mandate under para.8 of Res.I, without unduly pre-empting the decisions of, and imposing liabilities on, the Enterprise upon the coming into force ofthe Convention.

JEFERAD would enhance/facilitate

(a) the ability to have exploratory work done under para.12, Res.II;

(b) the institution of a training scheme appropriate to the Enterprise and to the other organs of the Authority;

(c) the agreement on appropriate incentives to the industrialized countries and their companies to enter into a joint arrangement which might create a desirable pattern for the Enterprise upon the coming into force of the Convention;

(d) ensuring the participation of developing countries in the operations from the very beginning, preparing them for their active participation in the Enterprise upon the coming into force of the Convention.

(e) ensuring co-development of requisite technologies and their availability to the Enterprise upon the coming into force of the Convention, while leaving the Enterprise free to decide whether it wants to avail itself of this option or choose another one that might be more appropriate in an indeterminate future.

(f) The funding of the preparatory work and of the future Enterprise.

We shall examine each of these propositions in turn.

Exploration

One of the reserved sites, chosen by the Commission in agreement with the partners of JEFERAD, would be explored with funds secured in advance, and not chargeable to the future Enterprise.

Upon the expiration of JEFERAD -- five years after its establishment or six months after the coming into force of the Convention, whichever comes first -- the Enterprise would be free to enter into a new agreement with the consenting partners of JEFERAD and submit a Plan of Work to the Authority for the subsequent phases of mining, transportation, processing, and marketing. A production authorisation would be guaranteed to this new Joint Enterprise for Ocean Mining (JEFOM) in accordance with Article 150, paragraph 5, of the Convention. But the Enterprise would also be free to abandon this option. The assets and liabilities of JEFERAD would be distributed among the partners in accordance with the terms of the JEFERAD agreement. These must be fair and commercial terms, and the agreement must provide for dispute settlement, most likely, through UNCITRAL.

Training

Training, clearly has two aspects. The Enterprise needs scientists and technicians, and these can be trained by the Pioneer Investors, in scientific institutions, or by Industry. But the Enterprise, and the Authority, needs also managers and decision makers, and they need a different kind of training. It is with regard to this second need that training by pioneer investors may not be appropriate for the Enterprise and the Authority.

It should be noted that even in the established industry there exists today a certain uneasiness with regard to the training for management. Managers and executives are still being trained for the industrial system that existed in the 'sixties. The curricula of business schools do not reflect the fundamental changes that have taken place in the industrial system during the past two decades. This was emphasised in the recent conference of the Club of Rome (Helsinki, July 1984). As one of the participants,Paulo C. Moura of Brazil put it,

> So, the new generation of managers, who were well educated according to the general social expectations and philosophy of the early sixties, perceives itself, in the eighties, as obsolete, unprepared, unprotected....There is a gap between the social expectation and the business performance....There are a great number of measures to be taken, if this situation is to be solved....One thing, however, is very clear, from the very beginning: management education has to be redesigned almost everywhere. Economic decision-making is no longer a simple economic or rational question. Business decisions are, in its fundaments, a highly complex process which involves the analysis and consideration of social-cultural-political variables, and those variables are, by definition, external to the business traditional mentality.

The project of the Club of Rome is entitled "The Enterprise in Flux," and it analyses the evolution of the commercial enterprise from a model or paradigm "A" to a model or paradigm "C." The characteristics of this evolution are listed in Table 1, extracted from Howard V. Perlmutter's study, The Symbiotic Enterprise. Global Disorder and the Future of Enterprise. A Report to the Club of Rome.

Table 1. PARADIGMS A, B, C SOCIAL ARCHITECTURE FOR ENTERPRISE

SOCIAL ARCHITECTURAL PARAMETERS	*PARADIGM A INDUSTRIAL*	*PARADIGM B ANTI-INDUSTRIAL*	*PARADIGM C SOCIETAL*
1. MISSION			
• Objectives	Profitability (Viability)	Public Acceptance (Legitimacy)	Profitability & Public Acceptance (Viability & Legitimacy)
• Geopolitical			
NORTH-NORTH	Mercantilist	Autarkic	Symbiotic Interdependence
NORTH-SOUTH	Trickle down paternalism	self-reliance	Parity and Partnership
EAST-WEST	Submergence	Divergence	Emergence Transideological
• Roles	Mainly: Economic Political	Social Ecological	Economic Social Political Ecological
2. GOVERNANCE			
• Ownership	Private or State (Command)	Collective (Cooperatives)	Autonomy & Multistakeholder negotiation
• Composition of Board	Professional	Some Stakeholders (Workers, Consumers)	Societal (Including Wealth Creation)

SOCIAL ARCHITECTURAL PARAMETERS	*PARADIGM A INDUSTRIAL*	*PARADIGM B ANTI-INDUSTRIAL*	*PARADIGM C SOCIETAL*
3. STRATEGY			
Market	Dominance	Self-reliance	Niches in Societal Development
Competition/ Cooperation	Going it Alone	A Collective/ Going it Alone (Internal Cooperative)	Autonomy & Multi-enterprise Cooperation & Coalition (Symbiotic/ Parity)
Geopolitical	Industrialized Focus	Developing	Both Industrialized & Developing
4. ORGANIZATION CHARACTER			
• Internationality	Ethnocentric	Polycentric	Geocentric Integrative
• Management Style	Authoritative	Democratic	Synarchic Strategic
• Values	Materialistic	Anti-materialistic	Quality and Quantity Human Progress (Social & Economic Wealth)
• Individual	• Efficiency > People • Responsibilities	• Efficiency < People • Rights	• Efficiency & People • Rights/ Responsibilities
5. ORGANIZATION STRUCTURE (Socio-technical)			
• Technology	High (Hard)	Low (Soft)	Wide range of Technologies
• Authority	Hierarchical Vertical Bureaucratic	Horizontal/ Debureaucratic	System & Network (Synarchic)
• Evaluation	Performance Related to Viability	Performance Related to Legitimacy	Performance Related to Viability & Legitimacy
• Rewards	Material Status	Social	Pluralistic & Societal
• Communication	Centralized	Shared internal	Shared Internal and External Multi-centered
• Indentification (Basis for)	Performance Related	Collectivity	Mission-Related

The Enterprise of the International Seabed Authority and JEFERAD definitely belong to paradigm C, and traditional training for paradigm A simply will not do. To institute a training scheme, the Prep.Com. therefore should design a curriculum responding to its very special needs. Such a curriculum could be designed by a small group of experts including representatives from all the stake-holders in the Enterprise and its joint ventures: pioneer investors; mining companies; landbased producers; potential miners; consumers; scientists and environmentalists. It could enlist the services of an organisation like the International Management Institute (IMI) in Geneva and the International Ocean Institute (IOI) in Malta, which is specialised in curricula of just this kind. We recommend that such training programmes should be planned to run for ten weeks each, and that they should be initiated in 1985.Not only managers, but also the future scientific and technical trainees -- every person working for the future Authority -- should go through such a programme to ensure the harmonious functioning of the new institution with all its challenges and aspirations.

INCENTIVES TO INDUSTRIALIZED COUNTRIES

The JEFERAD proposal stipulates that the investment cost for exploration, research and development be divided between the Commission, the Governments of industrialized States, and companies or consortia. This investment, for a period of five years, for exploration, R&D only: Not for the subsequent phases of mining, transportation, processing and marketing, is projected as between $200 million and $300 million. Half of this cost would have to be raised by the Commission, that is, between 20 and 30 million dollars per year; the other half would be divided between those States signatory to the Convention and those companies sponsored by them that may wish to participate in JEFERAD, on a purely voluntary basis, and because they are attracted by the incentives offered. The main incentive would be that their own investment would be reduced quite considerably. JEFERAD would offer them a unique opportunity to carry on the work

in which they invested so heavily in the 'seventies, and which all but dried up in the 'eighties due to the lack of risk capital. At a time when risk capital is very hard to come by, this is a strong incentive. No other arrangement could offer this incentive. [the proposal on p. 16 of Annex I, by the AALCC, while it has other merits, especially of a legal kind, does not offer this incentive. In that proposal, the members of the registered partnership have to come up with all the necessary funds, without financial benefit.]

PARTICIPATION OF DEVELOPING COUNTRIES

Very few developing countries would be ready to invest money in deep seabed mining at the present time. At this time of global economic crisis, with starvation rampant in large parts of the planet, ocean mining necessarily is a very low priority. Yet, participation in the Enterprise and in the decision-making processes of the Authority is one of the hard-won advantages conquered by the Third World during the long years of UNCLOS negotiations.

JEFERAD offers to developing countries the possibility of entering as equal partners in the management of a high-tech venture without cost to them: since it is the Commission that would have to come up with the money -- in a form to be discussed below --and which would, therefore, be in a position to appoint half of the members of the Board of Directors, or Joint Enterprise Committee (JEC). The Commission would choose these members from developing countries which apply for participation. These should include, above all

(a) land-based producers;

(b) coastal States intending to mine mineral resources in their own EEZs, who would benefit greatly from the JEFERAD experience;

(c) potential future deep-sea ocean miners;

(d) regional enterprises, if they come into being.

There is no other way of ensuring the participation of developing countries during this interim phase. [The AALCC alternative does not provide for such participation.]

CO-DEVELOPMENT OF TECHNOLOGIES

Much careful legal work is needed on this aspect of JEFERAD, which must be spelled out in great detail in the JEFERAD Agreement.

The case is relatively simple if it is assumed that, upon the entry into force of the Convention, the Authority, the Enterprise, and the other partners of JEFERAD agree that it would be most useful and practical to renew the agreement, with the Enterprise succeeding to the rights of the Commission.

There is an interesting precedent in research and development in space technology. INTERCOSMOS has been established for the joint development of scientific instruments and service systems and their integration into satellites, for joint research, experimental design development methodology and joint analysis of data. Scientific results of joint experiments form a common asset of all partners involved and are accessible to the international community.

To come!

In his address to UNIDO IV, the Director General of UNIDO indicated UNIDO's interest in establishing an International Institute for Marine Technology, somewhat along the lines of the recently established Institute for Bio-industries, with headquarters in Trieste and New Delhi. The International Institute for Marine Technology could be structured, with the necessary adaptations, like CERN (European Centre for Nuclear Research) or IIASA

(International Institute for Applied Systems Analysis). Such an Institute would deal with research and training in fishing and shipping technologies, technologies for the extraction of energy from the oceans, oil and gas exploration and exploitation technologies, and ocean mining technologies. In the sector of ocean mining technologies it would cooperate with the Ocean Economics and Technology Branch of the U.N. Secretariat (OETB). The technology bank, establishment of which is suggested in the JEFERAD proposal, could be considered a first piece of an International Institute for Marine Technology and, at a later stage, be connected with it. There is no other practical way of achieving this kind of technology transfer and co-development. [The AALCC proposal would leave out participation of most of the developing countries.]

Some suggestions with regard to the establishment of the Technology Bank will be presented in Austrian Working Paper III at the next Session of the Prep.Com.

More difficult, perhaps would be the case, which also must be considered by the JEFERAD Agreement, where JEFERAD is dissolved upon the coming into force of the Convention and its assets must be distributed among the partners. This would haave to be done, again, on the basis of fair, commercial criteria, and there would have to be a provision for settlement of any disputes, probably by recourse to UNCITRAL rules.

FUNDING

If the usefulness of the JEFERAD approach is agreed on, a way must be found to escape from the dilemma described on p.7 of this working paper.

On the one hand, the Prep.Com. must be able to be operative with regard to the future Enterprise to the same degree it is operative with regard to the pioneer investors. This, undoubtedly, is the intention of Resolutions I and II

as interpreted in the context of the history of UNCLOS III. If no action at all were to be undertaken by the Prep.Com. during the interim regime, the parallel system would be violated.

On the other hand, the counsel of those who hold that the Prep.Com., established, as it is, by a Resolution of UNCLOS III, has no legal personality and no legal power to enter into contracts or to raise funds, cannot be disregarded. This affects Scenario 1 just as much as it does Scenario II, and a legitimate way out of the dilemma must be found in any case.

This would be the establishment of a Revolving Fund with legal personality. Such a Fund could be established by Resolution of the Prep.Com. and Resolution by the General Assembly, as was done in the case of the United Nations Revolving Fund for Natural Resources Exploration. The document defining its operational procedures and administrative arrangements is reproduced in Annex II.

There are indeed so many points in common between this Fund and the kind of fund needed forJEFERAD that one might seriously consider the possibility of using the existing Fund for our purpose.

The Fund, as stated in the Introduction to the quoted document, "is a unique venture and is largely devoted to exploration activities involving a high element of risk and uncertainty". Hence, "the Fund's procedures and arrangements are, of necessity, flexible." There is nothing in the document that would prevent the Fund from including seabed minerals in its exploration activities. The services of the Fund are exclusively in the exploration and associated pre-investment fields, broadly defined. They provide opportunities for on-the-job training of nationals, transfer of technology and utilization of national institutional facilities to the extent that these contribute to the expeditious execution of the project as determined by the management of the Fund.

The Administrator of UNDP,in consultation with the Secretary-General of the U.N., appoints the Directorof the Fund, subject to confirmation by the Governing Council of UNDP.

A Joint Operations Group advises on major project decisions, such as the manner of execution of projects, the appointment of operations managers, etc. The Joint Operations Group consists of the Director of the Fund and representatives of UNDP, the World Bank, and the substantive office of the competent agency of the United Nations system, which, for mineral resources, generally is the United Nations. The Joint Operations Group is chaired by the Administrator of UNDP or his representative, and meets in the composition required for the subject under discussion. It can associate outside experts selected for their professional competence in the technical fields covered by the project.

The Fund may use, as appropriate, the facilities of UNDP and the United Nations for the purpose of recruiting project personnel, awarding contracts and purchasing euipment.

In implementing projects, the Director of the Fund has to give special consideration to recruiting experts, consultants and contractors from developing countries on a preferential basis. In the procurement of equipment and other materials required, the Director shall be invited to purchase suitable and competitive equipment and materials available in developing countries on a preferential basis.

A Project Agreement regulates the mutual rights and obligations of the Fund and of the user Government. This Agreement provides for the settlement by arbitration of any controversy which is not settled by negotiation or other agreed mode of settlement. Attached to the Project Agreement is a work plan describing the wort to be performed by the Fund in carrying out the project. The project agreement for

an exploration project normally covers only exploration work. For feasibility studies, the Fund may enter into a eparate project agreement between the Fund and the Government.

The Fund utilizes voluntary contributions and funds generated through the production of resources discovered or developed with the assistance of the Fund, i.e., replenishment contributions). In carrying out its mandate the Fund my also accept donations and advances in cash or kind, from intergovernmental and nongovernmental institutions, cofinancing by governments, international financial institutions and public and semi-public institutions, with the agreement of the recipient country.

Replenishment Contributions to the Fund for exploration projects are not intended to be repayments of loans but rather to provide the Fund, from its successful projects, with a share of the proceeds from resulting production. This is expected eventually to make the Fund revolve.

Replenishment Contributions from user countries for solid minerals exploration projects shall be levied at the uniform rate of 2 percent of the annual value of produced commodities, or one percent for least developed countries, and shall be payable at this rate for a period of 15 year from the start of commercial production or until a ceiling of 10 times total project costs at constant prices is attained. For period of nonproduction, payments are suspended. The 15 year period may be extended under certain circumstances.

It would appear that nothing in the Operational Procedures and Administrative Arrangements would prevent the Fund from assisting the Commission and the developing countries wishing to participate in JEFERAD and act, on behalf of the Commission, as the legal partner in JEFERAD.

This question should be studied by the Group of Experts the Commission should appoint as suggested by the JEFERAD

proposal, in cooperation with the Director of the Fund and the Legal Adviser.

The capital contributed by the Fund would be risk capital, not a loan. Should JEFERAD be dissolved upon the coming into force of the Convention, no liability would have been incurred by the Enterprise. Should the JEFERAD agreement be renewed, with the Enterprise entering as a partner, then the new Joint Enterprise of Ocean Mining would have to assume the responsibility of making replenishment contributions to the Fund which might be agreed to be one percent of production value for fifteen years, starting the year of the beginning of commercial production.

Should the Group of Experts come to the conclusion that the Fund is not competent to enter into the JEFERAD Agreement, the Fund would serve nevertheless as a most useful precedent, and a Special Trust Fund , under the Secretary-General of the United Nations, might be established by Resolution of the Commission and of the General Assembly.

Another precedent might be seen in the International Finance Corporation of the World Bank. Since 1961, the ICF has been empowered to serve as a share holder by purchasing corporate securities. Although the IFC purposely does not become a direct party to a joint venture. it promotes joint ventures by holding equities. The IFC also supports mixed enterprises, or joint ventures between governments and private entities. (See Alexandra Post, Deepsea Mining and the Law of the Sea, The Hague, Martinus Nijhoff Publishers, 1984,p. 174).

Thus there can be no doubt: If the Commission decides that JEFERAD provides the most efficient framework for the implementation of para.12 of Resolution II, and to ensure the early entry into effective operation of the Enterprise and its keeping pace with States and other entities in an efficient parallel system, a legal modus operandi can be found for the establishment of JEFERAD, either through the

United Nations Revolving Fund for Natural Resources Exploration, or through a Special Trust Fund under the Secretary-General.

The seat of JEFERAD should be the seat of the Authority. The applicable law should be international law, the Convention, and the law of Jamaica.

III/ Revised ~~Proposal~~ JEFERAD PROPOSAL IN THE FORM OF A DRAFT RESOLUTION

ANNEX

Original

DELEGATION OF AUSTRIA

WORKING PAPER 3

JOINT ENTERPRISE FOR EXPLORATION, RESEARCH AND DEVELOPMENT

(JEFERAD)

PREP.COM., RESUMED THIRD SESSION

Geneva, August 12, 1985

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(JEFERAD)

PREP.COM., RESUMED THIRD SESSION

Geneva, August 12, 1985

INTRODUCTION

1. During the Spring, 1985, session of the Prep.Com. numerous references were made to the Austrian proposal for the establishment of a Joint Enterprise for Exploration, Research and Development (JEFERAD), particularly in the context of the discussion on training. A number of Delegations expressed strong support for the Austrian proposal; others voiced criticism and concern.

2. Since the Spring Session, perspectives, once more, have been changing. It is the purpose of this paper to look at the proposal in the light of changing circumstances.

3. The JEFERAD proposal assumed a scenario in which all four Pioneer Investors should have registered their claims; the regime prescribed by Resolution II would have been in force; and Paragraph 12 of that Resolution had to be implemented. JEFERAD should have been the operational arm of the Prep.Com.: the most efficient instrument for the implementation of that paragraph. JEFERAD should have given reality, from the outset, to a parallel system in which the

Pioneer Investors should have been a pre-incarnation of the "Contractors" under the Convention, JEFERAD, a pre-incarnation of the Enterprise; and the Prep.Com, a pre-incarnation of the Authority. The proposal was based on the conviction that such an arrangement would indeed be necessary to ensure the early entry into effective operation of the Enterprise; that it would be equally beneficial to the Enterprise, to developing countries and to industrialized countries and their companies. It was founded on a wide interpretation of Resolution II, in the sense that the Prep.Com., having the legal capacity necessary for the exercise of its functions and the fulfilment of its purposes, was empowered to take all measures necessary for the early entry into effective operation of the Enterprise, and if the establishment of JEFERAD was one of such necessary measures, the Prepcom was competent to establish it.

4. In the light of developments since the last session, there is reason to fear a delay in the registration of the four Pioneer Investors.

5. The Delegation of Austria views these developments with profound regret and deep concern. The regime prescribed by Resolution II is, in a way, a trial run for the future regime of the Authority. If the Resolution II regime is not workable, the Authority regime is unworkable as well. If the Authority regime is unworkable, let us not establish the Authority. If we do not want to establish the Authority, let us not bring the Convention into force. This reasoning does not make a wrinkle. It should be added that if the Resolution II regime is not enacted and if the Convention does not come into force, the "Provisional Understanding" between the seven industrialized States constitutes the only valid international agreement in force with regard to sea-bed mining.

6. Clearly this is a situation that must be avoided. If there should be other delays in the registration of the four Pioneer Investors, the regime prescribed by Resolution II

must in any case be brought into force as the only legitimate regime, solemnly adopted by 159 members of the international community, for the exploration of the Common Heritage of Mankind and the research and development required for its exploitation, once the Convention comes into force.

7. The scenario for this study is based on the assumption that one Pioneer Investor has registered his claim, which is noncontroversial, there being no overlapping claims from any other party. This would have certain clear-cut advantages both for the Prep.Com. and for the Pioneer Investors. It would be a great practical learning experience, in a relatively simplified situation. Questions such as the assessment of the equal commercial value of the two mine sites prospected by the Pioneer Investor, confidentiality, transfer of technology, etc., would be experienced in practice and could be perfected in the process.

8. In accordance with Resolution II, one site will have accrued to the Commission, in this scenario, for exploration for the benefit of the Enterprise.

9. It would now be our task to

(1) ensure the early entry into effective operation of the Enterprise;

(2) benefit participating parties, whether developing or industrialized;

(3) implement paragraph 12 of Resolution II;

(4) strictly keep within the terms of reference of the Convention and of Resolutions I and II.

THE AALCC MEMORANDUM

10. Last year, the Asian-African Consultative Committee Secretariat (AALCC) proposed an alternative mode of establishment for JEFERAD in a Memorandum on the Austrian proposal before the Preparatory Commission for the International Sea-Bed Authority. While approving the aims and purposes of the JEFERAD proposal, the Memorandum questioned the legal competence of the Commission to initiate an undertaking of this sort.

11. As a working alternative the Memorandum suggested

(a) that a "registered partnership" (JEFERAD) be formed or a company incorporated under the appropriate laws of Jamaica or any country. The partnership shall be composed of two or more Pioneer Investors whether States or entities. In the event of a joint stock company being formed, it should be in the nature of a private company with the share capital subscribed by two or more Pioneer Investors as in the case of partnership. The possibility of admission of other Pioneer Investors in the partnership of the private company may be kept in perspective.

(b) The partnership or the company may at an appropriate stage enlarge itself by admission of States or entities other than Pioneer Investors. There follow, in the AALCC Memorandum, some points about the establishment of subsidiaries, which, for the moment, we shall leave aside.

(c) The next salient point is that this partnership or company shall be authorised to undertake activities concerning exploration of reserved areas and to organise directly or through subsidiaries such matters as training programmes, research and development and also work in relation to processing, transport and marketing. The partnership deed or the memorandum of association would naturally be as wide in terms as possible. However, care has to be taken that the memorandum or articles do not authorise any access to the reserved areas or data or information in relation thereof other than in conformity with the provisions of the Convention and Resolution II.

(d) As to the mode of financing, the AALCC Memorandum suggests that the finances required for the activities of this undertaking would need to come through normal commercial sources or from States or the undertakings in the shape of borrowings as may be worked out in the usual course of business.

(e) Once this partnership has been established with the participation of Pioneer Investors, it may bring that fact to the notice of the Preparatory Commission as being an effort on the part of the Pioneer Investors concerned to pool their resources and expertise for discharge of the functions under paragraph 12, clauses (a) and (b) of Resolution II. The Prep.Com. may at its option agree to the obligations of the Pioneer Investors, parties to the arrangement, to be performed by the partnership or the company on their behalf, the same acting basically as the agent on behalf of the Pioneer Investors who had formed the partnership or the company. In that event the costs for the exploration would be reimbursed to the partnership or the company. In regard to the training programme contemplated under para 12 (b) of Resolution II, it is conceivable that the partnership or the company will arrange for the training programmes on behalf of the Pioneer Investors concerned and may for that purpose avail itself of facilities of existing institutions such as the International Ocean Institute or any other institutions which might offer suitable training facilities approved by the Prep.Com.

(f) In undertaking any activity in research, development or designing of equipment as also in preparing themselves for activities connected with processing or transport, the partnership or company would have to act at their own risk and costs. Nevertheless, it is conceivable, the AALCC Memorandum suggests, that such efforts might fructify in award of contracts from the Enterprise in relation to its activities in the reserved areas. Even though the Prep.Com. could neither make any commitment nor give any assurances in this regard, it may be possible for the Prep.Com. to mention in its final Report under para 11

of Resolution I, the state of preparatory work undertaken and accomplished by the partnership.

(g) the AALCC Memorandum also suggests that it may be possible that the Prep.Com consider establishment of a Committee to oversee the fulfilment of the objectives under para 12 of Resolution II. Some thought may be given to the possibility of the Committee being composed of representatives of Pioneer Investors together with an equal number of members chosen by the Special Commission representing other signatory States, the Chairman of the Committee being the Chairman of the Special Commission on the Enterprise or in his absence a Vice-Chairman. This is in the light of the close involvement of Pioneer Investors in the preparations for the Enterprise as envisaged in Resolution II. Such a Committee could oversee the programmes of exploration of reserved areas, approve of and supervise training programmes under para 12 of Resolution II, and examine the work of the entities contemplated in this scheme with a view to their activities being included in the Prep.Com.'s Final Report under para 11 of Resolution I.

(h) The AALCC Memorandum concludes that the above scheme takes into account the objectives and purposes behind the Austrian proposal in promoting collective effort towards research and development of sea-bed technology as also in preparing for the Enterprise. But the approach in the scheme is somewhat different in retaining the primary role with Pioneer Investors in conformity with the provisions, objectives, and purposes of Resolution II. It postulates two or more Pioneer Investors pooling their resources and expertise for meeting their obligations in conformity with Resolution II concerning exploration of reserved areas and the training programme. It also envisages that Pioneer Investors could collaborate in research and development of mining technology and designing of equipment as also in preparing themselves in processing and transport. Participation of other States or entities in activities other than exploration of reserved areas is also contemplated by providing that 49 percent of the share

capital would be open for public subscription.

ASSESSMENT OF THE AALCC ALTERNATIVE

Advantages

12. The advantages of the AALCC proposal are obvious.

(a) In the first place, It provides an elegant solution to the difficult problem of the legal competence of the Prep.Com. This alternative is indeed compatible with the most narrow interpretation of the legal competence of the Prep.Com.

(b) Secondly, in theory, at least, it facilitates a solution to the financial aspect of the problem. In the AALCC proposal, the financing of JEFERAD, on a purely commercial basis, is entirely the responsibility of the participants.

(c) In the light of the present situation, there is a third, important, advantage. It gives far greater flexibility in defining the terms of reference of JEFERAD as broadly as desirable. Under the Austrian proposal, these terms would have had to be restricted to nodule mining and processing. The AALCC alternative does indeed provide for a pooling of resources and expertise for discharge of the functions under paragraph 12, clauses (a) and (b), of Resolution II. With regard to research and development of technologies, however, obviously the Pioneer Investors are free to determine the range of their R&D in accordance with changing circumstances and requirements so as to remain competitive with the most advanced industries. This may include exploration for cobalt crusts and polymetallic sulphides and the development of the requisite technologies which recently have become the focus of attention of industry in the industrialized countries.

Problem Areas

13. There would appear to be some problem areas in the AALCC alternative.

(a) Through the injection of public international funding, the Prep.Com. would have had unambiguous control over JEFERAD in the Austrian proposal. The AALCC alternative weakens this control, making it, in a way, voluntary and informal.

(b) Again, through the injection of public international funding, the Prep.Com. would have ensured the direct participation of developing countries in the management of JEFERAD. The AALCC proposal limits participation in the "partnership" (JEFERAD) to Pioneer Investors and other parties able to contribute financially to the investment capital.

(c) The Austrian proposal would have offered financial incentives to the Pioneer Investors, reducing their investments in exploration, research and development by 50 percent. Under the AALCC alternative, Pioneer Investors as well as other parties would have to bear the full financial burden of contributions to the investment capital.

(d) The relation between the partnership and the Authority would have to be clarified. Under the Austrian proposal, JEFERAD would be dissolved five years after its establishment or six months after the coming into force of the Convention, or it would have the option to transform itself into a Joint Venture of the Enterprise and submit a Plan of Work to the Authority. A partnership of Pioneers could, in theory, continue independently, not necessarily in joint venture with the Enterprise.

MERGING THE AUSTRIAN AND THE AALCC ALTERNATIVES

14. In the situation as it has developed during the last twelve months, the AALCC alternative has taken on new aspects. The one Pioneer Investor who could initiate action along the lines suggested by the AALCC is in fact a

developing country. The focus of action would shift to the Indian Ocean and could take advantage of, and enhance ongoing activities to strengthen scientific/industrial cooperation in that region. The recent Conference on Economic, Scientific and Technical Co-operation in the Indian Ocean in the Context of the New Ocean Regime (Colombo, Sri Lanka, 15-20 July 1985) moves in the same direction.

15. In this new context, one could envisage the following scenario: JEFERAD would be established as a public/private joint enterprise for high tech R&D in the Indian Ocean area. While it would be of unquestionable interest to at least some of the Pioneer Investors and some others to participate in this venture, the terms of reference of the venture should be considerably broader than those of Resolution II. They might, for instance, include exploration of the Indian Ocean Ridge for polymetallic sulphide deposits, which, according to Dr. Alexander Malahoff, one of the chief explorers of the sulphide deposits on the Galapagos Ridge, are most likely to exist in the Indian Ocean. It might also include testing of the Rand Corporation's study on nodule processing with OTEC energy, as well as the development of new mining concepts. Since JEFERAD would be an independent corporation, the Pioneers parties to it would be quite free to determine the functions and purposes of JEFERAD in such a way to put it at the spearhead of advanced R&D in sea-bed mining technology. One could imagine that, besides some of the Pioneer Investors, other entities, like the Saudi-Sudanese Red Sea Authority, might have a direct interest in participating in such a venture.

16. The relations with the Prep.Com. should be established as suggested by the AALCC paper, and a Committee might be established to oversee the fulfilment of the objectives under para 12 of Resolution II. The Prep.Com. would of course be free to determine at what point in time exploration of the reserved site should actually be undertaken. This will depend on broader developments within

the Prep.Com. itself and outside of it. A discretionary delay in the actual exploration of the reserved mine site would in no way imply a violation or abrogation of Resolution II. There can be no doubt, on the other hand, that the Prepcom. and, through it, the Authority would benefit greatly from R&D and training activities.

17. It should be pointed out that Pioneer Investors whose claim could not yet be registered in accordance with the terms of Resolution II, obviously have no obligations towards the Prep.Com. in regard to para.12 of Resolution II. It is conceivable, however, that they might voluntarily cooperate in assuming such responsibilities, in return for the advantages they would obtain from joint R&D.

18. It is essential to demonstrate that such advantages in fact exist. A proposal to commence research and development in deep sea-bed mining must pass certain tests of viability. Such tests will not necessarily search for satisfaction of all the usual private industrial/commercial criteria, but it is clear that, given the concerns of financial institutions and governments alike, any proposal in this area must guarantee a "return" of one kind or another.

19. The present proposal guarantees a return in the form of knowledge of the potential of particular areas, and the development of technology. Both are indispensable components of a strategy for recovery of minerals from the deep sea-bed. This vital component of future policy making, and the technological research which will accompany it, not only constitute a viable return on risk and investment, but do so without pre-empting future actions by the Authority.

20. At this point, however, it might be advisable to examine the possibilities of injecting, on behalf of the Prep.Com. some public international funding into JEFERAD, along the lines suggested by the original Austrian proposal. In the new context, this would not be any longer a legal problem, since a corporate entity, the JEFERAD partnerships, would already be in existence. It would be purely a financial

problem. Whether it is feasible to attract e.g., World Bank or regional bank funding for this purpose, is not a matter that can be discussed in the abstract. It would have to be discussed on the basis of economic and scientific facts as they would have arisen once JEFERAD, in the AALCC form, had been established and initiated its activities. A degree of public international funding, however, would ensure the three advantages mentioned above: (a) greater control by the Prep.Com.; (b) direct participation by more developing countries (even though, in the present context, quite a few would participate from the outset); (c) greater financial incentives to the Pioneer Investors. In addition, as pointed out in the previous Austrian working papers, it would be far less costly, and less binding and burdensome on the Authority, to pay for the exploration of the reserved mine site(s) whenever that takes place, rather than having to refund the Pioneer Investor at a much later date adding substantial interest payments which may easily double the cost.

21. There remains, however, yet another possibility of merging the advantages of the Austrian and the AALCC alternatives. One could envisage three stages of the JEFERAD partnership. The first stage would be the establishment of the partnership as proposed by the AALCC Memorandum. The second would be its association with the Prepcom through a series or sequence of agreements concerning the implementation of para.12 of Resolution II, and the establishment of a joint committee to oversee these activities. The third stage would be the establishment of a full-fledged joint venture, not between the Prep.Com. and the JEFERAD partnership, but between the Enterprise and the JEFERAD partnership -- i.e., this third stage could be postponed until the coming into force of the Convention. If the proposal were conceived in this way, it would be useful to include this option already in the original agreement for the JEFERAD partnership.

CONCLUSIONS

22. This analysis leads to three major conclusions.

(a) In the present situation, a modified version of the JEFERAD proposal provides the only possibility for the immediate implementation of Resolution II and the discharge of the operational part of the Prep.Com.'s responsibilities. Any other realistic strategy to break the present deadlock necessitates drastic amendments to Resolution II and, in practice, the relinquishing of the operational responsibilities of the Prep.Com. This could have very serious consequences for the coming into force of the Convention.

(b) The establishment of JEFERAD in the Indian Ocean region would benefit developing and developed countries and enhance ongoing efforts to strengthen industrial/scientific cooperation in that region. With the establishment of the International Centre for Bio-industries and Genetic Engineering in New Delhi, India has already become a leader in international cooperation in high tech R&D. The establishment of JEFERAD would be a step in the same direction. This kind of scientific/industrial cooperation between North and South is essential for the bridging of the development gap and the establishment of a new international economic order. It is of fundamental importance for the exploration of the Common Heritage of Mankind and the development of the requisite technologies.

(c) India has already requested registration of its claim. If the Prep.Com. decided to proceed with the implementation of Resolution II and the discharge of its operational responsibilities, it would have to consider two steps:

(i) to take a new decision with regard to the

tactics of registering the claims of all four Pioneer Investors simultaneously;

(ii) to complete, as expeditiously as possible, the rules and regulations for Registration.

23. The technical preparation for the establishment of the JEFERAD partnership would be the task of the partners themselves although it obviously would be advisable that this work should proceed in consultation with the Prep.Com. The possibility of adopting a Resolution welcoming and encouraging such a development might also be considered.

24. Quite apart from its practical usefulness, the legal importance of such a course of action, in giving reality and validity to the ocean mining regime under the Convention, cannot be overrated.

ANNEX 2

f.le → SEFERAD

POLICY RECOMMENDATION

POLLICY RECOMMENDATIONS

The scanty and superficial survey offered in the preceding pages makes it nevertheless clear that there is a need for developing and applying peaceful uses of ocean space and resources for the benefit of mankind. It is therefore urgent that the potential of marine industrial technology should be utilized to contribute to solving the pressing problems of development, particularly of food, minerals, energy, and sea-borne trade, in the developing countries.

Obviously there is a need for international cooperation in this field, particularly in research, development and training. An International Centre could play an important role in the application of marine industrial technology for development.

It is therefore suggested that an International Centre for Marine Industrial Technology (ICMIT) should be established as an international organisation comprising a centre and a network of affiliated national, subregional and regional centres. The Centre should have its seat at...

The objectives of the Centre should be

. to promote international cooperation in developing and applying peaceful uses of marine industrial technology, in particular for developing countries;

. to assist developing countries in strengthening their scientific and technological capabilities in the field of marine industrial technologies;

. to stimulate and assist activities at the regional and national levels in the field of marine industrial technologies

. to serve as a forum of exchange of information, experience and know-how among scientists and technologists of developed and developing member States;

. to act as a focal point of a network of affiliated research and development centres.

Towards the fulfilment of its objectives, the Centre should

. carry out research and development, including pilot-plant activities in the field of marine industrial technology;

. train and arrange the training elsewhere of scientific and technological personnel, particularly from developing countries;

. provide, upon request, advisory services to members to develop their national technological capacity;

. promote interaction between the scientific and technological communities of the member States through programmes to enable visits of scientists and technologists to the Centre, and through programmes of associateship and other activities;

. convene expert meetings to strengthen the activities of the Centre;

. promote networks of national and international institutions as appropriate to facilitate activities such as joint research programmes, training, testing and sharing of results, pilot-plant activities, information an material exchange;

. identify and promote without delay the initial network of highly qualified research centres to serve as Affiliated Centres, promote existing national, sub-regional, regional and international networks of laboratories, active in or related to the field of marine industrial technology to serve as Affiliated Networks, as well as promote the establishment of new highly qualified research centres;

. Collect and disseminate infomation on fieldds of activities of concern to the Centre and the Affiliated Centres;

. maintain close contacts with industry, and cooperate with industry in joint enterprises for research and development.

II

The purposes and functions of the ICMIT would obviously be quite similar to the purposes and functions of the International Centre for Genetic Engineering and Biotechnology;, since both are dealing with high technology, with the purpose of generating cooperation between developed and developing countries in these new fields. The structures of the two institutions, however, would be different. The ICMIT would have to respond to the particular challenges posed by the United Nations Conference on the Law of the Sea and to the specific nature and stage of development of marine industrial technologies. Cooperation between the two Centres would be essential in the sector of marine bio-industrial technology.

The U.N. Convention on the Law of the Sea establishes a an International Seabed Authority,with its seat in Jamaica, and with responsibilities for marine scientific research and the acquisition or development of industrial technology for ocean mining. Article 144 of the Convention provides that

> 1. The Authority shall take measures in accordance with this Convention:
>
> (a) to acquire technology and scientific knowledge relating to activities in the Area; and
>
> (b) to promote and encourage the transfer to developing States of such technology and scientific knowledge so that all States Parties benefit therefrom.

2. To this end the Authority and States Parties shall co-operate in promoting the transfer of technology and scientific knowledge relating to activities in the Area so that the Enterprise and all States Parties may benefit therefrom. In particular, they shall initiate and promote:

(a) programmes for the transfer of technology to the Enterprise and to developing States with regard to activities in the Area, including, inter alia, facilitating the access of the Enterprise and of developing States to the relevant technology, under fair and reasonable terms and conditions;

(b) measures directed towards the advancement of the technology of the Enterprise and the domestic technology of developing States, particularly by providing opportunities to personnel from the Enterprise and from developing States for training in marine science and technology and for their full participation in activities in the Area.

Similar responsibilities are vested already with the Preparatory Commission for the International Sea-bed Authority and for the International Tribunal for the Law of the Sea in Jamaica. Resolution II, adopted together with the Convention, recognizes, in its Preamble, "the need to ensure that the Enterprise will be provided with the funds, technology and expertise necessary to enable it to keep pace with the States and other entities referred to in the preceeding paragraph with respect to activities in the Area," imposes obligations on pioneer investors with regard to the exploration of sites for the Enterprise, of training of personnel for the Enterprise, and of transfer of technology to it (para.12). Resolution I provides that the Commission shall establish a special commission for the Enterprise and entrust to it the functions referred to in paragraph 12 of Resolution II, and empowers it "to take all measures necessary for the early entry into effective

operation of the Enterprise."

Resolutions I and II have established, for all practical purposes, an interim regime for exploration, research and development in ocean mining technologies which will remain in force until one year after the sixtieth instrument of ratification has been deposited and the Authority begins its operations.

The Delegation of Austria has introduced a proposal in the Special Commission for the Enterprise, for the establishment of a Joint Enterprise for Exploration, Research and Development (JEFERAD) as the operational arm of the Commission (LOS/PCN/SCN2./L2, and Add. 1 and Add.2); for it is only through such an organisational measure that the Commission's operational responsibilities can be effectively fulfilled.

According to the Austrian proposal, the activities of JEFERAD shouls be:

(a) the exploration of the ocean floor and deposit evaluation;

(b) research and development in mining technology, transport and processing, through

(i) the establishment of a technology bank;

(ii) the testing of mining sytems or the development of new concepts of mining systems;

(c) Training, through

(i) short, interdisciplinary foundation courses, for all trainees;

(ii) a scholarship programme for 1-2 years' specialised technical training, in cooperation with the pioneer investors;

(d) Preparation for the establishment of an Institute for Training Research and Development as part of an International Centre for Marine Industrial Technology.

The Austrian proposal anticipates that the total cost for JEFERAD, for a period of five years, would amount to US| 200 - 300 million, and that the Commission should raise half of this amount from public international funding sources and voluntary contributions. The second Austrian Working paper (Add.2) discussed the possibility of using the United Nations Revolving Fund for Natural Resources Exploration.The relevant pages are annexed in Annex 1.

A group of high-level experts should be appointed as soon as possible to study the project.

The Enterprise, and its pre-incarnation, JEFERAD, would constitute an important part of an international system of institutions for the development of marine industrial technologies for the benefit of all States concerned.

The Convention, however, provides other elements for the framework of such a system.

Article 276 provides that

> 1. States, in co-ordination with the competent international organizations, the Authority and national marine scientific and technological research institutions, shall promote the establishment of regional marine scientific and technological research centres, particularly in developing States, in order to stimulate and advance the conduct of marine scientific research by developing States and foster the transfer of marine technology.
>
> 2. All States of a region shall co-operate with the regional centres therein to ensure the more

effective achievement of their objectives.

Article 277 defines the functions of these regional centres as follows:

> The functions of such regional centres shall include, inter alia
>
> (a) training and educational programmes at all levels on various aspects of marine scientific and technological research, particularly marine biology, including conservation and management of living resources, oceanography, hydrography, engineering, geological exploration of the sea-bed, mining and desalination technologies;
>
> (b) management studies;
>
> (c) study programmes related to the protection and preservation of the marine environment and the prevention, reduction and control of pollution;
>
> (d) organisation of regional conferences, seminars and symposia;
>
> (e) acquisition and processing of marine scientific and technological data and information;
>
> (f) prompt dissemination of results of marine scientific and technological research in readily available publications;
>
> (g) publicizing national policies with regard to the transfer of marine technology and systematic comparative study of those policies;
>
> (h) compilation and systemataisation of information on the marketing of technology and on contracts and other arrangements concerning patents;

(i) technical co-operation with othe States of the region.

Nothing else is said as to how these centre are to be established and financed, and even though, in some regions, there are already promising beginnings, e.g., thanks to the initiative of the Commonwealth Secretariat, it is nevertheless difficult to imagine how the whole system could get off the ground without a a strong, central initiative, such as the one proposed in the Executive Director's Special Report to UNIDO IV.

Considering the already existing framework, and the mandate given by the Convention, it should not be too difficult, or costly, to achieve the purpose of establishing a well coordinated system of regional centres for marine industrial technology. Each regional centre would deal (a) with marine industrial technology serving the specific needs of the region; (b) with one specialised sector of global concern and on the basis of global cooperation.

Activities under (a) would enhance regional cooperation and development, primarily in the form of South-South cooperation. Activities under (b) would introduce into each regional centre a component of North-South cooperation, which would be immensely teneficial to the whole system.

The whole system would be held together by a Council consisting of the Executive Directors of each Regional Centre and perhaps other prestigious experts.

The strategy we would like to suggest is the following:

With regard to sea-bed mining, the Enterprise, and before it, JEFERAD, would be the natural component. The Preparatory Commission should be urged to concretise its work and fulfil its responsibilities with regard to the exploration of the sea-bed, training, and the development of

technology for the Enterprise as speedily as possible and to examine the possibilities of cooperation with UNDP and the Special Fund for Science and Technology for Development for this purpose.

With regard to the other technologies and their development in accordance with Article 277 of the Convention, it is suggested that the Regional Seas Programme be utilized as a practical basis. Here are ten or eleven regions within which States are already cooperating in marine affairs and have a clearly defined, ocean-oriented communality of interests. The establishment of a Regional Centre for Marine Industrial Technology would be a logical addition to the various Plans of Action: It would add concreteness and purpose to these Plans. Thus, one could imagine a Regional Centre for offshore oil and gas production technologies in the Gulf Region, perhaps in Kuwait; a Regional Centre for shipping technologies in Japan, or South Korea, or China; A Regional Centre for Environmental Studies in East Africa, in close cooperation with UNEP, but with its own laboratories and oceanographic ships; A regional centre for aquaculture and marine bio-industrial technology in India, for South East Asia, in cooperation with the International Centre for Genetic Engineering and Biotechnology; A Regional Centre for Management Studies might be located in Malta, for the Mediterranean Region, etc.

One could conceivably invite Canada's newly established International Centre for Ocean Development (ICOD) to act as coordinator for the whole system: To organise, on a regular basis, sessions of the Governing Council of the whole system and to assist, as far as possible, with the organisation and the funding of research and development projects. In other words: With regard to ocean development, Canada might play the role Japan is playing with regard to the U.N. University system.

Thus one could create a system by utilising and integrating what already exists, or is in the process of

being established, or already mandated, without establishing new and costly bureaucracies.

A development of this kind would contribute greatly to the implementation of the new Law of the Sea, the enhancement of international cooperation, and the co-development of marine industrial technologies for peaceful purposes.

JEFERAD

AUSTRIAN WORKING PAPER 2

Co-development of Technologies

Careful legal work is needed on this aspect of JEFERAD, which must be spelled out in great detail in the JEFERAD Agreement.

The case is relatively simple if it could be assumed that, upon the entry into force of the Convention, the Authority, the Enterprise, and the other partners of JEFERAD agree that it would be most useful and practical to renew the agreement, with the Enterprise succeeding to the rights of the Commission.

There is an interesting precedent in research and development in space technology. INTERCOSMOS has been established for the joint development of scientific instruments and service systems and their integration into satellites, for joint research, experimental design development methodology and joint analysis of data. Scientific results of joint experiments form a common asset of all partners involved and are accessible to the international community.

In his Special Report to UNIDO IV, the Director General of UNIDO indicated UNIDO's interest in establishing an International Centre for Marine Industrial Technology, somewhat along the lines of the recently established Institute for Bio-industries, with headquarters in Trieste

and New Delhi.

The International Centre for Marine Industrial Technology could be structured, with the necessary adaptations, like CERN (European Centre for Nuclear Research) or IIASA (International Institute for Applied Systems Analysis), or it could be decentralised, with branches in several regions. Such an Centre would deal with research and training in fishing and shipping technologies, technologies for the extraction of energy from the oceans, oil and gas exploration and exploitation technologies, and ocean mining technologies. In the sector of ocean mining technologies it would cooperate with the Ocean Economics and Technology Branch of the U.N. Secretariat (OETB). The technology bank, establishment of which is suggested in the JEFERAD proposal, could be considered a first piece of an International Centre for Marine Industrial Technology and, at a later stage, be connected with it. There is no other practical way of achieving this kind of technology transfer and co-development.

Some suggestions with regard to the establishment of the Technology Bank will be presented in Austrian Working Paper III at the next Session of the Prep.Com.

If, on the other hand, JEFERAD is dissolved upon the coming into force of the Convention, its assets must be distributed among the partners, and the provisions relating thereto will have to be detailed in the JEFERAD Agreement, on the basis of fair, commercial criteria. There also would have to be a provision for settlement of any disputes, probably by recourse to UNCITRAL rules.

Funding

If the usefulness of the JEFERAD approach is agreed on, a way must be found to escape from the dilemma described on p.7 of this working paper.

The Prep.Com. must be able to be operative with regard to the future Enterprise to the same degree it is operative with regard to the pioneer investors. This, undoubtedly, is the intention of Resolutions I and II as interpreted in the context of the history of UNCLOS III. If no action at all were to be undertaken by the Prep.Com. during the interim regime, the parallel system would be violated, to the detriment of the Enterprise and the Authority.

Bearing in mind the counsel of those who have expressed doubts that the Prep.Com., established, as it is, by a Resolution of UNCLOS III, has the requisite legal personality and power to enter into contracts or to raise funds, a practical way out will have to be found.

The financing of the operations of JEFERAD will require contributions by all participants therein, i.e., the Prep.Com., the pioneer investors, the industrialised States and their companies, and the developing States. As regards the contributions by the Prep.Com. and developing States, a solution may perhaps lie in the establishment of a Revolving Fund with legal personality. Such a Fund could be established by Resolution of the Prep.Com. and Resolution by the General Assembly, as was done in the case of the United Nations Revolving Fund for Natural Resources Exploration. The document defining its operational procedures and administrative arrangements is reproduced in Annex.

There are indeed so many points in common between this Fund and the kind of fund needed for JEFERAD that one might even examine and seriously consider the possibility of using the existing Fund for our purpose.

The Fund, as stated in the Introduction to the quoted

document, "is a unique venture and is largely devoted to exploration activities involving a high element of risk and uncertainty". Hence, "the Fund's procedures and arrangements are, of necessity, flexible." There is nothing in the document that would prevent the Fund from including seabed minerals in its exploration activities. The services of the Fund are exclusively in the exploration and associated pre-investment fields, broadly defined,including the exploration of solid minerals. They provide opportunities for on-the-job training of nationals, transfer of technology and utilization of national institutional facilities to the extent that these contribute to the expeditious execution of the project as determined by the management of the Fund.

The Fund utilizes voluntary contributions and funds generated through the production of resources discovered or developed with the assistance of the Fund, (i.e., replenishment contributions). In carrying out its mandate the Fund my also accept donations and advances in cash or kind, from intergovernmental and nongovernmental institutions, cofinancing by governments, international financial institutions and public and semi-public institutions, with the agreement of the recipient country.

Replenishment Contributions to the Fund for exploration projects are not intended to be repayments of loans but rather to provide the Fund, from its successful projects, with a share of the proceeds from resulting production. This is expected eventually to make the Fund revolve.

Replenishment Contributions from user countries for solid minerals exploration projects shall be levied at the uniform rate of 2 percent of the annual value of produced commodities, or one percent for least developed countries, and shall be payable at this rate for a period of 15 year from the start of commercial production or until a ceiling of 10 times total project costs at constant prices is attained.

It would appear that the Operational Procedures and

Administrative Arrangements would allow the Fund to assist the Commission and the developing countries wishing to participate in JEFERAD.

The capital contributed by the Fund would be risk capital, not a loan. Should JEFERAD be dissolved upon the coming into force of the Convention, no liability would have been incurred by the Enterprise. Should the JEFERAD agreement be renewed, with the Enterprise entering as a partner,and the operation be successful, leading to mineral production, then the new Joint Enterprise for Ocean Mining [JEFOM] will make replenishment contributions to the Fund which might be agreed to be one percent of production value for fifteen years, starting the year of the beginning of commercial production. Such replenishment contributions to the Revolving Fund could be justified on the grounds that (a) such contributions would not amount to a repayment of loans but would be a voluntary contribution for assistance rendered to the Prep.Com. at an earlier stage; (b) the payment might be less than the payment due under para 12 (a) of Resolution II, and (c) the payment would be used for operations of the Fund in the interests of developing countries, and would therefore amount to revenue sharing with developing countries. These aspects could also be embodied appropriately in an Agreement between JEFERAD and the Revolving Fund. The payment for a "feasibility study" by the Fund will be for services rendered.

This question should be studied by the Group of Experts the Commission should appoint as suggested by the JEFERAD proposal, in cooperation with the Director of the Fund and the Legal Adviser.

Should the Group of Experts come to the conclusion that the Fund is not competent to enter into a Project Agreement or other agreement with JEFERAD, the Fund would serve nevertheless as a most useful precedent, and a Special Trust Fund , under the Secretary-General of the United Nations, might be established by Resolution of the Commission and of the General Assembly.

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J E F E R A D

A Proposal for a

Joint Enterprise for Exploration Research and Development

In Ocean Mining

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Annex 10: A Joint Venture Agreement for Seabed Mining, by Jaenicke, Schanze, and Hauser

Annex 11: Disaggregated Tables of Ocean Mining Technology

EXECUTIVE SUMMARY

IN THE FORM OF A DRAFT RESOLUTION

The Preparatory Commission for the International Sea-Bed Authority and for the International Tribunal for the Law of the Sea

Conscious of its functions and purposes during the interim period between the signing of the United Nations Convention on the Law of the Sea, 1982, and its entry into force;

Desirous to encourage investments by States and other entities in a manner compatible with the international regime set forth in Part XI of the Convention and the Annexes relating thereto, before the entry into force of the Convention, and as set forth in Resolution II;

Recognizing that the Enterprise must be provided with the funds, technology and expertise necessary to enable it to keep pace with the States and other entities during the interim period;

Recalling that Resolutions I and II give to the Preparatory Commission the mandate to take all measures necessary for the early entry into effective operation of the Enterprise;

Conscious of the need to take adequate preparatory steps in this direction and to concentrate its activities in the Area in the interim period on exploration, research and development, data management, and training,

Has, on the recommendation of its Special Commission for the Enterprise, *decided* as follows:

1. The Preparatory Commission intends to enter into a joint venture arrangement with States and other

entities for the exploration, research and development of either the first, or, at its option, the second or the third reserved area accruing to it from the application of a pioneer investor under Resolution II.

2. The joint venture arrangement referred to in paragraph 1 may be designated as *Joint Enterprise for Exploration, Research and Development,* hereinafter called JEFERAD.

3. Partners in JEFERAD should be States signatories to the United Nations Convention on the Law of the Sea, 1982, and entities whose components being natural or juridical persons possess the nationality of one or more States signatories to the Convention or are effectively controlled by one or more of them or their nationals, and are able and willing to contribute, in cash or in kind, to the establishment and operation of JEFERAD.

4. The participation of Partners in JEFERAD should be on fair and reasonable terms and conditions.

5. The Preparatory Commission shall be entitled to a share of 51 percent in the capital funds of JEFERAD.

6. The Partners should establish a Joint Enterprise Committee for managing and supervising the activities of JEFERAD. Participation and voting in the JEC should be based on the Partners' contributions to JEFERAD. The Preparatory Commission should appoint half of the members of the JEC, keeping in mind the interests of developing countries.

7. The activities of JEFERAD should be

(a) the exploration of the ocean floor and deposit evaluation;

(b) Research and Development in mining technology, transport and processing, through

(i) the establishment of a technology bank;

(ii) the testing of mining systems or the development of new concepts of mining systems;

(c) Training, through

(i) short, interdisciplinary foundation courses, for all trainees;

(ii) a scholarship programme for 1-2 years specialized technical training in cooperation with the pioneer investors;

(d) Preparation for the establishment of an Institute for Training, Research and Development as part of the International Sea-Bed Authority.

8. JEFERAD should be established for a period of five years, extendable by one year at a time by a decision of the Preparatory Commission on the recommendation of the Partners. If the Convention comes into force before the expiration of JEFERAD, JEFERAD should terminate its activities within six months from the entry into force of the Convention. If within this period, the JEC of JEFERAD proposes a plan of work to the Authority, it should be considered and given priority in accordance with the provisions of Resolution II and the Convention. The Enterprise will, in that event, succeed to the position and the rights of the Preparatory Commission in JEFERAD, and a new arrangement, to the extent necessary, may be concluded between the willing partners of JEFERAD. The participation of partners in JEFERAD shall continue to be on fair and reasonable terms and conditions.

9. A Group of Experts, having specialized knowledge or practical experience in the fields covered by this Resolution, is hereby established to examine the modalities for the establishment of JEFERAD, prepare a draft

arrangement or memorandum of understanding for JEFERAD, and make such other recommendations relating thereto as they consider relevant and appropriate. The Group of Experts shall be composed as follows:

3 Experts nominated by Pioneer investors;

4 Experts nominated by the Commission.

Members of the Group of Experts shall be paid by their Governments, unless the Preparatory Commission can cover their cost from voluntary contributions. The administrative and maintenance expenses during the period of discussions in the Preparatory Commission or its Special Commission shall be borne by the United Nations.

The Group of Experts shall submit its report within a period of six months from the date of this Resolution.

EXPLANATORY NOTE

The United Nations Convention on the Law of the Sea has been signed. The number of signatures obtained in the short time since it was opened for signature constitutes a record in the history of treaty making. The Convention provides a framework for a new international order in the oceans.

The Preparatory Commission for the International Sea-Bed Authority and for the International Tribunal for the Law of the Sea has been established: Its organization, rules of procedure and plan of work have been agreed upon. The Commission, endowed with operational capacity to fulfill its mandate, again, is an organ without precedent in the history of international organization.

Thus a new phase of the "Marine Revolution" has started. The Commissions's task, though apparently less complex and, it is to be hoped, more limited in time, will be no less arduous and demanding than the tasks of UNCLOS III.

While some of these tasks are spelled out precisely, others are phrased more broadly and flexibly. Thus, for instance, the Special Commission for the Enterprise has the mandate (Paragraph 8, Resolution I)

> *to take all measures necessary for the early entry into effective operation of the Enterprise.*

This includes a wide range of options.

Besides the explicit, or "written" tasks, furthermore, there may be implicit, "unwritten" tasks, arising from the facts of the situation. The most important of the unwritten

tasks of the Commission is to *manage transition*: transition from legislation to implementation; transition from the economic and scientific situation that existed in the 1960s and 1970s -- on which the Convention is based -- to the economic and scientific situation as it emerges in the 1980s and 1990s, within which the new ocean institutions will have to operate. The main unwritten task of the Commission is to adjust the ideas and ideals of the '60s and '70s to the economic, scientific, and political realities of the '80s and '90s.

Many changes have taken place, which may radically affect the new regime.

Under the scientific aspect, there has been a twofold shift. First, recent research has shed new light on deep-sea mineral resources other than manganese nodules. The polymetallic sulphides discovered off the Galapagos Islands, and off the coast of the Western United States and Canada, have attracted a great deal of attention in the international scientific community and given rise to the expectation that there may be similar resources in many other places within the 97 percent of the ocean floor that has not yet been explored.

Secondly, it has become apparent that deep-sea mineral resources -- whether manganese nodules or polymetallic sulphides or other -- are not necessarily concentrated in the Area but have been and will be found in areas under national jurisdiction. Many deposits may straddle national boundaries or boundaries between areas under national jurisdcition and the Area.

While there may be gaps in the new information, just as there were gaps in the old one, the new discoveries cannot be ignored. If it is the responsibility of the International Sea-Bed Authority to carry out marine scientific research concerning the Area and its resources, and to enter into contracts for this purpose, and, furthermore, to promote and encourage the conduct of marine scientific research in the

Area and to co-ordinate and disseminate the results of such research and analysis when available, (Art. 143), this scientific research, in the '80s and '90s, must be far more comprehensive than was assumed in the '60s and '70s. It must comprize manganese nodules as well as other mineral resources in the deep seabed, in the Area and, in cooperation with member States, across the boundaries of the Area and in areas under national jurisdiction.

Under the economic aspect, the operations of the Sea-Bed Authority had been projected on the assumption that there would be a considerable number of applications for contracts for integrated mining projects in the imminent future: that, in fact, there might be more applications than available mine sites; that production limitation would have to be applied and that, in any case, full-scale commercial production would be on stream by 1985.

The deep, protracted Recession has played havoc with all these projections. And even if the Recession were to recede tomorrow, it has effectively slowed down research and development in mining and processing technology to such an extent that no integrated, commercial mining project may be conceivable for the next fifteen years.This may imply a tendency to make the drafting of rules, regulations and procedures as abstract, futuristic, and beset with uncertainties as was the drafting of Annex III, which the Prep.Com must consiously try to avoid.

The adoption of Resolution II has solved this problem, at least partly, by establishing, de facto, an interim regime for exploration, research and development. It responds to the needs of those States and companies who have invested in exploration, research and development, and enables them to continue to do so by guaranteeing a contract for exploitation, when the time comes, and protecting their investment.

Resolution II ensures the proper functioning of the

side of the Contractors in the parallel system during the transition period. While it imposes important obligations on the Pioneer Investors to assist the Commission in preparing for the early entry of the Enterprise into effective operation, the preparatory protection of the *Enterprise side of the parallel system* is far less structured: It lacks a legal and institutional framework.

The purpose of the present study is to contribute to the establishment of an interim/preparatory regime for exploration, research and development for the *Enterprise side of the parallel system* , "to ensure that the Enterprise will be provided with the funds, technology and expertise necessary to enable it to keep pace with States and other entities," a need recognized in the third preambular paragraph of Resolution II and re-affirmed in the chapeau to operative Article 12 of the same Resolution.

To create the institutional infrastructure capable of receiving and utilizing the services to be rendered by the Pioneer Investors under Article 12 of Resolution II, it is suggested that the Commission should take the initiative for the establishment of a *joint venture* or *Joint Enterprise for Exploration, Research and Development* (JEFERAD), open to those developed or developing States and those companies who wish to participate, and financed partly by industry, partly by Governments, and partly by public international funding institutions.

The Commission, having the legal capacity necessary for the exercise of its functions and the fulfilment of its purposes, is empowered, in paragraph 8 of the Resolution to "take all measures necessary for the early entry into effective operation of the Enterprise." Hence, if it is agreed that the establishment of JEFERAD is indeed a measure necessary for the early entry into effective operation of the Enterprise, the Commission, through its Special Commission for the Enterprise, is empowered to take this measure It should be noted, however, that the Commission does not have borrowing power. Contributions from

international funding institutions should therefore in the form of grants.

JEFERAD should be assigned the first suitable "reserved area" prospected by a Pioneer Investor. Just like the Pioneer Investor, it should submit a plan of work within six months of the coming into force of the Convention. There should be -- if all parties freely agree - a new joint-venture agreement at that time, covering the production and any subsequent phase as may be decided between the States and companies and, at this second stage, the Enterprise.

The advantages of JEFERAD would be obvious.

1. JEFERAD would be *complementary to PIP* in establishing an effective parallel system for the phase of exploration, research and development, which will constitute the sole activities in the Area, now and for the foreseeable future.

2. It would enhance exploration, research and development in ocean mining: giving it a boost, which is badly needed. As one experienced U.S. ocean miner put it recently, considering the extremely low level of investments that have gone into ocean mining R&D during the past two years, it is clear that imaginative initiatives in international cooperation are needed.

3. For developed countries, it would cut the cost of investment in R&D as much as 50 percent. For example: Company X in industrialized country A would need roughly $200,000,000 for the next phase of exploration and R&D. Since this kind of money is not available during the current recession, activities are reduced and "put on the back-burner." With JEFERAD, the Commission would be responsible for raising up to 51 percent of this amount in voluntary contributions. The rest of the investment would be shared by the companies and States participating. If the first phase of R&D required the pooling of the private

sector in multinational consortia, the second phase, which is far more costly, would certainly be greatly facilitated by an even wider cooperation between the private and the public sector, national and international.As Alexandra Post pointed out in a recent article ("The implications of change in mining finance and participation," Erzmetall, 36 (1983) Nr. 7/8)), "Along with a major shift in financial partners in recent years, private corporations and state agencies often conjoin in joint ventures and in a variety of other contractual arrangements....It is also clear that, with the emergence of many new contractual and legal relations between the corporate entity and the once but regulating, now even producing public authority, the traditional distinctions between the public and private sectors -- between business and government -- are becoming blurred..." An undertaking like JEFERAD thus would fit neatly into current trends.In any case, the role of JEFERAD in promoting the interests of the Enterprise and developing States would remain intact and woud not be adversersely affected,even though opportunities would be provided to industrialized States and their companies, to the socialist States and to Pioneer investors to participate in cooperation.

4. For Socialist countries, the arrangement should be equally advantageous. Nor should they encounter any legal or institutional difficulties.For instance, the Government of Cuba has recently (February 15, 1982) issued a decree on economic association between Cuban and Foreign Entities, which provides for the establishment of *Joint Enterprises* in which foreign companies can hold as much as 49 percent of the shares. "The joint Enterprises will be completely independent of the State. They will have absolute freedom in appointing the board of directors and managerial personnel, defining the production plan, setting prices and drawing up sales plans, deciding how many people will be hired and selecting them, signing contracts with national and foreign entities, choosing the accounting system, determining financial policy, etc." (International Legal Materials, Vol. XXI, Number 5, September 1982).

The People's Republic of China, likewise published, on July 11, 1979, a Law on joint ventures. Article 1 states:

> With a view to expanding international economic cooperation and technological exchange, the Peoples Republic of China permits foreign companies, enterprises, other economic entities or individuals (hereinafter referred to as foreign participants), within the territory of the People's Republic of China,into joint ventures with Chinese companies, enterprises or other economic entities (hereinafter referred to as Chinese participants).

Each party may contribute cash, capital goods,industrial property rights, etc. as its investment share in the venture.Foreign participation shall be in general not less than 25 percent, but there is no limit of 49 percent, as in the Cuban law.

The composition of the Board of directors is to be stipulated in the contract of Association. However, the Chairman of the Board is to be appointed by the Chinese participant; one or two vice-chairmen, by the foreign participants. On important problems, the Board of Directors shall reach decisions through consultation by the participants on the principle of equality and mutual benefit.

Under the Cuban as well as under the Chinese law, the applicable law for the joint enterprise or joint venture is the national law, whereas, in JEFERAD, it would be international law.

5. For developing countries, direct participation in the management of a high-technology development project would provide extraordinary if not unique opportunities for the training of scientists and technicians and the acquisition of high technology.

6. the *codevelopment of technology* would eliminate

many of the problems of the *transfer of technology*. Co-development is far less costly to developing countries than transfer. Co-develpment is a gradual process which creates its own scientific and economic infrastructure as it moves along. Last year, President Mitterand of France, opening the "summit" at Versailles, proposed the launching of a "concerted programme" by establishing "international commissions for research and development and for technical cooperation between private and public firms and States." In this proposal he stressed the importance of the participation of developing countries in joint undertakings to assure acquisition by them of the new technologies. JEFERAD would be the first major embodiment of this great idea.

7. The first phase of exploration and R&D is of crucial importance for the subsequent (overlapping) phases of exploitation, transportation, processing and marketing. While offering some direct, immediate benefits, it provides the best opportunity to maximize benefits from the later, productive stages of a mining project.

8. The current trend in contracts for mining and oil production appears to be toward shorter-term contracts, covering only one or two stages of an integrated project. JEFERAD would fit into this trend -- envisioned, and provided for, in the Convention itself.

9. Restriction to exploration and R&D would avoid, for the time being, the problem of *production limitation*, thus giving the Commission, and its special commission on the problems of developing land-based producer States, time to find realistic solutions in the context of present and forthcoming developments.

10. All partners in JEFERAD would have to contribute equity in the form of capital and technology, if the project is to be of equal and mutual benefit to all partners and to the Commission.

JEFERAD would, most likely, be a "classical joint venture," not a "joint venture corporation." In a "classical joint venture," the parties do not lose their legal personality. JEFERAD would be nonprofit, and would be established for a limited period, let us say, for five years, to begin with, although this period might be extended, if all partners agree. The partners could be pioneer investors or other signatory States or entities duly sponsored by signatory States. Membership need not be restricted to pioneer investors, since, in this case, it is not so much past investment as investment in JEFERAD that counts.

JEFERAD would undertake exploration and deposit evaluation. To explore a site of 150,000 square km to begin with (portions of it would have to be relinquished successively), at least sixty one-month-long expeditions are required. The research ship could be contributed by one of the pioneer investors (a developing country) which happens to have the most advanced and the most beautiful oceanographic ship in the world.Additional research ships could be added subsequently.

There are about 25 factors involved in the calculations needed to determine the economic value of a deposit of manganese nodules, such as grade of nodules, concentration of nodules per unit area of ocean floor, size distribution of nodules, physical characteristics of the associated sediments, depth of water, distance to port or processing facility, topography of the ocean floor in the deposit area, and weather in the deposit area.

The practical consequence of rapid, thorough,

comprehensive economic explorability on the one hand, and variations in the factors which will collectively determine the economics of the exploitation of the deposit on the other, is that it is possible for the first-generation mine site to be many times more profitable than lower grade deposits that may come up for mining in the future.

This is a consideration of crucial importance in decisions relating to the nature and content of exploration programmes, the time frame within which they should be carried out, the investments justified on these programmes, as also the R&D efforts. It is vitally important that work for the future Enterprise in deposit evaluation be undertaken now., simultaneously with the work of the private sector. Otherwise, and in spite of the banking system, the private sector may end up with mine sites many times more profitable than those of the Enterprise which thus will have lost the race before even starting.

It is obviously impossible to give a realistic estimate of what the costs to JEFERAD for exploration, research and development might be. The Cost Model of Deep Ocean Mining and Associated Regulatory Issues published in 1978 by the MIT gives the following estimate (in million dollars):

1. Research & Development Program			
Total R&D Program Cost			50.00
2. Prospecting and Exploration Programme			
Prospecting		1.6	
Exploration			
Research Team Salaries & Benefits	0.66		
Discrete Survey	2.60		
Continuous Survey	11.50		
Subtotal Exploration		14.8	
Total Prospecting and Exploration Program Cost			16.40
Total for Exploration R&D		US$66.40	

In a quite recent publication (Bureau of Mines Circular/1983), the U.S. Department of the Interior projects exploration costs (for 6 years) as $39.8 million, and costs

for R&D as $69.3 million, that is, a total for Exploration, R&D of $89.1 million.

Conrad (Welling (U.S. Mining Congress) estimates costs for exploration at the same level, but total for exploration, R&D for the next 5 years, at $300 million. He points out the importance of focusing on pilot-plant scale operations and scaling up of technology rather than basic R&D, which American companies have already behind them (Personal communication).

To remain somewhere inbetween these estimates, and including an inflation factor, let us project the cost for Exploration, R&D as $140.00 million.

The R&D to be undertaken would cover *mining technology, transportation, and processing.*

This R&D might have three major components: A survey of state-of-the art technology and the acquisition of existing technology for the Enterprise. This might take the form of a *JEFERAD Technology Bank* , to which participating companies might cede, voluntarily, at fair and commercial conditions, patents, etc., the transfer of which might be of mutual interest.

Secondly, R&D would consist in the *testing of mining systems or the development of new systems of mining concepts* : the development of collectors, of lifting gear, etc.

UNIDO recently published a study (5 October 1982, UNIDO/IS.345), edited by this writer under the title Ocean Mining and Developing Countries: An Approach to Technological Disaggregation. This study contains a series of tables showing subsystems of mining technology disaggregated into yet smaller systems which are marked in order of their complexity and stage of development. A glance at the tables, which are reproduced in Annex 10, clearly

indicates where research and development is needed. It also shows, especially to analysts in developing countries, which are the technologies that either are already available in developing countries or could easily be developed, with spin-off benefits for other sectors of industry.

For a more detailed analysis of Processing R&D, the reader is referred to the four excellent volumes published recently by the Department of Energy, Mines and Resources, Canada (1979, 1980). (It should be noted that the construction of a complete operational processing plant, according to the Canadian study, would run to about one billion Canadian dollars; the figure given by the U.S. Department of the Interior is quite similar: U.S.$ 886.3 million for a 3 million t/y facility.)

These references are intended merely to indicate the range of R&D still needed. If this work goes on in the private sector during the next five years, and the Enterprise has to buy the fully developed technology, once the convention comes into force, obviously the price to be paid by the Enterprise will be very much higher than the cost of investing now in JEFERAD, which would develop this technology on the basis of international cooperation and make it available to the Enterprise. The time to take such a decision is now.

The third component of a R&D programme for JEFERAD would be *training*. Training of manpower from developing countries, enabling these developing countries to fill their posts in the future Enterprise and in the other organs of the Authority, once the convention is ratified. Again, the time to take decisions and prepare for that moment is now: If one were to wait with this training until the Convention is ratified and the Authority established, it would be too late: the gap between the few States possessing seabed mining expertise and the many poor countries which don't, must not be allowed to widen further.

The training component of JEFERAD should consist of two

subcomponents:

A Foundation Course of 10 weeks, covering all aspects of deep-sea mining: scientific/technical; economic; managerial; environmental; legal; institutional. And a two-year specialized technical training programme.

The first, which is important considering the absolute novelty of the Seabed Authority, its structure and functions in the context of the making of a New International Economic Order, could be achieved, most economically, through cooperation with the IOI Training Programme, Class A, Seabed Mining, which has been developed by the International Ocean Institute over the last four years, under the direction of Ambassador Reynaldo Galindo Pohl and in cooperation with the Technical University of Aachen (Federal Republic of Germany, Preussag AG (Fed.Rep. of Germany) and all the competent institutions in the U.N. system.

The second training sub-component should be developed in cooperation with the pioneer investors, in accordance with Resolution II, para 12 (a)(ii). It might take the form of a scholarship system, to send gifted young marine scientists to the best technical institutions for a 2-3 year period; or of practical on-the-job training through the industries themselves, or , later on, as one delegate, Mr. Kazemi of Iran suggested during the Conference (A/CONF.62, SR23), the establishment, by the Authority, of an Institute responsible for keeping young research workers in the developing countries informed of the latest technology.

The cost of a "foundation course" of ten weeks for twenty-five participants is about US$200,000. If one hundred participants from developing countries should be trained each year, which would seem a reasonable number, four courses should be conducted annually, at a total cost of US$800,000. This would cover over-seas travelling for the participants as well as ten weeks room and board, medical insurance, teaching materials, field trips and pocket allowance as well as the costs for the teaching and

administrative staff.

The two-year technical training should not cost the Commission anything as it should be carried out by the Pioneer Investors.

The establishment of an Institute might cost $20 million over a five-year period -- an estimate based on the recently approved budget for the International Centre for Ocean Development (ICOD) established by the Federal Government of Canada.

The total operating budget for JEFERAD for a period of five years might thus look aproximately as follows(in million US$):

Exploration		
Research Team Salaries and benefits	1.40	
Discrete Survey	6.00	
Continuous Survey	25.00	
Total Exploration cost		32.40
Research and Development		
Technology Bank	100.00	
Testing of mining systems development of new mining concepts	43.6	
Foundation Courses	4.00	
Institute	20.00	
Total Research and Development		167.60
GRAND TOTAL FOR FIVE YEARS		200.00

To collect half this amount, over five years, that is, $20 million a year, in voluntary contributions, is not so much a financial problem as it is a question of political will.The other half could again be divided into two parts: one half to be borne by industry: we are now down to $50 million which could be divided among as many companies as wish to participate, in whatever proportion they wish to, and the remaining $50 million could be paid by the certifying Governments: Again, not so much a financial problem as a question of political will. A similar division of costs, incidentally, has been agreed on by the EEC for research and development in advanced technology: With the Community paying one half of the cost, and industry and States Members sharing the rest.

BACKGROUND

The earliest reference to joint ventures as the most appropriate embodiment of the concept of the Common Heritage of Mankind is to be found in a working paper submitted to the Seabed Committee on August 10, 1971, by Trinidad and Tobago, on behalf of thirteen States (Chile, Colombia, Ecuador, El Salvador, Guatemala, Jamaica, Mexico, Panama, Peru, Trinidad and Tobago, Uruguay, and Venezuela). This 13-Power draft (A/AC. 138/49) is summarized in the Official Records of the Seabed Committee (Twenty-Sixth Session, A/8421, Supplement No. 21) as follows:

> ...To give effect to this a body should be created which would itself, as the agent for mankind, undertake direct scientic investigation and the exploration of the Area and the exploitation of its resources on behalf of all mankind. It would be therefore more in consonance with the principle of the Common Heritage for such a body in the early stages to enter into joint venture, production sharing and profit sharing arrangements with other entities, public or private, national or international, rather than to grant or issue licences to such entities.

In Chapter II, Art. 15, of the same document, the Authority, again, is empowered "to avail itself for this purpose of the services of persons, natural or juridical, public or private, national or international, by a system of contracts or by the establishment of joint ventures." And Art. 33 (Section 3) establishes that "the Enterprise is the organ of the Authority empowered to undertake all technical, industrial, or commercial activities relating to the exploration of the Area and the exploitation of its resources (by itself, or in joint ventures with juridical persons duly sponsored by States."

The next important mentioning of joint venture is found in Vol.III of the Official Records of UNCLOS III in Document A/Conv.62/25: Economic Implications of Seabed Mineral Development in the International Area. Report of the Secretary General. Section III, paragraph 4(b), Participation of developing countries: Direct methods - joint ventures, reads as follows:

> Joint Ventures are becoming a common feature of the international mining and petroleum industries. It has been suggested that the future of the international petroleum industry will be one in which joint ventures with State companies, or service contracts and production-sharing arrangements, will be the order of the day. Participation of developing countries in the exploitation of seabed resources could be fostered in two types of joint ventures. One would be the association of companies from developing countries with enterprises of industrial nations possessing seabed technology. It is obvious that in this case participation would be accomplished in a direct manner with business groups from developing countries participating with risk capital and reaping any benefits obtained.
>
> A more indirect way of participation would be through the enterprise proposed by the 13-Power draft. It is likely that the over-all objective of control over nodule exploitation might be accomplished by the regulatory powers of the International Sea-Bed Authority. Nevertheless, there will still be considerable scope for participation in the decision-making process within the individual nodule mining units to warrant the establishment of joint ventures between interested parties of advanced countries and the enterprise. A host of questions relating to financial arrangements, management and marketing practices can so drastically affect the profitability of individual mining ventures as to make

> an active and direct role desirable for the International Sea-Bed Authority in each individual venture. The participation of the enterprise in joint ventures, moreover, would provide the necessary feedback for the Authority to adjust the rules, standards and regulations of sea-bed mining to the real needs of both the industry and the international community at large.

It is of interest to note that, in this section, the Secretary-General's Report makes reference, in a foot-note, to a paper, "Joint Exploration of Ocean Bed Resources: Some Organizational Aspects," prepared by Wolfgang Friedmann for Ocean Enterprises, a Special Report on a Preliminary Conference held in Preparation for Pacem in Maribus Convocation, 28 June - 3 July, 1970. The preparatory session was held in Santa Barbara in 1969.

In Caracas, this writer, representing the International Ocean Institute, made an authorized statement before the First Committee, pointing out that

> At Pacem in Maribus, we have done a considerable amount of work on the Enterprise system which, to many of us, seems to offer the only realistic instrument for the realization of a comprehensive concept of the Common Heritage of Mankind. I am annexing to this statement a proposal, published in 1972, for the structure of such an Enterprise.

The Annex to this statement contained an excerpt from "The Ocean Regime Proposal," Pacem in Maribus, E.M. Borgese, Editor, New York: Dodd Mead & Co., 1972. The Annex is reproduced as Annex 1 to this study.

In 1975, a special working group on joint ventures, under the chairmanship of Ambassador Christoper Pinto of Sri

Lanka, was established by the First Committee. Its report was issued as C.1/Working Paper No. 5, on April 8, 1975 (see Annex 2). The paper described various types of joint ventures with States and tried to identify some of the major legal and institutional issues that need to be considered if a joint venture with the Authority or the Enterprise were to be created. It pointed out that, in such joint ventures, the foreign entrepreneur is generally expected to provide the finance, technology and/or management required for the undertaking, the national government provides the natural resources. Transposed into the context of the Convention, this would mean that the consortia of the industrialized States provide financing, technology and/or management; the Authority provides the nodules.

Christopher Pinto had previously, in January 1972, introduced a document in the thirteenth session of the Subcommittee on the Law of the Sea of the Asian-African Legal Consultative Committee, of which he was the Rapporteur. The Document, comprizing over 80 Articles, was entitled "Preliminary Draft and Outline of a Convention on the Sea-Bed and the Ocean Floor and the Subsoil Thereof Beyond National Jurisdiction. In Chapter V, Pinto proposed the establishment of a "Sea-Bed Development Corporation" which would operate through joint ventures. This chapter is reproduced in Annex 3.

In the meantime, the "parallel system" began to gain ground in the negotiations, and while the joint venture idea was never lost sight of as a third, optional mode, attention was focused, above all, on the difficulties arising from the parallel system: the financial terms of contracts which had to be low enough to be bearable to companies and, at the same time, high enough to make the financing of the Enterprise possible; and the transfer of technology, to enable the Enterprise to start operations at the same time as the private sector. As these difficulties appeared to become more intractable with every session that passed, the next pitch for a unitary joint venture system, as a way out

of the impasse, came from the Delegation of Nigeria.

At the 37th meeting of the Fifth Session, Mr. Adio (Nigeria)

> felt that the procedure followed in the Committee had not worked well....His delegation proposed a compromise solution that was midway between the dual system and the system for the conduct of activities in the Area by the Authority with the participation of other entities, consisting in a single joint venture. The Nigerian proposal was set out in a paper that was being made available for consideration by delegations and would be formally submitted at the next session (Official Records, Vol.VI, Summary Records, 37th meeting, Tuesday 14 September 1976, t 3:30 P.M.).

The proposal (see Annex 4) was put forward by Nigeria's Commissioner for Justice, Mr. Justice Dan Ibekwe, at the end of that session.

In Document A/Conf.62/L.16 (6 September 1976) the Chairman of the First Committee, Mr. Paul Engo of Cameroon, made the following reference:

> Nigeria's distinguished Attorney-General and Commissioner for Justice, Mr. Justice Dan Ibekwe, similarly proposed what he considered the "area of least resistance." He suggested in effect a joint venture system applying to all activities of exploration and exploitation in the area: This, he argued, would avoid the problem of the types of relationships proposed between the Authority on the one hand and States and private parties on the other.

Engo referred to the Nigerian proposal once more during the

opening meeting (38th) of the Sixth Session (Wednesday 15 May 1977 (Official Records, Vol.VII, Sixth Session,p. 31):

> He suggested that serious consideration should be given to the kind of joint-venture arrangement which had been suggested at the previous session, together with the so-called "banking system," since it might provide a practical means for dealing with the financial and technological aspects of the problem for an initial system.

That was as far as the Nigerian proposal got at UNCLOS III.

In the meantime, in August 1976, an "Informal Proposal" was introduced in the working group chaired jointly by Dr. Jagota of India and Dr. Sondaal of the Netherlands (see Annex 5).

Realizing the enormous difficulties in getting the Enterprise started under the Parallel system, this "Informal Proposal" suggested a system for the initial phase, under which the Authority would conduct activities in the Area solely by two means: (1) joint ventures with the Enterprise; (2) contracts with the Authority.These two modes must be emloyed on an alternating basis, according to a time schedule established by the Authority. In other words, at any given time, there should have been no choice for a company applying for a mining site, whether to enter into a joint venture or mine the site on its own under a contract. If a competing company, last month, had obtained a contract, it was now joint-venture time, willy-nilly. Or else the company had to postpone its activities in the Area and wait until another company or State was found who was willing to enter into a joint venture. If an obligatory joint venture system was felt to be a constraint on a company, it is understandable that companies, and the industrialized States, would be reluctant to accept a system penalizing

every second applicant.

The proposal died a quick death.

Meanwhile a great number of working papers in several series (17 Paul-Bamela-Engo Papers: PBE 1-17); Weekly Reports by the two Co-Chairmen of the "Work Shop" (WR1-5), studies by the Secretariat, Draft Articles and Draft Statutes for the Enterprise, emerged from the First Committee.

Among these, at least one should be mentioned in the present context: a Draft for a "Statute of the International Seabed Corporation" of 26 March, 1976 (Annex 6).

The Corporation is not conceived as a joint venture but as a share-holding "corporation," financed by its share holders. In practice, however, the difference may not have been so great. The Seabed Corporation is a very large undertaking, duplicating, in many respects, the structure and the functions of the Authority itself. All signatories to the Convention are *eo ipso* members of the Assembly of the Corporation, with 500 votes each, on top of which each share-holder gets additional votes based on the number of shares he is holding. One could imagine that these share-holders are the four or five existing sea-mining consortia, in which case the resulting structure is not too different from that of the public/private joint Enterprise at which we are aiming with this study.

From 28 February to 11 March, 1977, an informal intersessional meeting took place in Geneva, under the chairmanship of Jens Evensen of Norway. The meeting made two major contributions to the development of the joint-venture concept.

The result of the meeting was circulated among all Delegations by a Note by the Secretariat of April 1977. Since the meeting was informal and intersessional, the

report on the meeting and the annexed working papers are not included in the Official Records of the Conference. They are, however, included in Dokumente der Dritten Seerechtskonferenz der Vereinten Nationen - New Yorker Session 1977, edited by Dr. Renate Platzöder (Stiftung Wissenschaft und Politik), pp.310-353.

On March 9, Ambassador Karl Wolf of Austria submitted a paper (Annex 7), "in the hope it might promote a better understanding of the joint-ventures system, mentioned by a number of participants during the discussion. It is intended as an *illustration*, not as a basis for discussion."

The proposal envisages a "conceptually unified system of exploitation in which the Authority would have a central and indispensable role in all activities as the Trustee of the Common Heritage." The system is not limited to one single Enterprise, but considers the possibility of a number of joint Enterprises -- perhaps one for each mining project.

Each one of these Joint Enterprises would be financed to the extent of 52 percent by the Authority and 48 by as many States or companies as wished to participate. Each Governing Board would consist of 25 members, 13 elected by the Assembly of the International Seabed Authority, to ensure that the principle of just regional geographical representation is taken into account, and with due regard to the interests of developing countries, of labour, and of consumers. Twelve members would be appointed by the companies having the largest investment shares in the Enterprise. Each member belonging to the first group would have an equal voting participation equivalent to 3 percent of the investment; each member of the second category would have a voting participation equivalent to the investment shares he represents.

As the working paper points out, the proposal aims at the full and active participation of the industrialized States and their companies; it provides a framework for *cooperation* rather than *competition* between the

Enterprise and the established Industry; it assures the effective control of the Authority; reduces and simplifies the problem of financing and technology transfer, maximizes financial benefits for the Authority; and -- particularly important in the context of more recent developments -- the system proposed is flexible enough to be applicable both in the Area and, if desired, and with some simple adaptations, in areas under national jurisdiction adjacent to the international Area.

The proposal was elaborated in considerably greater detail in an IOI Occasional Paper (No.6. Malta, November 1978) The Enterprises: A Proposal to Reconceptualize the Operational Arm of the Authority to Manage the Common Heritage of Mankind.

The second contribution, with a strong bearing on the joint-venture concept, emerged from a Mexican working paper, submitted to that same intersessional meeting.

Deeply concerned with the shortcomings of the "parallel system" which inevitably would be adopted by UNCLOS III, the Mexican Delegation stressed the provisional nature of this system and the need for a fundamental *review* twenty years from the entry into force of the Convention, which should examine whether and how far the "parallel system" fulfilled the purposes of the Convention and effectively ensured the proper functioning of the Enterprise and the participation of developing countries.

> If the [Review] Conference decides to amend Part I [now Part XI] of the Convention and the Annexes thereto, it shall in any event ensure that the principle of the common heritage of mankind, the international régime designed to ensure its equitable exploitation for the benefit of all countries, especially the developing countries, an Authority to organize and control activities in the Area, are maintained.

Explaining the proposal, the Mexican working paper states:

> The provisions of paragraph 3 are designed to ensure that, even if no agreement is reached to change the previous régime or to maintain it in force, no legal vacuum would occur. In other words, States and individuals would not, in such circumstances, acquire the right to exploit the seabed freely and unilaterally. In any event, the principle of the common heritage of mankind, about which there can be no argument either now or in 20 years' time, would be maintained, as would an international régime and an Authority responsible for organizing and controlling activities in the Area.

The Mexican proposal for a Review Conference was incorporated almost in its entirety in Doc. A/CONF.62/WP 10, Informal Composite Negotiating Text, of 15 July 1977, except that the provision in paragraph 3 -- what to do in case the Review Conference fails to agree to maintain the present régime or to establish a new one -- was further strengthened, by the inclusion of paragraph 6 in Art. 153, Review Conference.

> 6. If the Review Conference fails to amend or to reach agreement within five years on the provisions of this Part of the present Convention governing the system of exploration and exploitation of the resources of the Are *activities in the Area shall be carried out by the Authority through the Enterprise and through joint ventures negotiated with States and entities referred to in subparagraph (ii) of paragrpaph 2 of Article 151, on terms and conditions to be agreed upon between the parties thereto provided, however, that the Authority shall exercise effective control over such activities.*

Introducing the document, President Amerasinghe said (July 22, 1977, Doc.A/Conf.62/WP 10/Add.1)

> As a possible compromise, the Chairman of the First Committee has made a new proposal contained in paragraph 6 of Article 153 which in his view is intended to allay that scepticism and also to deal with the legal vacuum that would arise should the Review Conference fail to reach agreement. *As there have been many and varied references to joint arrangements, and in this case to joint ventures, a thorough discussion of such methods and their implications would serve a most useful purpose.*

The provision disappeared in the next following version of the Draft Convention, A/Conf.62/WP10/Rev.1, of 28 April, 1979 -- and this is not surprising. If it was indeed impossible to agree on a unitary joint venture system of exploration and exploitation *now*, it would seem unrealistic to *impose* it on a future generation!

The attempt nevertheless demonstrates the enormous importance the joint-venture concept had assumed in the discussions and negotiations.Privately, delegates, from developing as well as from developed countries, agreed that, even if the parallel system were adopted in the Convention,

in practice it would be the joint-venture system, provided for as an optional alternative, that would prevail.

References in the summary records of the negotiations and documents issued by the Secretariat, are so numerous that we shall not attempt to list them all. By way of example, we shall quote only one, before coming to the final major new proposal, that of the Delegation of the Netherlands.

Document A/CONF.62/C.1/L. 19, "Costs of the Authority and Contractual Means of Financing its Activities," contains a Section III,B, which gives an excellent survey of the evolution of contracts, from the early concessions to the most advanced joint ventures. Concrete examples are presented, for various types of arrangements, with different structures, terms, and purposes. Section D of the same document raises a number of pertinent questions as to how to apply a joint-venture model to the Authority's Enterprise. Of particular interest, in the present context, is the question of the acquisition of technology and expertise by the Enterprise through joint ventures. The last four paragraphs of the document deal with this question. They are reproduced in Annex 8.

The last of the important, and perhaps the most ingenious, proposal for a joint-venture system to solve the intractable problems of the financing of the Enterprise and of technology transfer, and to ensure that the Enterprise could commence operations at the same time as, and in step with, the "private sector," came from the Delegation of the Netherlands. Professor Willem Riphagen introduced it with a statement, which is reproduced in Annex 9.

The proposal is of admirable simplicity. Whenever an applicant obtains a contract for operations in a nonreserved area, the Enterprise has the *option* to form a joint venture with that contractor. The participation of the

Enterprise is not to exceed 20 percent. In return, the Contractor has the *option* to form a joint venture with the Enterprise in a reserved area. The participation of the Contractor in the reserved-area venture is to be equal to the participation of the Enterprise in the nonreserved-area venture. The proposal is fair to both sides, and extremely flexible. The option may, or may not, be exercised; but if the Enterprise realizes that it cannot start operations at the same time as, or in step with, the private sector, it may indeed exercise this option which would make it a significant partner in the joint-venture arrangement. "By participating in one or two consortia only, the Enterprise will be able to gain access to technology and the skill to operate it. After it has gained enough experience, the Enterprise can make a choice between the different technologies for its own operations."

The Netherlands proposal, further clarified by a set of draft articles which, however, never were formally introduced into the negotiations, and a second statement by Dr. Gajentaan (all included in Annex 9), was positively but prudently received both by developed and developing States. The warmest endorsement came from the Delegation of Austria, which listed a number of important advantages of the proposal, both for developed and developing countries. Ambassador Wolf's statement is also included in Annex 9.

One should have expected the Group of 77 to take up the proposal. With their endorsement, it would have been carried. But the Group of 77 failed to reach a decision, either pro or con. In the absence of such a decision, the Netherlands' Delegation did not press any further.

Article 11 of Annex III of the final text of the Convention timidly encourages joint ventures with the Enterprise as an option. It reads:

Article 11

Joint Arrangements

1. Contracts may provide for joint arrangements between the contractor and the Authority through the Enterprise, in the form of joint ventures or production sharing, as well as any other form of joint arrangement, which shall have the same protection against revision, suspension or termination as contracts with the Authority.

2. Contractors entering into such joint arrangements with the Enterprise may receive financial incentives as provided for in article 13 of this Annex.

3. Partners in joint ventures with the Enterprise shall be liable for the payments required by article 13 of this Annex to the extent of their share in the joint ventures, subject to financial incentives as provided for in that article.

This survey is far from complete. It permits us, nevertheless, to draw the conclusion that the concept of joint ventures, as the most realistic solution of the dilemma between a licensing system, felt to violate the principle of the Common Heritage, and a monopolistic Enterprise system, unacceptable to industry and to industrialized countries in whose hands capital, technology and know-how are concentrated: as the most cost-efficient *modus operandi* for the Authority's operational arm, played a most significant role in the negotiations.

Why, then, the reluctance? Why was it always pushed back, never allowed front-stage?

The reasons are complex. Some may be adventitious.

Others are intrinsic to the proposals themselves.

Thus it was an adventitious, unfortunate circumstance, that the first serious push for a joint-venture solution at the Conference -- the Nigerian proposal -- coincided, in time, with Secretary Kissingers offer to finance the Enterprise, should the Conference go for the "parallel system." Chairman Engo, in fact, reviewed the two proposals together in his Report to the First Committee of 16 September 1976 (A/CONF.62/L.16):

> During this session of the Conference some dramatic proposals were made public outside the forum of this Committee, for a substantial imput into our endeavours, provided the system of exploitation eventually agreed upon was acceptable to the Government concerned. The United States Secretary of State, Dr. Henry Kissinger, declared that his Government would be prepared to agree to a means of financing the Enterprise in such a manner that it could begin its mining operations either concurrently with the mining of States or private enterprises or within an agreed time span that was practically concurrent, and further that the United States would be prepared to include in the Treaty agreed provisions for the transfer of technology....Nigeria's distinguished Attorney General and Commissioner for Justice, Mr. Justice Dan Ibekwe, similarly proposed....

The big strong United States prevailed. The lure of dollars carried more conviction than a good idea. The perceived short-term advantage defeated the long-term rational solution.

But there were also intrinsic difficulties with the joint-venture concept.

From the very outset, developing countries intended to model the Enterprise's joint-venture system after the typical joint-venture agreements between a company of an

industrialized State and the Government of a developing country. As stressed alreay in the earliest studies of the Sea-bed Committee, the foreign entrepreneur is generally expected to provide the finance, technology and/or management required for the undertaking; the national government provides the natural resources. In other words, the International Seabed Authority provides the nodules as its share of equity; the other partner(s) in the joint venture provide(s) everything else.

Quite naturally the industrialized countries showed little enthusiasm for this kind of arrangement. First -- they pointed out -- the value of the nodules *in situ* was nil, or near nil; for without the technology, the capital, and the know-how which the industrialized countries alone possessed, the nodules would remain for ever on the bottom of the sea. Secondly, the question of ownership was different in the case of the Authority from what it was in the case of a national Government. The legal status of the Common Heritage was not at all clear. Did it bestow *ownership* on the Authority? In the view of the industrializied States, Common Heritage meant *free access*, above all. Thus the joint venture would bring them no benefit, but only a high cost.

The second major objection of the industrialized States was the notion that joint ventures should be *mandatory* : the *only* form of cooperation with the Authority. They did not object to a provision for *voluntary* association in joint ventures, when both parties freely agreed, but they insisted on their right to a license contract, if that was the way they wanted to go. The Nigerian, the Austrian, and the Netherlands proposal all made the sytem mandatory, or optional at the discretion of the Enterprise, not of the other partners.

But it was not only the industrialized countries that had difficulties with the joint-venture proposals. Many developing countries likewise had their misgivings. In their own national experience, joint-venture agreements had not

prevented, in many cases, the exploitation of the weaker partner by the stonger. Management, in many cases, remained in the hands of the foreign company; transfer of technology remained illusory, and the training of personnel remained restricted to the lower levels of employment, or, at any rate, was inadequate. Why should joint ventures be more successful for them in the oceans than on land -- when the development gap between the few rich and the many poor was even greater at sea than on land?

Another factor, undoubtedly, was inertia. The Group of 77 had worked hard and long to reach agreement on accepting the parallel system; and once that agreement was reached, it was too late to change position. The Austrian proposal, the Netherlands proposal, came too late in the game.

Or perhaps it was too early.

The Summary Records of the 160th Plenary Meeting (Eleventh Session of 6 April, 1982) report a statement by Ambassador Karl Wolf of Austria, which read, in part:

> On previous occasions his delegation had supported the concept of joint ventures between the Authority and operators as the most cost-effective solution to the problem of transferring technology and financing the Enterprise.
>
> It was generally acknowledged that, for reasons extrinsic to the Conference, the commercial exploitation of deep-sea-bed minerals was for the distant future, and the Authority might have to wait for a long time if it were to depend on "contracts" for integrated mining projects, since activities in the Area would, for the foreseeable future, consist of exploration research and development, and not of exploitation. If the Authority was to be of immediate use to the international community, it should at the

> earliest possible opportunity, establish a *joint venture on exploration, research and development* .... At the same time he pointed out that a joint venture would be less costly to the industrial nations and require considerably less investment capital. It would also be much more beneficial to developing countries in that it would provide an infrastructure for a future joint venture in exploitation, thus enabling the Authority and the Enterprise to engage directly in sea-bed mining, in cooperation rather than in competition with the other "operators."
>
> Such a joint venture would bring the Authority and developing countries into the mainstream of oceanographic research. There was no need to stress the enormous importance to the developing countries of acquiring a scientific infrastructure which was, as generally recognized, the basis for technological development in the building of a new international economic order.

A Joint Enterprise for Exploration, Research and Development (JEFERAD), clearly, must be of mutual advantage to all participants, whether developed or developing. or it will not be at all. If it is clearly advantageous, it may well be voluntary, not mandatory. Nobody will want to miss the advantages it offers.

Clearly, also, it would have all the advantages of the Nigerian, Austrian, and Netherlands proposals in the past. At the same time, however, there is the opportunity to learn from past failures.

The situation has radically changed. Nothing is as powerful as an idea whose time has come.

.

ANNEX 1

THE OCEAN REGIME PROPOSAL

Annex 1

The Ocean Regime Proposal

(Pacem in Maribus. E.M. Borgese, ed. New York: Dood, Mead & Co., 1972)

Article XII

The Maritime Corporations

1. The Maritime Commission, with the approval of the Maritime Assembly, may establish:

(a) an Ocean Science Corporation, responsible for conducting programs of research development of ocean science and technology;for coordinating national and private programs; for servicing an international ocean data center; and for acting as a repository and clearing house for information;

(b) an Ocean Weather Corporation, responsible for meteorological data gathering, weather forecasting, control and modification and providing services for a fee to nations and corporations;

(c) an Ocean Petroleum Corporation, responsible for prospecting, developing, and producing petroleum products from the deep oceans, by itself or in joint ventures with other national or private oil corporations;

(d) **an Ocean Mining Corporation, responsible for prospecting for minerals, developing underwater recovery methods, and producing minerals from the seabeds, by itself or in joint venture with corporations;**

(e) other operative corporations, in accordance with technological and economic requirements.

2. The Corporations are controlled subsidiaries of the Ocean Regime. The Ocean Regime shall advance

at least one-half of their capital and elect at least one-half of the members of their boards of directors. The balance of their capitals and boards shall be supplied by those States; or public or private corporations who choose to subscribe, subject to the reservation of adequate representation for the developing nations.

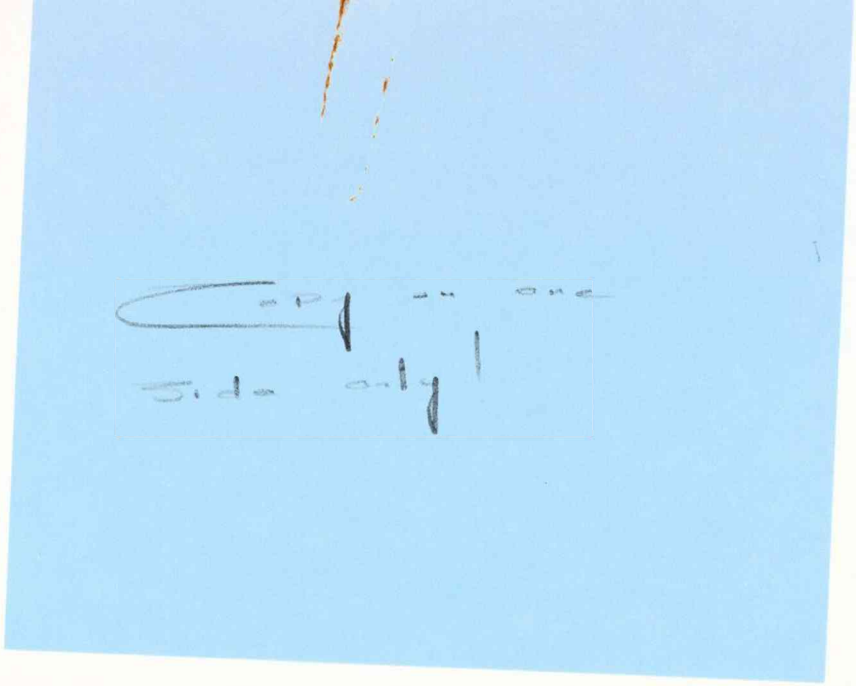
3. The Chairmen of the Boards and at least one-half of the Members of the Boards shall be elected by the competent chambers of the Maritime Assembly in accordance with Article VIII, E,4.

4. The Corporations shall be entitled to representation in the competent functional chambers of the Maritime Assembly.

5. Profits on the Regime's investment in the Corporations' stocks will be returned to the Regime's assets.

Annex 2

Information Note on Joint Ventures



Annex 3

Preliminary Draft by Christopher Pinto

MR. CHRISTOPHER W. PINTO: PRELIMINARY DRAFT AND OUTLINE OF A CONVENTION ON THE SEA-BED AND THE OCEAN FLOOR AND THE SUBSOIL THEREOF BEYOND NATIONAL JURISDICTION (1972)

Prepared by Mr. Christopher W. Pinto of Ceylon, Rapporteur of the Subcommittee on the Law of the Sea, the Asian-African Legal Consultative Committee, and submitted at its thirteenth session held at Lagos, Nigeria, 19th–25th January 1972.

Chapter V. *The Sea-bed Development Corporation*

Art. 62. 1. There is hereby established the Sea-bed Development Corporation (the Corporation).

2. The Corporation shall have an international legal personality distinct from the Authority and such legal capacity as may be necessary for the performance of its functions and the fulfilment of its purposes. The Corporation shall function in accordance with the Statute set forth in Annex I to this Convention, and shall in all respects be governed by the provisions of this Convention.

3. The President of the Council shall *ex officio* be President of the Corporation.

4. The Corporation shall have its principal place of business at the seat of the Authority.

Art. 63. All Contracting Parties are *ipso facto* parties to the Statute of the Corporation.

Art. 64. Subject to the general policies and supervision of the Authority:

(i) The Corporation shall be responsible for the preparation and execu-

tion of projects for the exploration of the International Sea-bed and the exploitation of its resources, in implementation of sub-paragraph (i) of Article 23 of this Convention (Corporation Projects);

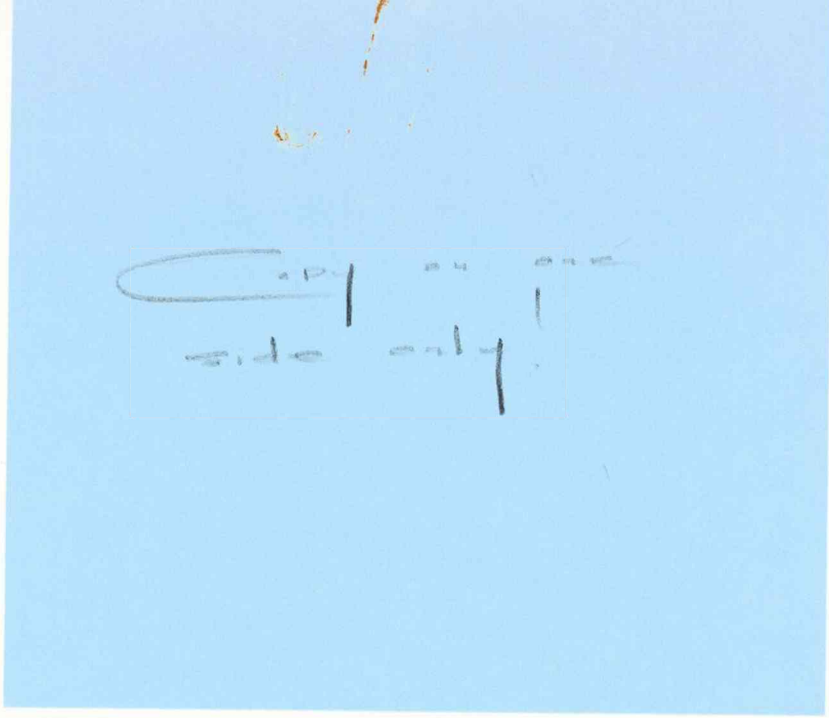
(ii) The Corporation may enter into arrangements with one or more Contracting Parties or with one or more nationals of Contracting Parties acting with the consent and under the sponsorship of such Contracting Parties, for the establishment of joint projects for exploration of the International Sea-bed or the exploitation of its resources (Joint Projects);

(iii) All projects of the Corporation shall be subject to approval by the Council, and supervision by the Economic and Technical Commission.

Art. 65. 1. In relation to portions of the International Sea-bed that are open for exploration and exploitation, Corporation Projects and Joint Projects shall not be accorded treatment in the matter of exploration licences, exploitation licences, exploitation rights, work requirements and other terms and conditions more favourable than any other projects for exploration of the International Sea-bed and the exploitation of its resources; provided, however, that the Council may in its descretion waive international fees and other forms of payment with respect to Corporation Projects.

2. The Corporation shall make arrangements for marketing of any raw materials recovered through Corporation Projects and Joint Projects.

3. The Corporation shall make arrangements to ensure that any raw materials recovered through Corporation Project shall not be used to further any military purpose.



ANNEX 4

THE NIGERIAN PROPOSAL

Article 22

(1) All States shall cooperate with the International Seabed Authority in the exploration and exploitation of the Area, conservation and management of the marine resources, the preservation of the marine environment, scientific research and other peaceful uses of the Area compatible with the Convention.

(2) The International Seabed Authority shall regulate, authori and supervise all explorations and exploitations of the seabed Area and conduct on its own exploration and exploit when it shall deem it necessary.

(3) State Parties, persons natural or juridical have a right to enter inot a joint venture with the Seabed Authority.

(4) The Seabed Authority shall be an effective partner of the joint venture according to arrangements agreed by negotiations between the joint parties.

(5) The products of prospecting and explkitations shall be the common heritage of mankind and shall be shared equitab taking into account the interests and needs of developing countries.

(6) The Authority and State Parties shall cooperate in promoti the transfer of technology and scientific knowledge relating to acitivities in the Area so that all States benefit therefrom in particular they shall promote:

(a) Programme for the promotion of transfer of technology to developing countries with regard to activities in the Area, including <u>inter alia</u> facilitating the access of developing countries to the relevant technology, under just and reasonable conditions.

(b) Measures directed towards the advancement of domestic technology of developing countries, particularly through the opening of opportunities to personnel from developing countries for training in marine science and technology and their full participation in activities in the Area.

(7) In the exercise of its controlling and regulatory powers, the Authority shall take into account the financial and technological contributions of the prospector (be it a State or person natural or juridical) and this shall be reflected in the interest of both parties to the joint operations.

(8) Before prospecting is undertaken the prospector shall, not less than .... months in advance of the expected commencement date of operations, provide the Authority with full descriptions of:

(a) The name of the prospector, its director and the person in charge of the project.

(b) The methods and means to be used including name, tonnage, type and class of vessels and description of scientific equipment.

(c) The precise geographical area in which the activities are to be conducted.

(d) The expected date of commencement.

(9) During prospecting and before exploitation, the prospector shall:

(a) Provide the Authority at its request, with preliminary reports as soon as practicable and with the final results at the conclusion of prospecting.

(b) Undertake to provide access for the Authority at its request to all data and samples derived from the projec

(10) The Autority on its part having been satisfied of the full compliance of the terms of the convention by the prospector shall grant access to the prospector if for some reasons the Authority feels the requirements are not fulfilled it should give reasons and the prospector should be at liberty to repair the shortcomings and re-submit its application to the Authority for re-consideration.

(11) The Authority and State Parties to joint ventures in the Area shall guarantee effective participation in the activities in the Area of developing countries.

(12) In all cases of operations the Authority shall act through the Enterprise.

(13) The Assembly in exercising its supreme policy making powers shall lay down general principles and issue directions of a general character to the council or other organs of Authority. It may make any recommendations on any matters relating to the Venture.

Annex 5

The Exploitation System -- An Informal Proposal

THE EXPLOITATION SYSTEM -- AN INFORMAL PROPOSAL

1. In view of the present difficulties confronting the negotiations in the First Committee, it is proposed that a solution to this impasse may be envisaged as follows: for an initial stage a system with two alternating means of exploitation; this initial stage shall end once the Enterprise has gained sufficient financial standing and technologica capability in order to conduct activities on its own. The exploitation system proposed here applies to the initial stage and is not intended to prejudice in any way the nature of the exploitation system in a subsequent stage.

2. Under this proposed system, the Authority shall conduct activities in the Area solely by two means:

(i) through a form of association between the Enterprise, on the one hand, and qualified States Parties, state enterprises, or persons natural or juridical which possess the nationality of States Parties or are effectively controlled by them or their nationals, when sponsored by such States, or any group of the foregoing, on the other hand (hereinafter referred to as "qualified entities").

The terms of this association shall be negotiated between the Enterprise and the qualified entities. The terms to be negotiated shall deal with the respective contributions of the parties, including the contribution of funds, materials, equipment, skills, and know-how as necessary for the conduct of operations covered by the association,and the extent of the participation of developing countries therein, as well as the specific financial arrangements.

(ii) through a contract with qualified entities. The qualified entities shall provide the funds, materials, equipment, skills, and know-how as necessary for the conduct of operations covered by the contract. The only terms subject to negotiation for these contracts shall be: a) the specific financial arrangements; b) the training programmes for the personnel of the Authority; and c) the exact data to be transferred by the qualified entities to the Authority, as envisaged in the Convention. Upon satisfactory negotiation of these specific terms, a contract shall be concluded.

3. The two means specified above shall be employed on an alternating basis, which shall be maintained at all times during this initial stage.

4. The competent organ of the Authority shall establish a time schedule for the alternation of these two means within a given time period for the implementation of paragraphs 2 and 3 above. This schedule shall be established in order to achieve the volume of production in the Area referred to in paragraph 10 below.

5. On the basis of the schedule referred to in paragraph 4 above, the Authority shall publish and make known to all Members a time limit for receiving applications for the corresponding means. The two means shall not be open simultaneously to applications during a given time period. Orderly alternation of the two means must be maintained.

6. Each application shall be required to contain the coordinates of either two potential mine sites of equivalent commercial value or an area no less than twice the size of a mine site.

7. Each application shall be required to contain the terms of the association or contract as specified in paragraph 2(i) and (ii) for the corresponding means. An association or a contract, as the case may be, shall be concluded with the qualified entity which offers the best terms.

8. Upon conclusion of an association or a contract, as the case may be, the Authority shall retain the area included in the application but not in the corresponding association or contract, as well as the data received in connection with the corresponding application. However, the Authority shall return all data and information in respect of any other applications received during that time period. The Authority shall not disclose nor misuse any data or information obtained in connection with those other applications.

9. If the Authority decides that the area included in an application but not in the corresponding association or contract, or any other area, is to be exploited, the means for exploitation shall be in strict conformity with the alternation specified in paragraphs 2 and 3 above. In that case the Authority shall indicate the coordinates of the area and publish and make known to all Members a time limit for receiving applications for that area. Paragraph 6 is not applicable in that case.

10. General principles shall be provided in the Convention regarding economic aspects of activities in the Area, such as:

a) all processed metals derived from activities in the Area shall be made available on the world market by means of a public auction;

b) a formula shall establish the volume of production in the Area in order to ensure an adequate supply of metals to meet world demand;

c) adequate measures shall protect against adverse economic effects of a substantial decline in the mineral export earnings of developing countries for whom export revenues from minerals or raw materials also under exploitation in the Area represent a significant share of earnings, when such decline is caused by activities in the Area, by such means as commodity arrangements, a total production limit within the initial stage, and a compensatory system of economic development assistance in respect of these adverse effects.

EXPLANATORY NOTE

1. One of the difficulties confronting the negotiations in the First Committee is to find an acceptable system of exploitation in the international area which would offer opportunities for production sufficient to meet world demand for raw materials and which would also ensure fair and equitable participation in seabed mining by all interested parties. This difficulty is partly attributable to the fact that so far no viable means have been found to ensure that the Enterprise can commence commercial production successfully and quickly.

2. The objectives of this proposal are:

a) to ensure the availability of metals from seabed production on the world market to all consumers, while at the same time providing adequate measures to protect the interests of land-based producers;

b) to provide equal opportunities to engage in seabed mining for the Authority, i.e. the Enterprise, on the one hand, and States Parties, o state enterprises, or persons natural or juridical which possess the nationality of such States or are effectively controlled by them or their nationals, when sponsored by such States, or any group of the foregoing, on the other hand;

c) to furnish means for the early and successful commencement of seabed production in which the Enterprise shall play a meaningful role;

3. In order to play that meaningful role, the Enterprise must overcome financial, technological, and managerial handicaps inherent in its creation. Let us now examine these handicaps.

4. Financing

It has been suggested and widely supported that the Enterprise shall operate as a completely self-contained, integrated entity. For this case, the sources of funds for the Enterprise are as follows:

a) charges on the operations of other entities -- e.g., taxes on gross revenues or royalties on the actual metals produced. While such charges would yield relatively small funds to the Enterprise after other entities commenced commercial production, this source of revenue by itself does not help the Enterprise to commence operations quickly.

b) borrowed funds (loans) -- e.g., from banks, short-term bonds sold privately or publicly, or the treasuries of individual governments. It is important to note that the World Bank or any regional development bank--such as the Inter-American Development Bank--would not be able to lend funds to the Enterprise itself. These institutions can lend only for projects directly involving individual or groups of Member countries.

For the initial stages of seabed mining operations, no sufficient assessment of economic viability can be made upon which to base loans from any source. As a result, any loans must be guaranteed in some way.

Presumably governments would not lend money directly without any guarantee for the loan. Also, neither short-term bonds nor commercial bank loans would be available without some form of guarantee. A sufficient and commonly used form of guarantee would be "callable capital" from governments. In this connexion, it is necessary to examine the third source of funds for the Enterprise--namely, voluntary contributions or assessments from States Parties.

c) voluntary contributions or assessments from States Parties. At the outset, two types of voluntary contributions or assessments must be distinguished: 1) a direct cash donation, known as "paid-in capital"; and 2) "callable capital", meaning a commitment of capital which is not paid directly, but rather serves only as a guarantee to borrowings made in other financial markets. This commitment would only be translated into a transfer of money from governments to the Enterprise if it was required to meet the Enterprise's obligations on its own borrowings.

The foregoing examination shows that if the Enterprise were to operate as a self-contained, integrated entity, it would require the governmental guarantee of loans in order to commence operations at the earliest possible date.

5. Technology

How could the Enterprise acquire the necessary technology? Presumably three means are available:

a) direct purchasing;

b) hiring, or sub-contracting;

c) internal developing by the Enterprise itself.

a) a simple organizational structure;

b) quick decision-making processes;

c) capability to effectively implement decisions taken;

d) experienced technical staff under a capable manager entrusted with powers and responsibility for the conduct of the daily operations.

According to the present text of the Statute of the Enterprise, it is doubtful that the above-mentioned criteria could be satisfied. The general policy directives of the Enterprise would be given by the Council, which is a political body. Furthermore, those directives are to be implemented by a Governing Board, the composition of which is similar to that of the Council. In addition, the manager of the Enterprise is supposedly the Director General; however, he possesses no real power and cannot give guidance to and effectively lead the operations of the Enterprise.

Finally, it should be noted that at least two years would be required to staff the Enterprise in the manner currently foreseen in the Statute. This time gap and its deleterious consequer on the commencement of operations by the Enterprise must be duly recognized.

7. Conclusions

The preceding paragraphs have pointed out the financial, technological, and managerial handicaps facing the Enterprise as well as possible solutions. It should be evident that the Enterprise will not be able to overcome these handicaps if it has to rely on the means and methods already discussed above. A new system, therefore, must be devised.

8. Proposal

The objectives of this proposal for a new system have been set out already in paragraph 2 of this Note.

The new system contains the following elements:

a) Since the Enterprise will not be in a position to operate on its own in view of the considerations mentioned, the exploitation system is envisaged in two stages. The initial stage, proposed here, would involve exploitation both by the Enterprise through a form of association with States Parties, or state enterprises, or persons natural or juridical which possess the nationality of States Parties or are effectively controlled by them or their nationals, when sponsored by such States, or any group of the foregoing (hereinafter referred to as "qualified entities") and by qualified entities through a contract with the Authority. These two means of conducting activities in the Area would be employed on an alternating basis, which must be maintained at all times during this initial stage. The differences between the two means are set forth in paragraph 2 of the proposal. This initial stage presumably would end after the Enterprise had gained sufficient financial standing and technological capability in order to conduct activities independently.

b) The mechanism for alternating the two means is described in paragraphs 4 and 5 of the proposal.

c) The application process, as well as the components of the application itself, are elaborated in paragraphs 6 and 7.

d) Paragraphs 8 and 9 deal with various consequences of the application process.

e) The principles contained in paragraph 10 provide not only the basis for this initial system, but also the framework within which this system must function. These principles guarantee the availability of metals from seabed production on the world market to all consumers, while simultaneously protecting the interests of land-based producers.

9. Advantages of the proposal

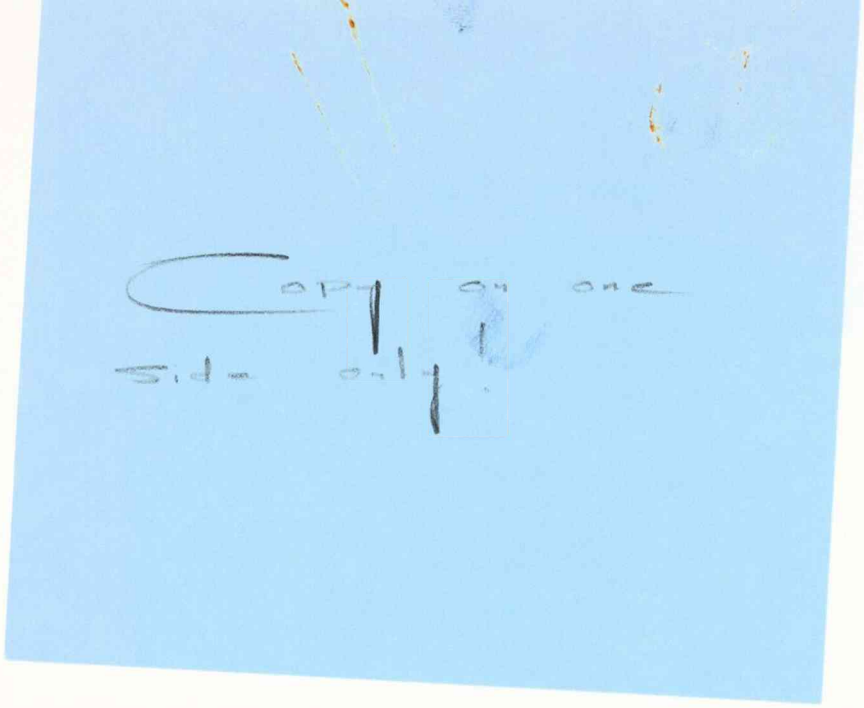
a) Under the proposed system, the Enterprise would have the best--if not the only--opportunity to become an operative and economically viable entity as quickly as possible.

b) The proposed system would enable the Enterprise to raise funds more readily, if necessary. First, simply by forming an association with a commercially established entity, the Enterprise would require considerably less funds than if it were to operate on its own. Moreover, the financial standing of that entity would strengthen the basis for the Enterprise to obtain loans. In addition, new sources of funds would become available to the operations--for example, governments sponsoring such entities probably would be more interested in lending funds directly, and regional development banks could grant loans if Member countries were involved. Finally, a successful association with the Enterprise probably would encourage the entity, as well as other prospective entities, to invest further in such associations.

c) As a result of an association with an entity already possessing the necessary technological capability, the Enterprise in turn could acquire the requisite skills. In addition, the Enterprise could benefit from the managerial expertise and experience of that entity.

d) Since under the proposed system qualified entities will be selected for an association on a comparative and competitive basis, the Authority will be in a position to obtain the best possible terms in pursuit of the benefits mentioned above.

e) Because in alternate time periods the qualified entities always have the opportunity to seek a contract with the Authority on more restrictive terms, the Authority is constrained to conduct reasonable negotiations with the entities applying for a form of association with the Enterprise on broader terms.



ANNEX 6

STATUTE OF THE INTERNATIONAL SEA-BED CORPORATION

(ENTERPRISE

STATUTE OF THE INTERNATIONAL SEA-BED CORPORATION (ENTERPRISE)

Article 1

PURPOSE

1. The International Sea-Bed Corporation shall carry out activities in the Area on behalf of the Authority in the performance of its functions in implementation of Article 22.
2. In the performance of its functions and in carrying out its purposes, the Corporation shall act in accordance with the provisions of this Convention, in particular of Article 9 thereof, and the Annexes thereto.

Article 2

RELATIONSHIP TO THE AUTHORITY

(a) The Corporation shall be guided in all its decisions by policies laid down by the Authority for this purpose.

(b) Nothing in this Annex shall make the Corporation liable for the acts or obligations of the Authority, or the Authority liable for the acts or obligations of the Corporation.

Article 3

MEMBERSHIP

1. The members of the Corporation shall be the members of the Authority on the date of the entry into force of this Convention.
2. Any State which subsequently becomes a member of the Authority shall ipso facto become a member of the Corporation from the date on which it becomes a party to this Convention.

Article 4

LIMITATION OF LIABILITY

No member shall be liable, by reason of its membership, for obligations of the Corporation.

Article 5

FINANCE

1. Funds shall be allocated initially by the Authority for use by the Corporation for the commencement of its operations as follows:
   (a) amounts determined from time to time by the Assembly out of the Special Fund referred to in paragraph 2 of Article 45;
   (b) voluntary contributions made by States Parties to this Convention.
2. The Board of Governors of the Authority shall determine when the Corporation may commence operations after the funds initially allocated pursuant to paragraph 1 of this article shall be in excess of _____.

3. The Corporation shall have the power to borrow funds, and in that connexion to furnish such collateral or other security therefor as it shall determine; provided, however, that before making a public sale of its obligations in the markets of a member, the Corporation shall have obtained the approval of that member and of the member in whose currency the obligations are to be denominated. The total amount outstanding of borrowings incurred by the Corporation shall not be increased if, at the time or as a result thereof the aggregate amount of debt incurred by the Corporation from any source and then outstanding shall exceed an amount equal to _____ times the amounts allocated to pursuant to this article.
4. Whenever it shall become necessary for the purpose of this Annex to value any currency in terms of the value of another currency, such valuation shall be as reasonably determined by the Corporation after consultation with organizations with broad responsibilities in the field of international monetary matters.
5. The funds of the Corporation shall be kept separate and apart from those of the Authority. The provisions of this paragraph shall not prevent the Corporation from making arrangements with the Authority regarding facilities, personnel, and services and arrangements for reimbursement of administrative expenses paid in the first instance by either organization on behalf of the other.

Article 6

OPERATIONS

Activities in reserved areas

1. The Corporation may carry out in such part or parts of the Area reserved to it for the purpose by the Authority, any of the activities referred to in Article 1 of this Annex. In doing so it shall act at all times in accordance with the provisions of paragraph 4 of Annex I.

Activities in other areas

2. In addition, the Corporation may carry out in part or parts of the Area not so reserved to it, activities pursuant to contracts for associated operations specified in paragraph 5 of Annex I. In such cases the provisions of Part C of that Annex shall apply mutatis mutandis to the Corporation as applicant and contractor with respect to those activities.

Procurement of goods and services

3. (a) To the extent that the Corporation does not at any time possess the goods and services required for its operations, it may procure and employ them under its direction and management. Procurement of goods and services required by the Corporation shall be effected by the award of contracts, based on response to invitations in member countries to tender, to bidders offering the best combination of quality, price and most favourable delivery time.

(b) If there is more than one bid offering such a combination, the contract shall be awarded in accordance with the following principles :

(i) Non-discrimination on the basis of political or similar considerations not relevant to the carrying out of operations with due diligence and efficiency.

(ii) Guidelines approved by the Board of Governors with regard to the preferences to be accorded to goods and services originating in the developing countries, particularly the land-locked or otherwise geographically disadvantaged among them.

(iii) (Other).

(c) The requirement of invitations in member countries to bid may be dispensed with in accordance with rules adopted by the Board of Governors.

Residual powers

4. Without prejudice to any general or special power conferred on the Corporation under any other provision of this Convention, the Corporation shall exercise all such powers incidental to its business as shall be necessary or desirable in the furtherance of its purposes.

Political activity prohibited

5. The Corporation and its officers shall not interfere in the political affairs of any member; nor shall they be influenced in their decisions by the political character of the member or members concerned. Only economic considerations shall be relevant to their decisions, and these considerations shall be weighed impartially in order to carry out the purposes specified in Article 1 of this Annex.

Article 7

ORGANISATION AND MANAGEMENT

Structure

1. The Corporation shall have a Board of Governors, a President and such other officers and staff to perform such duties as the Corporation may determine.

Board of Governors

2. (a) The Board of Governors shall be responsible for the conduct of the operations of the Corporation, and for this purpose shall exercise all the powers given to it by this Annex, or conferred on it by the Assembly.

(b) The Board of Governors shall have 25 members elected by the Assembly so that 4 are elected from the category of States referred to in sub-paragraph 1(a) of Article 27; 6 in accordance with sub-paragraph 1(b) and 15 in accordance with sub-paragraph 1(c) of that article. When the number of States members of the Authority at the time of entry into force of this Convention increases

by ____ %, the Assembly shall consider whether, and if so in what manner the number of members of the Board of Governors may be increased. A decision to increase the number of Governors shall be taken by a majority of two thirds of the members of the Assembly.

(c) Governors shall be elected every two years.

(d) Each Governor shall have one vote. Except as otherwise expressly provided all matters before the Corporation shall be decided by a majority of the votes cast.

(e) Each Governor shall appoint an alternate with full power to act for him when he is not present. When the Governors appointing them are present, the alternates may participate in meetings, but shall not vote.

(f) Governors shall continue in office until their successors are appointed or elected. If the office of Governor becomes vacant more than ninety days before the end of his term, the former Governor's State may appoint another Governor for the remainder of the term. A majority of the votes cast shall be required for election. While the office remains vacant, the alternate of the former Governor shall exercise his powers, except that of appointing an alternate.

(g) The Board of Governors shall function in continuous session at the principal office of the Corporation and shall meet as often as the business of the Corporation may require.

(h) A quorum for any meeting of the Board of Governors shall be a majority of two thirds of the Governors.

(i) The Assembly shall adopt regulations under which a member not represented by a Governor may send a representative to attend any meeting of the Board of Governors when a request made by, or a matter particularly affecting, that member is under consideration.

(j) The Board of Governors may appoint such committees as they deem advisable.

The President and Staff

5. (a) The Board of Governors shall select a President who shall not be a Governor or an alternate. The President shall be Chairman of the Board of Governors, but shall have no vote except a deciding vote in case of an equal division. He may participate in meetings of the Assembly but shall not vote at such meetings. The President shall hold office for a period of 5 years and may be re-appointed for one further term.

(b) The President shall be chief of the operating staff of the Corporation and shall conduct, under the direction of the Board of Governors, the ordinary business of the Corporation. Subject to the general control of the Board of Governors, he shall be responsible for the organization, appointment and dismissal of the officers and staff.

(c) The President, officers and staff of the Corporation, in the discharge of their offices, owe their duty entirely to the Corporation and to no other authority. Each member of the Corporation shall respect the international character of this duty and shall refrain from all attempts to influence any of them in the discharge of their duties.

(d) In appointing the officers and staff the President shall, subject to the paramount importance of securing the highest standards of efficiency and of technical competence, pay due regard to the importance of recruiting personnel on as wide a geographical basis as possible.

Relations with other International Organizations

6. The Corporation, acting through the Authority, shall enter into formal arrangements with the United Nations and may enter into such arrangements with other public international organizations having specialised responsibilities in related fields.

Location of Offices

7. The principal office of the Corporation shall be at the seat of the Authority. The Corporation may establish other offices in the territories of any member.

Channel of Communication

8. Each member shall designate an appropriate authority with which the Corporation may communicate in connection with any matter arising under the Annex.

Publication of Reports and Provision of Information

9. (a) The Corporation shall, not later than 3 months after the end of each financial year, submit to the Authority for its approval an annual report containing an audited statement of its accounts and shall transmit to the Council and circulate to members at appropriate intervals a summary statement of its financial position and a profit and loss statement showing the results of its operations.

(b) The Corporation may publish its annual report and such other reports as it deems desirable to carry out its purposes.

(c) Copies of all reports, statements and publications made under this Article shall be distributed to members.

Allocation of net income and minerals recovered

10. (a) The Board of Governors shall determine annually what part of the:

(i) net income of the Corporation after provision for reserves and surplus, and

(ii) minerals recovered through its operations, in raw or processed form, should be distributed to members. Distribution shall take place in accordance with the criteria, rules, regulations and procedures adopted by the Assembly pursuant to sub-paragraph 2 (x) of Article 26 of this Convention.

Article 8

WITHDRAWAL; SUSPENSION OF MEMBERSHIP; SUSPENSION OF OPERATIONS

Withdrawal by Members

1. Any member withdrawing from membership in the Authority shall cease to be a member of the Corporation on the date on which such withdrawal becomes effective.

Suspension of Membership

2. (a) Persistent violation by a member of any of its obligations to the Corporation, shall render such member liable to suspension pursuant to article 68 of this Convention.

(b) While under suspension, a member shall not be entitled to exercise any rights under this Annex except the right of withdrawal, but shall remain subject to all obligations.

Suspension or Cessation of Membership in the Authority

3. Any member which is suspended from membership in, or ceases to be a member of, the Authority shall automatically be suspended from membership in, or cease to be a member of, the Corporation, as the case may be.

Rights and Duties of Governments ceasing to be Members

4. (a) When a government ceases to be a member it shall remain liable for any amounts due from it to the Corporation. The Corporation and the government may agree on a final settlement of account and a final settlement of all obligations of the government to the Corporation.

(b) If such agreement shall not have been made within six months after the government ceases to be a member or such other time as the Corporation and such government may agree, the settlement shall be made in accordance with the following conditions:

(i) any payments due to the government may be made in such instalments, at such times and in such available currency or currencies as the Corporation reasonably determines, taking into account the financial position of the Corporation;

(ii) any amount due to the government shall be withheld so long as the government or any of its agencies remains liable to the Corporation for payment of any amount and such amount may, at the option of the Corporation, be set off, as it becomes payable, against the amount due from the Corporation;

(iii) if the Corporation sustains a net loss on the operations pursuant to Article 6 as of the date when the government ceases to be a member, and the amount of such loss exceeds the amount of the reserves provided therefor on such date, such government shall repay on demand the amount by which the amount due to the government would have been reduced if such loss had been taken into account when the latter amount was determined.

(d) In no event shall any amount due to a government under this Article be paid until six months after the date

member. If within six months of the date upon which any government ceases to be a member the Corporation suspends operations under paragraph 5 of this Article, all rights of such government shall be determined by the provisions of such paragraph 5 and such government shall be considered still a member of the Corporation for purposes of such paragraph 5, except that it shall have no voting rights.

Suspension of Operations and Settlement of Obligations

5. (a) The Corporation may permanently suspend its operations if, on the recommendation of the Corporation, the Assembly, by a vote of two thirds of its members so decides. After such suspension of operations the Corporation shall forthwith cease all activities, except those incident to the orderly realization, conservation and preservation of its assets and settlement of its obligations. Until final settlement of such obligations and distribution of such assets, the Corporation shall remain in existence and all mutual rights and obligations of the Corporation and its members under this Annex shall continue unimpaired, except that no member shall be suspended or withdraw and that no distributions shall be made to members except as in this paragraph provided.

(b) No distribution shall be made to members until all liabilities to creditors shall have been discharged or provided for and until the Assembly, by vote of a majority of its members shall have decided to make such distribution.

(c) Subject to the foregoing, the Corporation shall distribute the assets of the Corporation to members in accordance with the criteria, rules regulations and procedures adopted by the Assembly pursuant to sub-paragraph 2 (x) of Article 26 of this Convention, subject, in the case of any member, to prior settlement of all outstanding claims by the Corporation against such member. Such distribution shall be made at such times, in such currencies, and in cash or other assets as the Corporation shall deem fair and equitable. Distribution to the several members need not necessarily be uniform in respect of the type of assets distributed or of the currencies in which they are expressed.

(d) Any member receiving assets distributed by the Corporation pursuant to this paragraph shall enjoy the same rights with respect to such assets as the Corporation enjoyed prior to their distribution.

Article 9

STATUS, IMMUNITIES AND PRIVILEGES

Purposes of Article

1. To enable the Corporation to fulfil the functions with which it is entrusted, the status, immunities and privileges set forth in this Article shall be accorded to the Corporation in the territories of each member.

Status of the Corporation

2. The Corporation shall possess full juridical personality, and, in particular, the capacity:

(i) to contract;

(ii) to acquire and dispose of immovable and movable property;

(iii) to institute legal proceedings.

Position of the Corporation with Regard to Judicial Process

3. Actions may be brought against the Corporation only in a court of competent jurisdiction in the territories of a member in which the Corporation has an office, has appointed an agent for the purpose of accepting service or notice of process, has entered into a contract for goods or services, or has issued securities. The property and assets of the Corporation shall, wheresoever located and by whomsoever held, be immune from all forms of seizure, attachment or execution before the delivery of final judgment against the Corporation.

Immunity of Assets from Seizure

4. Property and assets of the Corporation, wherever located and by whomsoever held, shall be immune from search, requisition, confiscation, expropriation or any other form of seizure by executive or legislative action.

Immunity of Archives

5. The archives of the Corporation shall be inviolable.

Freedom of Assets from Restrictions

6. To the extent necessary to carry out the operations provided for in this Annex and subject to the provisions of this Annex, all property and assets of the Corporation shall be free from restrictions, regulations, controls and moratoria of any nature.

Privilege for Communication

7. The official communications of the Corporation shall be accorded by each member the same treatment that it accords to the official communications of other members.

Immunities and Privileges of Officers and Employees

8. The members of the Board of Governors, Alternates, officers and employees of the Corporation:

(i) shall be immune from legal process with respect to acts performed by them in their official capacity;

(ii) not being local nationals, shall be accorded the same immunities from immigration restrictions, alien registration requirements and national service obligations and the same facilities as regards exchange restrictions as are accorded by members to the representatives, officials, and employees of comparable rank of other members;

(iii) shall be granted the same treatment in respect of travelling facilities as is accorded by members to representatives, officials and employees of comparable rank of other members.

Immunities from Taxation

9. (a) The Corporation, its assets, property, income and its operations and transactions authorized by this Annex, shall be immune from all taxation and from all customs duties. The Corporation shall also be immune from liability for the collection or payment of any tax or duty.

(b) No tax shall be levied on or in respect of salaries and emoluments paid by the Corporation to Governors, Alternates, officials or employees of the Corporation who are not local citizens, subjects, or other local nationals.

(c) No taxation of any kind shall be levied on any obligation or security issued by the Corporation (including any dividend or interest thereon) by whomsoever held:

(i) which discriminates against such obligation or security solely because it is issued by the Corporation; or

(ii) if the sole jurisdictional basis for such taxation is the place or currency in which it is issued, made payable or paid, or the location of any office or place of business maintained by the Corporation.

Application of Article

10. Each member shall take such action as is necessary in its own territories for the purpose of making effective in terms of its own law the principles set forth in this Annex and shall inform the Corporation of the detailed action which it has taken.

Waiver

11. The Corporation in its discretion may waive any of the privileges and immunities conferred under this Article to such extent and upon such conditions as it may determine.

Annex 7
The Austrian Proposal

Enclosure 6

9 March 1977

PAPER SUBMITTED BY AMBASSADOR WOLF

The attached paper is being circulated in the hope that it might promote a better understanding of the joint-venture system, mentioned by a number of participants during these discussions. It is intended as an illustration, not as a basis for discussion.

Model for a unified joint-venture system

The model is in agreement with all six points listed in the paper circulated, at the initiative of some participants, on 3 March. Very concretely, it spells out "a conceptually unified system of exploitation in which the Authority would have a central and indispensable role in all activities as the Trustee of the Common Heritage".

Beyond the points listed in that document, the model proposed here would have the following aspects:

1. It is based on the full and active participation of the industrial States and their companies.

2. It provides a framework for co-operation rather than competition with established industry.

3. It maximizes the participation of developing countries.

4. It assures the effective control of the Authority.

5. It reduces and simplifies the problems of financing and technology transfer.

6. It maximizes financial benefits for the Authority.

7. It does not foreclose any options for the future. The control of the Authority could be increased or decreased on a sliding scale, within the same system.

8. The very enlightening and useful discussions of these last days on paragraph 8 (new) and 8 (bis) would remain equally relevant in this new context, even though the problems discussed in connexion with these paragraphs would be greatly simplified.

9. The system is flexible enough to be applicable both in the international area and, if desired and with some simple adaptations, in areas under national

/...

jurisdiction adjacent to the international area: this may become important if a relevant portion of nodules were to be mined in areas under national jurisdiction.

If the system here proposed were to be considered, article 22 would read somewhat along the following lines:

Article 22

1. Activities in the area shall be organized and controlled exclusively by the Authority as determined by this Convention and in accordance with article "X".

2. Activities in the area shall be conducted by Enterprises established by the Authority in joint venture with States Parties or State Enterprises, or persons natural or juridical which possess the nationality of States Parties or are effectively controlled by them or their nationals, when sponsored by such States, or any group of the foregoing ("Signatories"), in accordance with the provisions of this Convention and the Statute for Enterprises.

The most relevant provisions of the Statute for Enterprises would be somewhere along the following lines. All numbers and figures are illustrative.

Establishment of the Enterprises

Enterprises shall be established in conformity with the provisions of this Convention and its annexes.

Purpose

The purpose of an Enterprise shall be the common exploration of manganese nodule deposits and the development of extraction, recovery, transportation and treatment systems for large-scale tests, as well as the subsequent economic operation of the mine. Further elements of the purpose of an Enterprise shall be feasibility studies in the fields of marketing, transportation, logistics and site selection.

Operational and financial principles

1. The Enterprises shall be financed partly by the International Sea-Bed Authority in accordance with the provisions of this Convention, and partly by contributions of Signatories. Each Signatory shall have a financial interest in the Enterprise to which it belongs, in proportion to its investment share.

2. Each Signatory shall contribute to the capital requirement of the Enterprise to which it belongs and shall receive capital repayment and compensation for use of capital in accordance with annex I.

3. The investment of Signatories shall be limited to 48 per cent of the required investment capital. At least 52 per cent of the investment capital (inclusive of the value of the nodules in situ) must be provided by the International Sea-Bed Authority in accordance with the provisions of this Convention.

4. The Enterprises shall operate on a sound economic and financial basis having regard to accepted commercial principles.

Structure

The Enterprises shall be governed by

- a Governing Board;

- a Directorate headed by a Director-General.

The Governing Board

The Governing Board of an Enterprise shall consist of 25 representatives of Signatories.

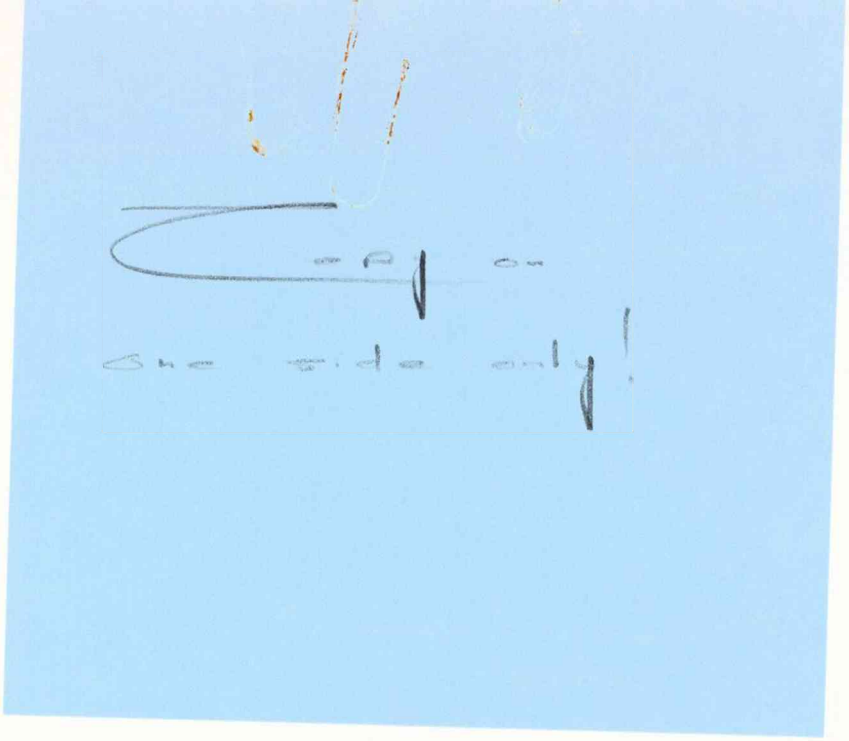
Board -- Composition

1. Twelve representatives of those Signatories or groups of Signatories not otherwise represented, which have agreed to be represented as a group, which have the largest investment shares in the Enterprise.

2. Thirteen representatives not otherwise represented on the Board, elected by the Assembly of the International Sea-Bed Authority on nomination by the Council, in order to ensure that the principle of just geographical representation is taken into account, with due regard to the interest of developing countries, of labour, and of consumers. Any signatory elected to represent a geographical or functional group shall represent each Signatory in this group which has agreed to be so represented and which is not otherwise represented on the Board.

3. Each representative belonging to category (1) shall have a voting participation equivalent to the investment shares he represents. Each representative belonging to category (2) shall have an equal voting participation equivalent to 3 per cent of the investment.

/These articles would be followed by an Article on Board Procedure, establishing, among other things, that no Signatory can have a voting participation greater than 25 per cent; this would be followed by Articles on Board - Functions; Directorate (Director-General, to be appointed by the Board, subject to confirmation by the Authority's Assembly); an Article on Procurement; an Article on Inventions, Technical Information and Transfer of Technology; on Distribution of Products ("Each Signatory shall be assigned a part of the products for marketing in accordance with his share in the Enterprise"); on Privileges and Immunities; on Liability; Audit; Withdrawal; Dissolution; Suspension and Termination; and Dispute Settlement. Much of this could be based on the articles now in the RSNT. It would be relatively easy to agree on such articles, once the general framework had been determined./



ANNEX 8

COSTS OF THE AUTHORITY AN

CONTRACTUAL MEANS OF FINANCING ITS ACTIVITIES

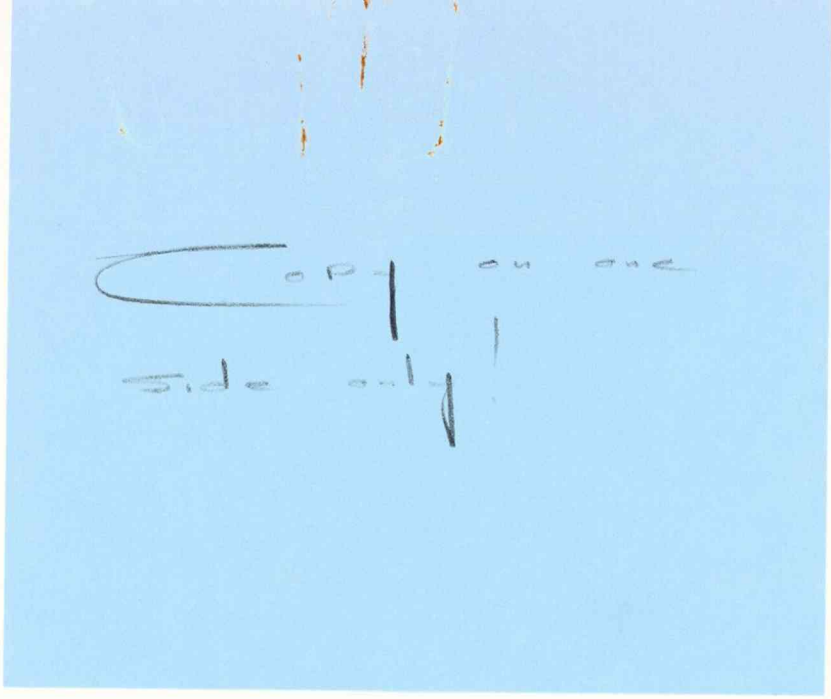
99. It would seem unlikely that the Enterprise would be able to purchase outright and operate the necessary technology on its own -- at least during its first few years of operation -- even assuming that both the problem of the availability of the financial resources required and the problem of the availability of technology on the open market were resolved. it would take some time for the Enterprise to acquire and develop its own teams of experts and its own experience and thus be in a position to dispense with the continuing collaboration of the supplier of the technology which would ensure its proper application in operation.

100. In the joint venture, the technology and expertise required is one of the contributions expected from the partner. No royalties or fees are paid for the use of that technology. Consequently, this approach would seem to be the most appropriate for the Enterprise, at least in its early years of operation. Another feasible approach might be to hire the necessary services through the conclusion of service contracts. In that case the Enterprise would have the continuous assistance of the supplier of the technology, covering both the administrative and technical direction of operations, but would not have to involve the supplier in the ownership of the venture. There is the possibility that the Enterprise may decide to concentrate for a time on the acquisition and development of a specific technology as opposed to the over-all technology required. Since distinct phases of exploration and exploitation of mineral resources can be identified, the use of service contracts would complement that approach (see para.44 above). As a further possibility the Enterprise may wish to resort to such contracts as would involve production-sharing or a share in the profits from the activity, etc. Of course the choice of contract will be related to the kind of incentives that the Enterprise is able or willing to offer to the supplier of the technology.

101. In many of the above forms of contract, where the supplier assumes responsibility for applying the technology during the operations, there is the inevitable

result that the supplier will have some control over, or involvement in, the management of the operation. Some types of contracts such as engineering and construction agreements and management contracts presuppose a greater degree of such control than others. This question raises problems with respect to distinguishing between the "direct" activities of the Authority and activities which are carried out "in association" with other entities, and hence to determining the most appropriate forms of contract into which the Enterprise may enter. Although certain levels of control might be considered incompatible with the nature of the Enterprise it is possible to visualize arrangements which might be acceptable to both parties: such arrangements could involve the transfer of managerial and technical know-how required to plan, organize, construct, equip, put into operation and carry on a given activity and allow the entity supplying such know-how satisfactory incentives.

102. A final consideration, affecting the Enterprise -- and the Authority -- will be the market situation for seabed production. Such a question as the determination of the value of production from the area will require consideration of the implications of basing values on, to take two examples, untreated nodules or processed metals. The problem of access to the market-place is often met through committing the contractor to the sale of all or part of the production (see foot-note 25 above). The real problem for the Enterprise over access would arise in cases where the type of contract would not give such a responsibility to the contractor.



ANNEX 9

THE NETHERLANDS PROPOSAL

- STATEMEN BY PROFESSOR WILLEM RIPHAGEN
- DRAFT ARTICLES
- STATEMENT BY MR. H. GAJENTAAN
- STATEMENT BY AMBASSADOR KARL WOLF OF AUSTRIA

Annex 10

A Joint Venture Agreement for Sea-Bed Mining

by Jaenicke, Schanze, and Hauser

4. Main Legal Features of the Agreement

4.1. Interlinked Triangular Solution

Starting from the arrangement of institutions created by the Convention, there are three basic relations to be covered in an agreement concerning a joint venture between the Enterprise and a private investor for the exploitation of a reserved site.

(1) The concessionary relation between the holder of an option for the mine site (Enterprise) and the controlling organ (Authority) which is termed by the Convention a "Plan of Work" (Annex III, Article 3).

(2) The relation between Authority and Investor concerning the fiscal obligations (and incentives) and security of tenure (which is also to be extended to the Operating Company). The relation includes parts of the arrangements which would be termed a "contract" under the Convention if the Investor were the sole applicant and operator (Annex III, Article 3, para. 5).

(3) The Joint Venture Agreement between the partners (Enterprise and Investor).

This general arrangement has parallels in land-based mining. Host states with an important mining sector have in some instances created state companies which then are responsible for mining activities, and in this capacity are the joint venture partners of any prospective mining investor. The state company frequently holds the option to mine the sites. In this case it is a common practice to enter into an agreement to which the host state, the state company and the private investors are parties. All parties acknowledge and consent to the rights and obligations of the other partners.

The linking of the parts of the agreement will specifically guarantee the control interests of the Authority and the investment security interest of the Investor. The relations between the parties may be expressed as a triangle (cf. Diagram 2 at p. 2 – double line indicates the joint venture relationship).

An agreement in the *non-reserved* area would have a slightly different legal structure because the Enterprise would not bring along an exclusive option for a particular mine site. Here, in accordance with the Convention, the concessionary relation would have to be a "contract" between the Operating Company and the Authority; the question of security of tenure would have to be covered in this contract. The Enterprise would be a joint

Diagram 2: Relationships in Reserved Area

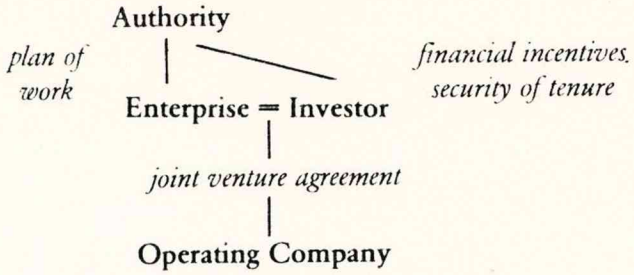
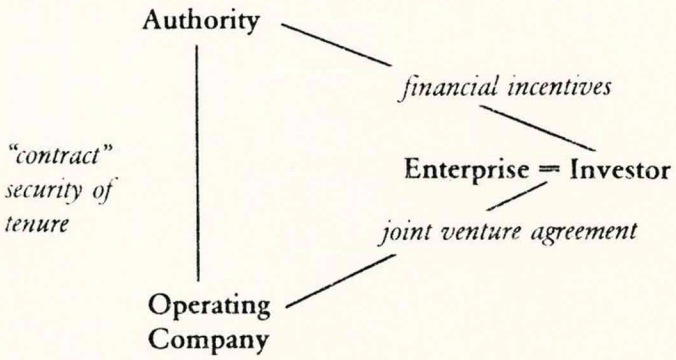


Diagram 3: Relationships in Non-Reserved Area



venture partner just as any private investor. Of course, the special relationship between Authority and Enterprise would remain. Additionally, the Investor would have to seek a contractual arrangement with the Authority to stipulate his financial obligations and incentives. The main, individual clauses would be almost identical to those found in reserved area agreements. However, it would be realistic to assume that the particular area would not yet be prospected as in the case of a reserved site.

4.2. Diversification of Decision-Making Mechanisms and Conflict Resolution

The practical failure of a number of long-term contracts concerning large projects in the past is due in part to a lack of cooperative elements in the decision-making process, and in part to the inflexibility of the adjustment procedures. From the experience in land-based mining it can be inferred that a balanced definition of the powers of the various internal and external actors and the newly created organs will ensure the better functioning of the decision-making process.

As a starting point it is assumed that each joint venture partner and the

Authority will wish to exercise direct control over all major points of the decision-making process. However, each of the partners will have to accept solutions if they are developed within workable common institutions in which the interests of the parties have been represented. The way in which we have addressed the problem of decision-making and control powers is outlined in 4.5. *infra.*

Specific attention has been given to the problem of conflict resolution. Heretofore, contracts drafted with a single conflict resolution instance have been common. The question of the choice of applicable law and the selection of a forum sometimes posed insurmountable problems, and were frequently decided by simply coercing the weaker party to the deal. We think that the multitude of issues could be resolved, if not by institutionalizing appropriate initial decision-making procedures within the joint venture, then by using a "conflict-screening" approach. By this approach we understand the creation of a set of internal and external conflict resolution mechanisms for a defined set of possible conflict zones. These mechanisms are ordered as "screens" proceeding from the internal to the external.

For example, one must foresee that conflicts regarding investment policy may arise. We have therefore institutionalized the following set of screens listed from the inside to the outside:

(1) an additional (seventh) board member intended as an internal conciliator (Part C, Article 6);
(2) the General Investment Plan which serves as a guideline for decision-making by the Board and by the Managing Director (Part C, Article 7);
(3) for cases of change of fundamental circumstances of Part C (Joint Venture Agreement) a renegotiation procedure, which starts by forming an internal Special Renegotiation Committee (Part C, Article 22);
(4) an external Board of Conciliators with a special election procedure (Part C, Article 22);
(5) commercial arbitration (Part C, Article 20).

A number of discrete subject matters in the Agreement are decided by different specified bodies. For the resolution of conflicts between parties to the Tripartite Agreement the following considerations apply:

If either the Investor or the Operating Company is aggrieved by a decision of the Authority, the Draft Convention provides for two alternative dispute settlement mechanisms. Disputes between parties to a contract are either decided by the Seabed Disputes Chamber (Art. 187 (c) (i)), or, alternatively, at the request of any party to the dispute, submitted to binding commercial arbitration. In the latter case, however, questions of interpretation of the Law of the Sea Convention must be

referred by the arbitral tribunal to the Seabed Disputes Chamber for a pre-ruling (Article 188, para. (2) (a) Draft Convention). The arbitration shall be conducted in accordance with the UNCITRAL Arbitration Rules, unless the parties stipulate otherwise in the contract or mutually assent to other rules. Our draft agreement follows this approach in Part B, Article 7.

In the relation between the Authority and the Enterprise, a formal conflict resolution body is not needed because the Enterprise is subject to the Authority's directives (Part A).

As far as disputes relating to Part C of the Tripartite Agreement are concerned, commercial arbitration seems appropriate. Since it seems advisable to have the same arbitration mechanism in all parts of the Agreement, we suggest that the UNCITRAL Arbitration Rules be applied.

4.3. Incorporation of the Operating Company

The Enterprise and the Investor may choose to cooperate in a joint venture in the strict legal sense, i.e. a loose form of a common undertaking with shared profits and losses which is sometimes designated in the international practice as a "contractual joint venture". Or they may choose to incorporate the Operating Company formed by them, creating what is termed in the international practice an "equity joint venture" (cf. *UNIDO*, Manual on the Establishment of Industrial Joint Venture Agreements in Developing Countries, 1971, at p. 3). For purposes of the Draft Agreement, we have selected an equity joint venture and assume that the Operating Company will be incorporated.

There are strong reasons to incorporate the undertaking in view of its participation in the commercial and financial markets; incorporation establishes a clear-cut separation between the operations and assets of the Operating Company and those of both joint venture partners. There may also be valid reasons against incorporation: The Operating Company when incorporated under the laws of a certain country will become subject to the ordre public of that country and to possible burdens and restrictions with respect to taxes, exchange regulations, import and export restrictions, accounting procedures, and participation rights of workers. These problems may, however, also arise if the Operating Company has its administrative seat in a certain country, whether incorporated or not under the law of that country.

Land-based mining agreements do not provide much guidance here. Joint ventures in this field nowadays generally decide in favour of the national law of the state where the mining takes place, because this state

will exercise control over these activities regardless of whether the Operating Company has been incorporated under its laws or elsewhere. In the case of seabed mining, the choice is limited: it does not seem advisable to incorporate in a state which has no connection with the mining venture unless the law of that state recommends itself because of its liberal regime, in particular in respect to its tax system.

We shall proceed on the assumption that the Operating Company will be incorporated under the laws of a certain country; we have, however, left it to the joint venture partners to select the most appropriate place in view of the special circumstances of each case. However, the question of incorporation is of no fundamental importance and does not substantially affect the main lines of the Draft Agreement we have proposed.

Another, unprecedented, solution of the problem could be a provision in the Convention itself which would grant corporate juridical personality to an Operating Company of a Joint Venture, formed under the Convention, in the territories of the States Parties to the Convention.

4.4. Capital Formation

Based on various recent estimates, we proceed on the hypothesis that the mining operation alone will require US $ 260 million, not accounting for expensed Research and Development (R & D) costs and/or a capitalization of the undefined value of the right to mine the site. This projected figure includes US $ 70 million as the estimated sum required for exploration.

We have chosen a model in which each partner has to contribute 50 percent of the equity and has to provide for 50 percent of the loans on an assented debt/equity ratio of 1:1. The low debt/equity ratio expresses our assumption that the Operating Company will have a low borrowing capacity, particularly in the initial phase. In the second stage, equipment and nodules could be objects of security arrangements. In practice, the Investor and the Enterprise will probably give additional security for the payment on the loans. Under the assumption of the Draft Convention that the Enterprise will be furnished with sufficient capital to finance one complete, integrated operation of mining, shipping, and processing, it should have enough capital to seek capital participations in several joint ventures. These participations would guarantee a better inflow of technology than would the establishment of only one integrated operation.

We proceed on the hypothesis that the Operating Company will obtain parts of the finance as loans from international and national development banks. We also contemplate that the Enterprise (through the Authority or

as such) might eventually obtain loans from the World Bank and channel them to the Operating Company. For the present moment this source of financing is hypothetical because it would require a change in rules and policies governing the Bank.

Diagram 4: Capital Formation of Operating Company

Equity
130 Mio.

US Dollars

Enterprise
(1) 35 Mio. Exploration
(2) 30 Mio. Exploitation

Investor
(1) 35 Mio. Exploration
(2) 30 Mio. Exploitation

Debt
130 Mio.

(1) 65 Mio. commercial loans (guaranteed by Investor)
(2) 45 Mio. commercial loans (guaranteed by Enterprise)
(3) 20 Mio. World Bank loans to Enterprise

4.5. Control

In defining the control rights, we have taken special account of the control mechanisms available in the Convention and of the additional control rights resulting from the capital participation. As already mentioned above in 4.2., we have institutionalized control and conflict resolution mechanisms in a "screening" technique by allocating the problems to parties, experts or newly created organs which are close to the problems in their daily working experience.

The right of the Authority to control the design and conduct of operations is safeguarded through the Plan of Work and the Authority's indirect participation through the Enterprise in the establishment of the successive General Investment Plans for both the exploration and the commercial exploitation stages. In the Draft Agreement, the regulation of operational problems is largely left to the final coverage of the Convention and the administrative acts of the Authority. We have not attempted to "freeze" all issues in the Agreement. This is, however, subject to further consideration because the Investor and the Authority might prefer foreseeable control schemes. However, in formulating such control rights,

special consideration should be given to subjecting *all* operators to the same general legal regime for reasons of avoiding competitive distortions.

Within the Operating Company the four key control institutions are the Board of Directors, the General Investment Plan, the Managing Director and the General Training Program Supervisor.

4.5.1. Board of Directors

For the composition of the Board and the deadlock-breaking procedure we have selected an approach which is utilized in the codetermination scheme of the German Steel and Coal Industry ("eleventh-man" procedure). Each side commissions an equal number of members, and all commissioned members elect an additional "neutral" member with special expertise. The alternative procedure would be a scheme of casting double votes, for example through a rotating chairman. We assume that the „seventh-man" procedure is capable of neutralizing a number of problems before the deadlock-breaking vote is required, and that this procedure will render a certain amount of autonomy to the Operating Company.

4.5.2. General Investment Plan

The General Investment Plan serves as a general norm for decision-making within the Operating Company. The Enterprise and the Investor will have to expend some effort to develop this Plan and to reach agreement on the various data because the plan will enhance the stability of future decision-making patterns. In proposing the institution of a General Investment Plan, we draw on the experience in land-based mining where instances of well functioning agreements rely on – at least factually – detailed catalogues of understanding pertaining to economic and technical matters. We think that for the General Investment Plan the parties might take the vital parts of the Feasibility Study and revise or ratify them for such a document of understanding.

4.5.3. Managing Director

The Managing Director is nominated and subject to recall by the Investor for the first 10 years of the operation. This arrangement is similar to a management contract which is found in some advanced forms of hard mineral mining agreements (e.g. in the new Jamaican agreements, the Sar Cheshmeh Agreement and the Cerro Colorado Agreement). The Managing Director, through his close relation to the technology owner, safeguards the smooth running of the day-to-day operations and facilitates the

practical aspects of the technology transfer. The powers of the Managing Director are limited through the supervision of the Board and the General Investment Plan. In resolving training questions, the Managing Director must cooperate with the General Training Program Supervisor on equal footing.

4.5.4. General Training Program Supervisor

The institution of a General Training Program Supervisor is broadly analogous to a pattern used in land-based mining. The position responsible for the training program for nationals (localization) is in some instances staffed by a member of the management who is a national. The Enterprise's desire to train own personnel is, of course, different from a localization program in a less developed country. We understand that the Enterprise's basic aim is not tuned to general employment effects but rather to the quick and efficient adaptation of trained personnel to the special technologies and administrative needs of seabed mining.

4.6. Revenue Distribution

Revenue Distribution within the Operating Company is determined by two principal considerations:

(1) Net profits of the Operating Company are distributed *equally* between the parties, as in any commercial 50:50 joint venture.

(2) Income of the Operating Company (gross revenue) resulting from the sale of nodules is determined through a scheme which provides for incentives in both the mining and the processing sectors, and which safeguards an equitable distribution of proceeds in the medium and long run in regard to the invested capital and the costs.

The main regulatory problem arises in the provision for the second consideration. Here, we start from our general assumption of a joint Operating Company, the operational orbit of which is confined to mining and employing a carrier to ship the mined product to a harbour. Further, our scheme takes account of the following technical and economic premises:

- The chemical composition of the nodules in the various Pacific sites and in the Clarion-Clipperton Area varies. Accordingly, processing has to be adjusted to the characteristics of the particular mined product.
- The project is one of the first under the regime of the Convention. No processing facilities suitable for the mined nodules yet exist.

Therefore it seems realistic to expect the processing to be undertaken by the technology-owning Investor who is also the joint venture partner of

the Enterprise. Given the specific properties of unprocessed nodules, they are presently not a commodity which could be the object of market transactions. As a consequence, a method has to be developed to split the value produced by the distinct mining and processing sectors.

Among the several methods of solving this revenue splitting problem are three models which deserve special scrutiny:

(1) Revenue Splitting Based on an Equal Rate of Return on Invested Capital
This model starts from the basic assumption that mining and processing constitute a hypothetically integrated operation. The revenues from the sale of processed metals are reduced by the operating costs of both sectors to obtain net proceeds. The net proceeds are then distributed between both sectors in proportion to each sector's capital investment thus producing an equal rate of return for each sector.

(2) Cost Plus Fee Accounting of Each Sector
Both (or all) sectors of the operation are deemed to operate on a cost plus fee basis. The mining operator is regarded as a service partner and may demand a reimbursement of all accountable costs (including expensed capital costs) plus a negotiated fixed profit (e.g. expressed as a percentage of the billed costs). The same model could be applied, vice versa, for the operator processing. The sector regarded as a service partner is rendered free of risk while the other side has to bear the complete risk of a hypothetically integrated operation.

Both models outlined above pose serious practical problems. The first solution clearly discriminates against the principle of accountability and responsibility for an efficient operation because, even in the case of complete internal inefficiency of one side, this partner would participate in the gains developed by the other partner. In light of the higher investment costs of the processing sector, this lack of incentive should be lower than in the mining sector because the processing sector receives a larger proportional share of the proceeds. The Investor, as a joint venture partner of the Operating Company, remains interested in an efficient operation because he will receive 50 percent of the profits. However, the Enterprise could insist on increasing those costs attributable to specific non-monetary transfers, such as training or project design of other Enterprise-related projects through the Operating Company. Since the mining sector is guaranteed an equal rate of return, these costs would not affect the Enterprise in due proportion. In this situation the Investor would try to show processing costs to be as high as possible thereby internalizing profits through accounting of the excessive costs.

The problems of the second model arise in the distribution of risk and reward. The service partner engages in a virtually risk-free operation, and he also has incentives to account for high costs. If the Investor assumes the risk by engaging the Operating Company as a service partner in mining, he carries the risk but also enjoys possibly higher rewards of the whole operation. The gains from deep sea mining, which are deemed to be part of the common heritage of mankind, would be attributed only to his side. The idea that returns on the Enterprise's side consist of a fixed fee appears inconsistent with the establishment of the Enterprise as an active participant in seabed mining. On the other hand, cost-plus-fee accounting for the Operating Company's part might be more costly than an active involvement in sharing risks and rewards. It is almost impossible to project *ex ante* a solution based on this model which would lead to an equitable distribution of proceeds and still keep incentives to rationalize and to implement all sectors of the operation.

We have therefore developed a third model which we have called

(3) Gross Operating Cost-Based Revenue Splitting Model
In this model we add on an annual basis operating costs and deemed capital costs at a fixed rate and define the sum as deemed gross operating costs. After this calculation has been made for both the mining and the processing sector, we then derive the Revenue Splitting Factor as the ratio of Deemed Gross Operating Costs Mining to total Deemed Gross Operating Costs.

This approach is based on the principle that each sector of the operation should receive not only reimbursement of the operating costs incurred, but also a certain annual return on invested capital. In this respect, our solution resembles the first model. However, the Revenue Splitting Factor is not determined annually by using that year's real costs. Rather, the Revenue Splitting Factor will be determined ex ante for a certain period of years by using projected costs and a fixed rate of return on invested capital. By fixing the Revenue Splitting Factor for a certain period of time, each sector of the operation is given an incentive to reduce costs in that period in order to increase profits. Thus, each sector enjoys a period in which it may receive extra gains by rationalizing operations or taking advantage of generally lower costs of auxiliary goods and services.

In order to rectify possible long-run inequities resulting from one side's superior cost structure, the Revenue Splitting Factor is adjusted periodically. In defining the length of the period between readjustments, we were guided by the following considerations. On the one hand, a very short period would be a disincentive to optimize operations. On the other hand, the revenue splitting might become inequitable, if this Factor were to remain fixed over a very long period of time. We believe that an adjust-

ment after a three year period creates sufficient incentives to ensure a return on rationalization efforts and likewise does justice to the interest of the other side in receiving an equitable share of the total proceeds.

The initial calculation of the Revenue Splitting Factor is based on the projections contained in the General Investment Plan (which is assented to by the Enterprise and the Investor) in the mining sector, and a Special Investment Plan which has to be proposed by the Investor for the processing sector under control of an independent consulting firm. In proposing this solution, we have taken account of the Investor's interest not to be subjected to the total supervision and control of the Enterprise in a commercial undertaking outside the reach of the Convention. We have thus set forth detailed procedural rules by which the conflicting interests of the Enterprise (Authority) and the Investor are resolvable. If the parties cannot agree on a mutually acceptable consulting firm, the final decision as to the firm will be made by an umpire.

Our Agreement further provides that, in the case of disagreement between the Special Investment Plan and the calculations of the consulting firm, the latter judgement is to prevail. As unlikely as such disagreement may be, the Investor must be prepared to tolerate for an initial period of three years the fact that his own projections may deviate from those established by the independent consultant. Such a deviation would not result in an option to withdraw. An option to withdraw would be impracticable in any event because at the date of the establishment of the first Revenue Splitting Factor, the Investor will have invested such a formidable amount in the processing plant that unilateral action to withdraw would result in prohibitive losses.

Once commercial production has commenced, the Revenue Splitting Factor will be recalculated using the real costs of the final year of the elapsed three year-period.

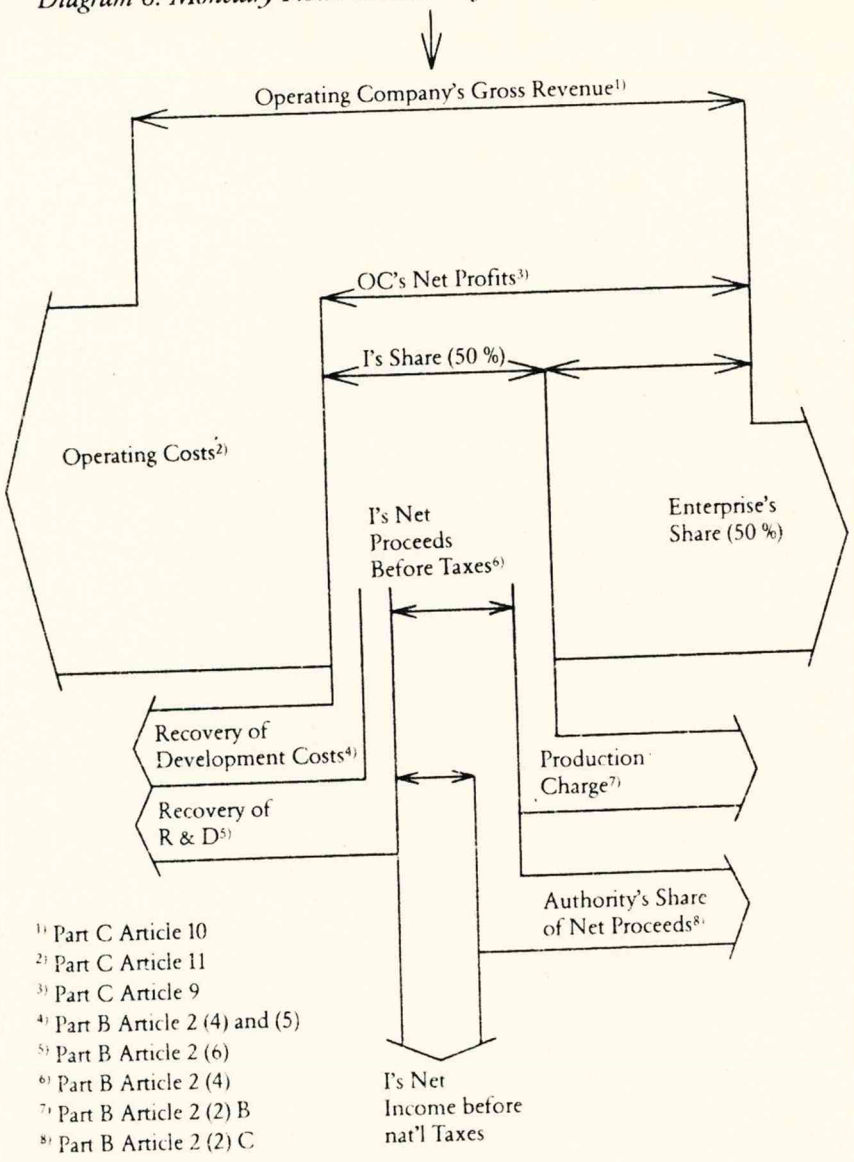
We suggest to use the figures of this last year rather than the three preceding years' average cost figures for a number of reasons. By ignoring the first two year period for the calculation of the new Revenue Splitting Factor, we stress an incentive for efficient production, cost reduction and high profitability. Each side may enjoy the short-term benefits of increases in efficiency without regard to the future revenue distribution. At the same time, there is a certain premium for expenses incurred in the third year; higher costs in this reference year affect the size of the attributable share of revenues for the following three years. We do not believe that this structure will create an incentive for inefficient expenditures in the third year. Economically unjustifiable increases in operating costs in the third year – simply to improve the Revenue Splitting Factor – will influence the Factor only approximately by *one half* (cf. Diagram 5, page 31) but will have a full negative impact on the net profit of the operation in the reference

Diagram 5: REVENUE SPLITTING MODEL
Example based on various recent estimates (all amounts in Mio. US $)
(R & D expenses deemed to be 25 Mio. Mining, 75 Mio. Processing)

	(1) Capital Investment	(2) Projected Operating Costs	(3) Recovery of Development Costs incl. R & D expenses	(4) Interest on Capital Investment (15 %)	(5) Gross Operating Costs (2) + (3) + (4%
Operating Company (Mining and shipping through service carrier)	260	76	28,5	39	143,5
Investor (Processing)	510	119	58,5	77	254,5
Total	770	195	87	116	398

	(6) Revenue Splitting Factor (RSF)	(7) Market Value of the Nodules' Metal Content	(8) Revenue Splitting (7) times RSF (6)	(9) Net Revue (7) − (2) − (3)	(10) Return on Capital Investment (excl. R & D) before tax
Operating Company	0.3606		180,30	75,80	29,15 %
Investor	0.6394		319,70	142,3	27,88 %
Total		500	500	218	

Diagram 6: Monetary Flows within and from the Operating Company



year. Furthermore, a probable parallel behaviour of both sides will partly neutralize uneconomical spending decisions.

We assume that this model will encourage replacement investment or rationalization investment which promises benefits in the following years. Using only the third year's data will also simplify the administration of this system.

4.7. Transfer of Technology

During the last Sessions of the Law of the Sea Conference, the issue of technology transfer has been one of the most controversial issues in the negotiations on the system of exploration and exploitation of the International Seabed Area. The lengthy Article 5 of Annex III of the Draft Convention which has resulted from these negotiations provides a very complicated set of rules and procedures; for the sake of brevity the reader will allow us to abstain from a detailed analysis of this Article. It must suffice here to note that Article 5 as formulated in the Draft Convention of 1980 has been the result of a delicate compromise after protracted negotiations and has to be accepted as such. The rules and procedures for the transfer of technology contained in Article 5 cover new ground. They cannot rely on precedents, and it is therefore extremely difficult to predict whether and to what extent this system will serve its purpose. On the one side, the Investor is faced with burdens of a new kind; on the other side, doubts were expressed whether this system will put the Enterprise in a position to really use the transferred technology efficiently and economically.

Indeed, one purpose of this study is to explore alternatives which may dispose with the need to have recourse to the complicated rules and procedures for the mandatory transfer of technology contained in Article 5 of Annex III of the Draft Convention, and which may nevertheless have the effect of reaching the desired result, perhaps even more easily and economically: that is, to enable the Enterprise to explore and exploit its reserved sites – and later also other available sites – as quickly and efficiently as possible. A joint venture scheme between the Enterprise and another qualified party, whether public or private, which already possesses the necessary technology, seems to be a much better, and in other fields of industrial co-operation already well-tried method for making the technology available to a party who requires it. In fact, Article 5 of Annex III of the Draft Convention recognizes this alternative by providing in its paragraph (6) that "in the case of joint ventures with the Enterprise, technology transfer will be in accordance with the terms of the joint venture agreement." It follows from this provision that the rules and procedures of mandatory transfer of technology contained in the preceding paragraphs of this Article shall not be applicable in the case of joint ventures between the Enterprise and a qualified private or public partner. And, it leaves the parties to such a joint venture agreement complete freedom and flexibility as to how to arrange for the use of the needed technology and the enjoyment by the Enterprise of the benefits therefrom. Transfer of technology in this framework will then be the result of co-operation and the consequence of parallel interests in the exploration and exploitation of the min-

ing site, and not merely an additional burdensome charge for obtaining an exploration and exploitation contract in the International Seabed Area.

It will be one of the topics of future discussion to find out what are the most appropriate arrangements with respect to the technology to be used in the joint venture project, keeping in mind the specific technical and financial dimensions of a deep sea mining venture. In the Draft Agreement, we have proposed basic rather than detailed clauses in order not to prejudge discussions on what the parties desire and what they are able to offer.

In negotiating the provisions of the joint venture agreement regarding the use of technology, particular attention should be paid to the purpose for technology transfer to the Enterprise, in view of the underlying reason for Article 5 of Annex III of the Draft Convention. The primary purpose of Article 5 is to enable the Enterprise to explore and exploit its reserved sites. With respect to the reserved site which is to be exploited under the joint venture agreement, this purpose will be fulfilled by providing the Operating Company with the equipment and technical know-how, whether proprietory or not, necessary to carry out efficient seabed mining (see Part C, Article 16 para. (1) of the draft Tripartite Agreement *infra).* This transfer will be done either by transferring equipment and know-how from the Investor as part of his capital investment in the Operating Company or, where the Investor is not himself in the possession of equipment or know-how, by the Investor assisting the Operating Company in acquiring the equipment and know-how from other sources. As a shareholder of the Operating Company the Investor should, in its own interest, provide the Company with the best technology available.

The question remains whether the Investor should go beyond such transfers and make this technology available not only to the Operating Company (and in this context also to the Enterprise in its capacity as shareholder of the Operating Company), but also to the Enterprise for the purpose of exploring and exploiting other reserved sites or even sites in the non-reserved area. It seems that this problem presents itself here in quite a different environment than under the premises of Article 5, which assumes that the Enterprise will go it alone. The following considerations may be valid in this respect:

(1) If the Enterprise pursues a policy by which it exploits its reserved sites through joint venture agreements with different qualified partners, the need to use technology elsewhere than in the concrete joint venture will normally not arise.

(2) The Investor's transfer of technology obligations, which, according to Article 5 para. (6) Annex III of the Draft Convention may be freely negotiated between the joint venture partners, should certainly not copy the contents of the paragraphs (1) to (3) of Article 5, but should

rather be less burdensome for the Investor and thus provide an important incentive for entering into a joint venture with the Enterprise.

(3) The personnel of the Enterprise which is employed in or is in contact with the Operating Company will acquire, by the very fact of the Enterprise's participation in the Operating Company, the knowledge of technical processes used in seabed mining. It would be unrealistic to assume that they will not and should not use that knowledge in the Enterprise's other operations; only proprietory know-how, in particular, patents or other protected know-how, could not be used freely elsewhere but would have to be acquired for that purpose under commercial terms.

(4) The Investor himself may well have a commercial interest in selling equipment or his designs for such equipment; therefore he may have his own interest in the Enterprise's acquiring the necessary information and knowledge to be able to evaluate the quality of the Investor's equipment, patents and designs, and in inducing the Enterprise to buy them or to offer a second joint venture project to the Investor, either in the reserved area or elsewhere.

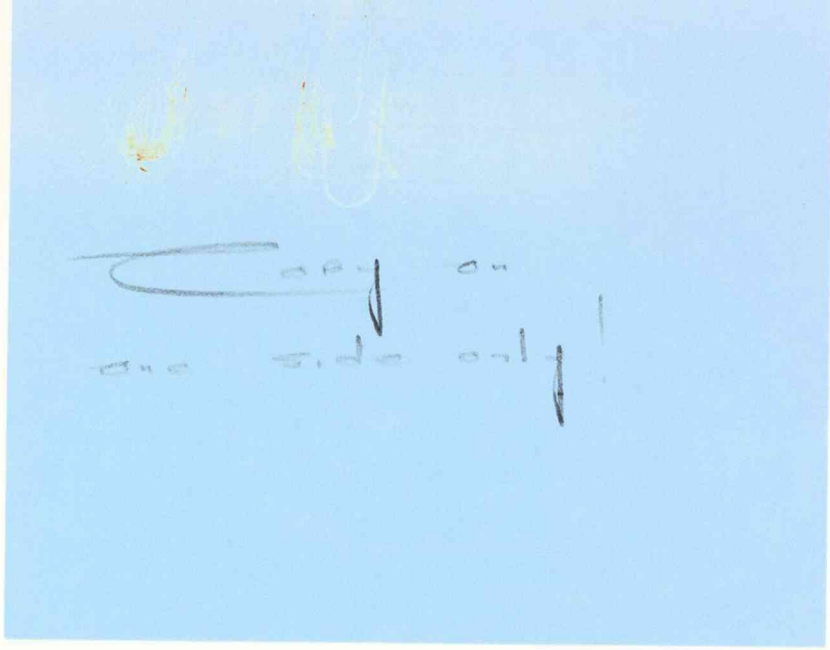
Thus, it may be realistic to assume that the Investor will be prepared to offer to transfer all or some technology, proprietory or non-proprietory, software or hardware, not only to the Operating Company, but also to the Enterprise, provided that there is no proliferation to third parties without the consent of the Investor, and provided further that the technology will be acquired by the Enterprise under commercial terms. It does not seem advisable to coerce the Investor to make transfers free of charge or at non-remunerative prices because such an arrangement is not in the interest of both parties: it reduces the incentive to enter into joint venture agreements, and, more seriously, it stifles the indispensable efforts for continuous innovation and development.

Moreover, the special characteristics of the contemplated technology transfer present strong reasons for an intimate relationship between the transferor and the transferee (Operating Company). Seabed mining technology is not now and will not soon be "state of the art–technology", readily available from a number of transferors as a package for a fee. Rather, the technology involved will be characterized by very few or no previous applications, a short elapsed time since development and limited diffusion. In this stage, technology is aptly termed by recent empirical studies as *leading-edge-technology* (cf. *Teece*, Technology Transfer by Multinational Firms: The Resource Cost of Transferring Technological Know-How, 87 Economic Journal 242 (1977). This kind of technology is in a state of flux; the engineering drawings will be subject to constant alteration thus complicating the transfer. The transfer costs are likely to be high; there will be enormous information flow and constant personal

communication between the technology transferor and the transferee (Operating Company). The cost of adequate documentation of the information flow is likely to be substantial. The likelihood of encountering unusual new technical problems requires that R & D capability be either in house, or at least readily available with the joint venture partner.

Within a joint venture relationship, technology transfer is in the first instance an intracompany matter. From our knowledge of land-based mining agreements, we infer that technology transfer, in the sense of transferring technical knowledge, is in practice an ongoing process, which is mainly channelled and effectuated through a large number of training and practising opportunities within the working of the Operating Company.

We assume, therefore, that the Enterprise will have an important interest in this aspect of the matter, perhaps even more than in the modalities for providing the necessary equipment. Consequently, we have also proposed some model clauses for the training of Enterprise personnel (see hereafter Part C, Articles 17-18 of the Daft Tripartite Agreement). For this purpose we have drawn on the practice in land-based mining joint venture agreements, but it should be borne in mind that the training possibilities in deep sea mining are much more limited as to the personnel that could be employed on the mining ships at sea or in the headquarters of the Operating Company on land. For this reason it may well be a negotiating point whether and to what extent the Investor will be capable and prepared to train within his own premises personnel of the Enterprise and, when the primary need of the Enterprise has been satisfied in this respect, also personnel from interested developing countries.



Annex 11

Disaggregated Tables of Ocean Mining Technology

III. OVERVIEW OF SUBSYSTEMS REQUIRED BY VARIOUS MINING CONCEPTS

This section provides an overview of the subsystems and principal components of ocean mining systems required for the various mining concepts. A set of marks ("0") after each subsystem or component indicates their technological status.

A. COMPARISON OF MINING CONCEPTS

Table 1 shows the subsystems for the mining concepts and their general complexity and the technology required for their design, construction and operation.

Table 1. Subsystems for Various Mining Concepts [a/]

Hydraulic Concepts		Mechanical Concepts			
Pumps or Air Lift		Bucket Line		Scraper-Submarines	
Mining sybsystem	00000	Mining sybsystem	000	Mining subsystem	00000
Mining vessel	000	---		Mining vessel	000
Transport vessel	0	Transport/mining vessel	0	Transport vessel	0
Transport vessel	0	Transport/mining vessel	0	Transport vessel	0
	0				
Logistics vessel	0	Bucket-lowering vessel	0	Logistics vessel	0
Survey vessel	0	Survey vessel	0	Survey vessel	0
Port facility	0	Port facility	0	Port facility	0

a/ Estimated level of technological complexity is indicated as follows:
0 = low; 000 = medium; 00000 = high.

Table 1 shows that the bucket line system is less complex than the other concepts and does not need special mining and logistics vessels.

B. SUBSYSTEMS AND PRINCIPAL COMPONENTS

Table 1 is amplified in table 2 which lists the principal components within each subsystem followed by X marks in two separate columns indicating if the component can be considered as part of existing technology or if new research and development(R+D) efforts are necessary to build it. The scraper-submarine concept has been excluded from these lists because it is assumed that buoyancy control, scraping on the sea floor and in situ sediment elimination will pose problems of such magnitude that considerable work is still needed to bring this concept closer to realization.

Hydraulic Concepts with Pumps or Air Lift

Table 2. Subsystems and Principal Components

Subsystem or Component	Existing Technology	R+D Required
Mining Subsystems		
Pick-up		X
Flexible link		X
Ore lift pipe		X
Subsea instrumentation		X
Ore lift, pumps or air lift		X
Collector handling		X
Ore lift pipe handling		X
Ore receiving		X
Ore storage	X	
Ore transfer	X	
Spares	X	
Mining Vessel		
Hull	X	
Power plant	X	
Propulsion	X	
Ship's machinery	X	
Ship's deck equipment	X	
Outfitting + furnishing	X	
Navigation + control	X	
Communication	X	
Spares	X	

Table 2. (continued)

Subsystem or Component	Existing Technology	R+D Required
Transport Vessel		
Hull	X	
Propulsion	X	
Ship's machinery	X	
Ship's deck equipment	X	
Outfitting + furnishing	X	
Navigation and control	X	
Communication	X	
Ore transfer equipment	X	
Ore unloading equipment	X	
Spares	X	
Logistics Vessel		
Hull	X	
Propulsion	X	
Ship's machinery	X	
Ship's deck equipment	X	
Outfitting + furnishing	X	
Navigation + control	X	
Material transfer equipment	X	
Spares	X	
Survey Vessel		
Hull	X	
Propulsion	X	
Ship's machinery	X	
Ship's deck equipment	X	
Outfitting + furnishing	X	
Navigation + control	X	
Communication	X	
Instrument handling	X	
Fixed instrumentation	X	
Portable instruments		X
Laboratories		X
Spares	X	
Port Facility		
Unloading pier	X	
Unloading buoy	X	
Port office	X	

Mechanical Concepts With Bucket Line

Table 3. Subsystems and Principal Components

Subsystem or Component	Existing Technology	R&D Required
Mining Subsystem		
Buckets		X
Bucket attachment		X
Rope loop		X
Subsea instrumentation		X
Rope handling machinery		X
Bucket unloading machinery		X
Ore receiving & handling		X
Ore storage	X	
Spares	X	
Spares handling	X	
Mining/Transport Vessel		
Hull	X	
Power plant	X	
Propulsion	X	
Ship's machinery	X	
Ship's deck equipment	X	
Outfitting & furnishing	X	
Navigation and control	X	
Communication	X	
Spares	X	
Transport Vessel		
No special transport vessels required		
Logistics Vessel		
No special logistics vessel required		
Survey Vessel		
Hull	X	
Propulsion	X	
Ship's machinery	X	
Ship's deck equipment	X	
Outfitting & furnishing	X	
Navigation & control	X	

Table 3 (continued)

Subsystem or Component	Existing Technology	R&D Required
Communication	X	
Instrument handling	X	
Fixed instrumentation	X	
Portable instruments		X
Laboratories		X
Spares	X	
Port Facility		
Unloading pier	X	
Unloading buoy	X	
Port office	X	

IV. COMPARISON OF TECHNOLOGY, COMPLEXITY, AND CRITICALITY OF MINING SUBSYSTEMS

This section lists the subsystems of ocean mining systems and their principal components/subassemblies. Each component is followed by an X mark that indicates (as in table 2) if it can be considered as part of existing technology or if extensive R+D are required for its design and construction. The complexity of the equipment is indicated by 0 marks. The fourth column indicates if the equipment is critical for the ocean mining operation; its failure would mean an interruption of the operation until it is fully functioning again. Spare parts should be kept on board to reduce the loss of mining days caused by such repair activities.

A. HYDRAULIC CONCEPT WITH PUMPS OR AIR LIFT

Table 4. Subsystems, Components and Subassemblies[a/]

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complex-ity	Critical-ity
Mining Subsystem				
1. Nodule Collector				
Collector support assembly			00000	X
Framing structure		X	000	X
Collector deployment assembly		X	000	X
Nodule pick up assembly		X	00000	X
Nodule oversize eliminator		X	0	X
Sediment eliminator		X	00000	X
Power distribution		X	00000	X
Power cable(s), harnesses		X	00000	X
Motors, pumps		X	00000	X
Propulsion units[b/]		X	00000	X
Motor[b/]		X	00000	X

Table 4 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complexity	Criticality
Motor controls [b/]		X	00000	X
Steering [b/]		X	00000	X
Steering controls [b/]		X	00000	X
Flexible Link				
Link structure	X		000	X
Nodule collector connection	X		000	X
Lift pipe connection	X		000	X
Flexible hose	X		000	X
Power cable	X		000	X
Instrumentation cable	X		00000	X
Ore Lift Pipe				
Lift pipe		X	00000	X
Lift pipe connectors		X	00000	X
Lift pipe instrumentation	X		000	
Power cable connectors	X		00000	X
Instrumentation cable connectors	X		00000	X
Fairing & attachments	X		000	
Subsea Instrumentation				
Nodule collector instrumentation	X		00000	X
Nodule flow sensors	X		00000	X
Nodule flow controls	X		00000	X
Collector propulsion sensors	X		00000	X
Collector propulsion controls	X		00000	X
Collector steering sensors	X		000	X
Collector steering controls	X		000	X
Flexible link sensors	X		000	
Lift pipe instrumentation	X		000	
Ore Lift - Pumps				
Pump casings	X		000	X
Pump impellers	X		000	X
Pump liners	X		000	X

Table 4 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complexity	Criticality
Pump motors	X		00000	X
Power cable	X		000	X
Power cable connectors	X		000	X
Pumping control board	X		000	X
Ore Lift - Air Lift				
Air lift pipe and connectors	X		000	X
Air chamber injection	X		000	X
Flexible link	X		000	X
Air control device	X		000	X
Air compressors	X		000	X
Air manifold & valves	X		000	X
Air lift control board	X		000	X
Collector Handling				
Hoists	X		000	X
Tie-down equipment	X		0	
Release devices	X		000	X
Hoists position control	X		000	
Flexible link	X		000	
Ore Lift Pipe Handling				
Derrick structure	X		000	
Gimbal platform	X		00000	X
Heave compensator	X		00000	X
Locking devices	X		000	X
Draw works	X		000	X
Pipe connecting devices	X		000	X
Pipe handling equipment	X		000	X
Power cable handling equipment	X		000	X
Instrumentation cable equipment	X		00000	X
Instrumentation & control	X		00000	X
Control board	X		00000	X
Work platform	X		0	
Ore Receiving				
Nodule receiving	X		000	X
Screens	X		000	X
Cyclones	X		000	X
Pumps	X		000	X
Motors	X		000	X
Motor controls	X		000	X

Table 4 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complexity	Criticality
Conveyors	X		000	X
Nodule handling pipes	X		0	X
Air/water/nodule/sediment separators		X	000	X
Main control board	X		000	X
Ore Storage				
Dewatering & pumps	X		000	
Storage distribution	X		000	
Reclaiming and pumps	X		000	
Storage instrumentation	X		000	
Main control board	X		000	
Ore Transfer				
Reclaiming and pumps	X		000	
Pumps	X		000	X
Motors	X		000	X
Material flow sensors	X		000	
Material flow control	X		000	
Transfer hoses	X		000	X
Transfer hose handling devices	X		000	
Nodule flow pipes	X		000	X
Spares				
Collector stand-by units		X	00000	
Pipe sections		X	00000	
Fairing sections	X		0	
Pumps	X		000	
Motors	X		000	
Instrumentation sets	X		000	
Instrument control sets	X		000	
Stand-by power cable	X		000	
Stand-by instrument cable	X		00000	
Cable harnesses	X		000	
Cable connectors	X		000	
Air supply pipe sections	X		0	
Air injection chamber section	X		000	
Hardware and machinery spare parts	X		000	

Table 4 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complexity	Criticality
2. Mining Vessel				
Hull				
Shell, frames	X		0	
Double bottom	X		0	
Bulkheads. decks	X		0	
Centre-wheel + reinforcements	X		0	
Hatches, closures, doors, bull's eyes	X		000	
Tanks for ballast & fuel	X		0	
Tanks for roll stabilization	X		0	
Holding tanks for wastes	X		0	
Sea chests & valves	X		000	
Foundations for machinery	X		000	
Deck-houses	X		000	
Bridge at bow	X		000	
Bridge at stern	X		000	
Power Plant				
Diesel engines	X		000	X
Electric generators	X		000	X
Switch gear	X		000	X
Power conversion gear	X		000	X
Power distribution	X		000	X
Emergency generators	X		000	
Main switchboard	X		000	
Propulsion				
Propulsion motors	X		000	X
Shafts, bearings and propellers	X		000	X
Thruster motors	X		000	X
Thrusters, rotative, retractive	X		000	X
Main control board	X		000	X
Ship's Machinery				
Ballast water pumps	X		000	
Bilge water pumps	X		000	
Fire main pumps	X		000	
Fire extinguishing equipment	X		000	

Table 4 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complex-ity	Critical-ity
Sanitary water pumps	X		000	
Fresh water distillers	X		000	
Fresh water pumps	X		000	
Piping and valves for above equipment	X		000	
Steering equipment & rudders	X		000	X
Roll stabilization equipment	X		000	
Heating	X		000	
Air conditioning	X		000	
Ventilation	X		000	
Ship's Deck Equipment				
Anchor winches	X		000	
Anchors & chains	X		0	
Mooring winches	X		000	
Warping winches	X		000	
Deck cranes, rotating	X		000	
Container gantry crane	X		000	
Lifeboat hoists + davits	X		000	
Outfitting & Furnishing				
Masts and rigging	X		0	
Platforms and railings	X		0	
Lifeboats and rafts	X		0	
Living space for crew & officers	X		000	
Living space for mining personnel	X		000	
Recreational space	X		00	
Galleys and mess halls	X		000	
Ropes, lines, cables	X		0	
Workshops & repair space	X		000	
Laboratories	X		000	
Storage rooms	X		0	
Refrigerated stores	X		000	
Diver equipment stores	X		0	
Diver access devices	X		0	
Diver recompression chamber	X		000	
Helicopter deck	X		0	

Table 4 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complexity	Criticality
Navigation & Control				
Navigation equipment	X		000	X
Satellite navigation equipment	X		00000	X
Weather recorders	X		00000	
Radar equipment	X		00000	
Sonar equipment	X		000	
Depth sounders	X		000	
Vessel distance sensors	X		000	
Subsea mining navigation equipment	X		00000	X
Long base line transponders	X		00000	X
Computer equipment	X		00000	
Ship's steering equipment	X		000	X
Propulsion control equipment	X		000	X
Thruster control equipment	X		000	X
Automatic cruise track control	X		00000	X
Communications				
Radio equipment, long distance	X		000	
Bridge-to-bridge equipment, short distance	X		000	
Internal ship's service communication	X		000	
Internal mining service communication	X		000	
Emergency communication equipment	X		000	
Spares				
Conventional spares for ship's service	X		000	
3. Transport Vessel				
Hull				
Shell, frames	X		0	
Double bottom	X		0	
Bulkheads, decks	X		0	

Table 4 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complex-ity	Critical-ity
Hatches, closures, doors, bull's eyes	X		000	
Tanks for ballast & fuel	X		0	
Holding tanks for wastes	X		0	
Sea chests and valves	X		000	
Foundations for machinery	X		000	
Deck-houses	X		000	
Bridge	X		000	
Power Plant				
Diesel engines	X		000	
Electric generators	X		000	
Power conversion gear	X		000	
Power distribution	X		000	
Switch gears	X		000	
Emergency generators	X		000	
Main switchboard	X		000	
Propulsion				
Propulsion motors	X		000	
Shafts, bearings, propellers	X		000	
Thruster motors	X		000	
Thrusters, rotative, retractive	X		000	
Main control board	X		000	
Ship's machinery				
Ballast water pumps	X		000	
Bilge water pumps	X		000	
Fire main pumps	X		000	
Sanitary water pumps	X		000	
Fresh water pumps	X		000	
Fire extinguishing equipment	X		000	
Piping and valves for above equipment	X		000	
Steering equipment & rudders	X		000	
Heating	X		000	
Air conditioning	X		000	
Ventilation	X		000	
Ship's Deck Equipment				
Anchor winches	X		000	
Anchors, chains	X		0	

Table 4 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complex-ity	Critical-ity
Ropes, lines, cables	X		0	
Mooring winches	X		000	
Lifeboat hoists and davits	X		000	
Outfitting & Furnishing				
Masts and rigging	X		0	
Platforms and reelings	X		0	
Lifeboats and rafts	X		0	
Living space for crew and officers	X		000	
Recreational space	X		000	
Galleys and mess halls	X		000	
Repair space	X		000	
Storage rooms	X		0	
Refrigerated stores	X		000	
Helicopter deck	X		0	
Navigation and Control				
Navigation equipment	X		000	
Radar equipment	X		000	
Vessel distance sensors	X		000	
Ship's steering equipment	X		000	
Propulsion control equipment	X		000	
Thruster control equipment	X		000	
Communications				
Radio equipment, large distance	X		000	
Bridge-to-bridge equipment, short distance	X		000	
Internal ship's service communication	X		000	
Emergency communication equipment	X		000	
Spares				
Conventional spares for ship's service	X		000	

Table 4 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complex-ity	Critical-ity
4. Logistics Vessel				
Hull				
Shell, frames	X		0	
Bulkheads, decks	X		0	
Hatches, closures, doors, bull's eyes	X		000	
Tanks for ballast & fuel	X		0	
Holding tanks for wastes	X		0	
Foundations for machinery	X		000	
Deck-house	X		000	
Bridge	X		000	
Tanks for Fuel for mining vessel	X		0	
Cargo holds for crates + spares for motor vessel	X		0	
Propulsion				
Diesel engines	X		000	
Electric generators	X		000	
Power conversion	X		000	
Power distribution	X		000	
Emergency generator	X		000	
Switchboard	X		000	
Propulsion motors	X		000	
Shafts, bearings, propellers	X		000	
Thruster motor	X		000	
Thruster, rotative	X		000	
Ship's Machinery				
Ballast water pump	X		000	
Fire main pump	X		000	
Bilge water pump	X		000	
Fresh water pump	X		000	
Sanitary water pump	X		000	
Piping for above equip-ment	X		000	
Steering equipment and rudder	X		000	
Air conditioning	X		000	
Heating	X		000	
Ventilation	X		000	

Table 4 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complexity	Criticality
Ship's Deck Equipment				
Anchor winch	X		000	
Anchors, chains	X		0	
Lifeboats, hoists and davits	X		000	
Outfitting & Furnishing				
Mast	X		0	
Railings	X		0	
Lifeboats and rafts	X		0	
Living space for crew and officers	X		000	
Galley and mess hall	X		000	
Ropes, lines, cables	X		0	
Storage rooms	X		0	
Refrigerated store	X		000	
Living space for mining personnel	X		000	
Navigation & Control				
Navigation equipment	X		000	
Radar equipment	X		000	
Vessel distance sensors	X		000	
Ship's steering equipment	X		000	
Propulsion control equipment	X		000	
Thruster control equipment	X		000	
Communications				
Radio equipment, long distance	X		000	
Bridge-to-bridge equipment, short distance	X		000	
Internal ship's service communication	X		000	
Emergency communication equipment	X		000	
Spares				
Conventional spares for ship's service	X		000	

Table 4 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complexity	Criticality
5. Survey Vessel				
Hull				
Shell, frames	X		0	
Bulkheads, decks	X		0	
Hatches, closures, doors	X		000	
Tanks for ballast & fuel	X		0	
Holding tanks for wastes	X		0	
Foundations for machinery	X		000	
Deck-house	X		000	
Bridge	X		000	
Sea chests and valves	X		000	
Propulsion				
Diesel engines	X		000	
Electric generators	X		000	
Power conversion	X		000	
Emergency generator	X		000	
Switchboard	X		000	
Propulsion motor	X		000	
Thruster motor	X		000	
Thruster, rotative	X		000	
Shaft, bearings, propeller	X		000	
Ship's Machinery				
Ballast water pump	X		000	
Bilge water pump	X		000	
Fire main pump	X		000	
Sanitary water pump	X		000	
Fresh water distiller	X		000	
Fresh water pump	X		000	
Piping and valves for above equipment	X		000	
Steering equipment and rudder	X		000	
Heating	X		000	
Air conditioning	X		000	
Ventilation	X		000	
Ship's Deck Equipment				
Anchor winch	X		000	
Anchors, chains	X		0	
Lifeboat davits	X		0	

Table 4 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complexity	Criticality
A-frame at stern for instruments	X		0	
Cranes to deploy instruments	X		000	
Winch and cable drum for instruments	X		000	
Warping winches	X		000	
Portable instrumentation		X	00000	
Outfitting & Furnishings				
Masts and rigging	X		0	
Platforms & railings	X		0	
Lifeboats and rafts	X		0	
Living space for crew and officers	X		000	
Living space for scientists	X		000	
Living space for instrument technicians	X		000	
Recreational space	X		000	
Galley and mess hall	X		000	
Ropes, lines, cables	X		0	
Laboratories	X		000	
Storage rooms for instruments	X		0	
Workshops and repair spaces	X		000	
Storage rooms for samples	X		0	
Storage room for documents	X		0	
Refrigerated store for samples	X		000	
Refrigerated store for galley	X		000	
Instrument preparation space	X		0	
Computer room	X		0	
Navigation and Control				
Navigation equipment	X		000	
Satellite navigation equipment	X		000	
Weather recorders	X		000	
Radar equipment	X		000	
Sonar equipment	X		000	
Depth sounders	X		000	

Table 4 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complexity	Criticality
Vessel distance sensors	X		000	
Subsea mining navigation equipment	X		00000	
Long baseline transponders	X		00000	
Computer equipment	X		00000	
Ship's steering equipment	X		000	
Propulsion control equipment	X		000	
Thruster control equipment	X		000	
Automatic cruise control track	X		00000	
6. Port Facility				
Unloading Pier				
Pier structure	X		000	
Bollards	X		0	
Pier loading crane	X		000	
Container handling crane	X		000	
Piping for fresh water	X		0	
Piping for fuel	X		0	
Communication lines	X		000	
Unloading Buoy				
Unloading buoy	X		000	
Mooring system equipment	X		000	
Floating hoses	X		0	
Pipeline to shore	X		000	
Communication lines	X		000	
Lighting	X		000	
Port Office				
Office space	X		0	
Waiting room for personnel	X		0	
Communication lines	X		000	
Radio equipment, long distance	X		000	
Shore-to-bridge equipment, short distance	X		000	
Office space for vessel personnel	X		0	

Table 4 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complex-ity	Critical-ity
Storage building for spares	X		0	
Storage building for consumables	X		0	
Post office room	X		0	
Sanitary rooms	X		0	

a/ Estimated level of technological complexity is indicated as follows: 0 = low; 000 = medium; 00000 = high.

b/ Additional equipment needed for an active nodule collector.

B. MECHANICAL CONCEPT WITH BUCKET LINE

Table 5. Subsystems, Components and Subassemblies [a/]

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complex-ity	Critical-ity
Mining Subsystem				
Buckets				
Frame		X	0	
Housing		X	0	
Support		X	0	
Sediment cutter		X	000	
Net		X	0	
Bucket Attachment				
Attachment rings		X	0	
Attachment links		X	0	
Attachment mechanism		X	000	
Swivels		X	0	
Rope Loop				
Loop sections	X		000	
Section couplings		X	000	
Rope support buoy	X		000	
Buoy attachment	X		0	

Table 5 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complex-ity	Critical-ity
Subsea Instrumentation				
Location indicators	X		000	
Still cameras	X		000	
Rope Handling Machinery				
Rope receiving	X		000	
Motion compensation	X		00000	
Hydraulic controls	X		000	
Ship's motion sensors	X		000	
Compensation control	X		00000	
Rope tracking	X		000	
Pressure system	X		000	
Motors	X		000	
Motor controls	X		000	
Clutches and gears	X		000	
Tension control	X		000	
Speed control	X		000	
Rope discharge	X		0	
Motion compensation	X		00000	
Bucket Unloading Machinery				
Bucket receiving	X		000	
Bucket transport	X		000	
Bucket guiding	X		000	
Bucket unloading	X		000	
Ore Receiving and Handling				
Ore receiving chutes	X		0	
Dewatering	X		000	
Desilting	X		000	
Belt conveyors	X		000	
Ore Storage				
Ore distribution	X		000	
Ore dewatering	X		0	
Ore unloading	X		0	
Spares				
Spare bucket units		X	000	
Bucket spare parts		X	000	
Machinery spare parts	X		000	

Table 5 (continued)

Subsystem, Component or Subassembly	Existing Technology	R&D Required	Complexity	Criticality
Spares Handling				
Spare bucket handling hoists	X		000	
Spare lifts	X		000	
Mining/Transport Vessel				
Equal to transport vessels of hydraulic systems, but with foundations for rope loop handling machinery, motion compensators, ore handling equipment and spare bucket handling.				
Logistics Vessel				
No special logistics vessels required				
Survey Vessel				
Equal to survey vessel of hydraulic system				
Port Facility				
Equal to port facility of hydraulic system				

a/ Estimated level of technological complexity is indicated as follows: 0 = low; 000 = medium; 00000 = high, use of extremely sophisticated equipment necessary.

SUMMARY AND RECOMMENDATIONS

The findings of this study can be summarized as follows:

(a) Four principal mining concepts have been developed by several mining consortia with varying degrees of complexity or sophistication;

(b) The bucket line concept has been tested twice in deep water, but has been abandoned. Insufficient filling of buckets with nodules and low mining rates were the main reasons;

(c) The hydraulic concept, using pumps or air lift, were tested by several consortia for very short periods. Based on tests with small-scale prototype units, the system can be considered workable. Long-term tests are needed to prove the reliability of the equipment;

(d) The scraper-submarine concept will require extensive R+D work to solve problems related to buoyancy control, sediment elimination and nodule pick-up;

(e) An ocean mining system consists of many subsystems and components. These are listed in this study with additional information expressed in symbols indicating if they are part of existing technology, or if extensive R+D is still required. The complexity is also rated. Furthermore, the criticality of each component to mining operations is indicated. A failure of critical equipment means that mining operations must be interrupted for repair;

(f) The comparison of ratings indicates that:

  (i) The bucket line system is less complex than the hydraulic system;

  (ii) Most R+D is still required for the subsea mining systems;

ORE HANDLING AND TRANSFER AT SEA

JOHN E. HALKYARD
MANAGER, OCEAN NODULE PROJECT

KENNECOTT EXPLORATION, INC.
DAN DIEGO, CALIFORNIA 92111

ABSTRACT

A DEEP SEAS MINING OPERATION REQUIRES THE RECOVERY AND TRANSPORTATION OF UP TO FOUR MILLION TONS OF MATERIAL ANNUALLY. THE METHODS OF TRANSFERRING IT TO A TRANSPORT VESSEL REQUIRE SOLUTION OF A UNIQUE SET OF PROBLEMS. THE ALTERNATIVES FOR HANDLING THE ORE AND FOR TRANSPORT CONNECTION ARE DISCUSSED AND RECOMMENDATIONS FOR FUTURE WORK PRESENTED.

TABLE 2 FURTHER DEVELOPMENT REQUIRED

- SLURRY HUDRAULICS
  - -- ATTRITION THROUGH LIFT SYSTEM
  - -- ATTRITION THROUGH TRANSFER HOSE
  - -- HYDROCYCLONE PRODUCT RHEOLOGY
  - -- FLOW CONTROL SYSTEM
- HOSE MECHANICS
  - -- COMPREHENSIVE DYNAMIC ANALYSIS
  - -- MATERIAL TESTING
- MANEUVERING/STATIONKEEPING
  - -- OPTIMIZE SEPARATION DISTANCE
  - -- DETERMINE LONG PERIOD VARIATIONS
  - -- CONFIRM THRUSTER POWER
  - -- DEFINE STATIONKEEPING EQUIPMENT

C. DISAGGREGATION OF ON-SHORE MANGANESE NODULE PROCESSING

The on-shore processing of sea-floor minerals is only one element in a complex venture producing marketable products from raw materials which must be retrieved from great depths. For the processing of manganese nodules, however, it is the single most costly element of the overall venture [3/] and, aside from mining itself, the technologically most sophisticated. In this section, attention will be focused on the land-based processing of raw manganese nodules to produce metals in marketable forms. Partial processing of nodules, or final processing of materials which have been pretreated at sea, will be considered briefly.

As a basis for deciding which developing countries have the capability of participating in the processing of manganese nodules, "processing" will be disaggregated into its essential components. Since functioning nodules mining and processing ventures are nonexistent, no nation yet possesses fully demonstrated technology. However, elements of the technology do exist, in that much of the extractive metallurgy appropriate for nodules processing has been used on terrestrial ores.

3/ See Nyhart, J.D., el al., A Cost Model of Deep Ocean Mining and Associated Regulatory Issues, Massachusetts Institute of Technology, Report No. MITSG 78-4, March 1978.

The components of a nodules processing plant are presented in table 6, which includes estimates of the degree of technological sophistication.

Table 6. Components of a Nodules Processing Plant

Process Component	Estimated Level of Technological Difficulty a/
(a) Materials Storage, Handling and Preparation	0
(b) Nodules Reduction and Metals Extraction	00
(c) Metals Separation	000
(d) Reagent Recovery and Purification	00
(e) Metals Recovery and Purification	000
(f) Plant Services	0
(g) Supporting Services	0

a/ Low = 0; moderate = 00; high = 000.

This evaluation does not include transport of raw nodules to and rejects from the plant. Consideration will also have to be given to waste disposal as part of the processing sequence.

(a) Materials Storage, Handling and Preparation

The first component includes all operations necessary to receive, store, reclaim and put into service all raw materials and supplies consumed in the processing plant. These operations are conventional, and common to existing large integrated minerals or chemical processing plants.

Bulk nodules storage, handling and preparation facilities do not now exist, but would not require development of new techniques for their construction and operation. Location of these facilities, and indeed the entire processing facility, may be constrained by the need to be located adjacent to a deep-water port or facility constructed for nodules unloading, and with access to transportation facilities for supplies and products.

(b) Nodules Reduction and Metal Extraction

For certain process options, nodules reduction and metals extraction could be carried out with equipment and techniques similar to those used for some terrestrial ores. For example, operation of a high temperature reduction/ammonia leach process would be similar to nickel laterites processing as practised at Nicaro, Cuba, or at the Suriago Nickel Refinery off Mindanao in the Philippines. High-temperature sulphuric acid leach processes would be similar to the laterites processing practice at Moa Bay, Cuba, while nodules smelting processes would be analogous to ferronickel production from laterites as practised, for example, at Sulawesi, Indonesia. The analogies to the smelting of terrestrial sulphide ores, such as at the operations of Outokumpu Oy in Finland are somewhat less direct. The relatively greater complexity of the nodules "ore" generally requires a more complicated sequence of purification steps.

(c) Metals Separation

The mineralogical complexity of manganese nodules also requires an elaborate metals separation sequence to produce marketable products. No suitable integrated process is in operation, although elements of the technology have been practised, as in the copper liquid ion-exchange plants at Nchanga, Zaire, and at several locations in the United States.

(d) Reagent Recovery and Purification

These operations include such steps as tailings washing and ammonia recovery. As is the case with materials handling, they are common to integrated minerals processing facilities and are entirely conventional in design and operation.

(e) Metals Recovery and Purification

This is widely practised, but mainly from separated process streams. Nickel and cobalt and, especially, copper electrowinning operations are found in various parts of the world, including in developing countries. Other metals separation techniques, such as reduction and sintering of precipitated nickel carbonates, as practised at Nicaro, would not be used directly in currently proposed manganese nodules processing sequences. Manganese reduction in electric furnaces would have similarities with nickel laterites smelting as practised at Dominicana in the Dominican Republic.

(f) Plant Services

These are also conventional and common to existing integrated facilities. These services include provision and distribution of necessary utilities (water, steam, cooling, power) operational support (fire protection, security, medical facilities, etc.), on-site maintenance facilities, and general administrative support facilities (offices, laboratories, etc.) for the plant. Where these services exist at all in the aforementioned plants located in developing countries, they are usually provided to support only the needs of the existing operations and cannot be used easily for other purposes. This is particularly true with respect to the supply and distribution of utilities.

(g) Supporting Services

These include those functions which may be provided by the local community in support of the operating facility (in some cases, they may be considered as an extension of plant services). Examples of these services include: housing, schools, hospitals, stores and shops, etc. for the plant labour force; hotels, airport or harbour, and transportation networks necessary to facilitate access to the facility; satellite

businesses such as contract maintenance shops, waste removal, cleaning/ provisioning, administrative supply, etc., which might not be part of direct plant services. Supporting services also include raw materials supply operations, such as mining of limestone if locally available, to reduce the amount of imported materials necessary, and provision of services - particularly water and power - to the extent that they are not generated on site.

The configuration of a manganese processing complex could be simplified, and necessary support requirements decreased, if it were feasible to process nodules partially at sea and subsequently to manufacture a semi-finished product on land, or to process nodules partially in a land-based plant and ship the semi-finished products elsewhere for final production of marketable products. For example, the leach liquors from a reduction/ammonia leach process might be stripped to yield a highly concentrated, solid, basic metal (copper/nickel/ cobalt) carbonate. This intermediate product, in turn, might be shipped elsewhere for redissolution, separation of the metals, and electrolytic reduction.

While the reduction and stripping operations would consume large amounts of fossil fuels, elimination of electrowinning would reduce electric power requirements by about 50 per cent compared to a fully integrated facility. If sufficient underutilized power generation and electrowinning capacity were available in the region, the savings in capital requirements would be significant. Analogous modifications might be considered for other process routes, which would provide greatly increased flexibility in considering the use of existing or modified facilities in developing countries.

Unfortunately, it does not appear that partial processing of manganese nodules at sea can be technically or economically justified, at least for first-generation plants.[4/] Furthermore, shipment of raw

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4/ Op. cit., p. 41.

nodules to developing countries not located on the rim of the Pacific Basin would increase costs significantly by virtue of the increased size of the transport fleet required. Such costs could outweigh reductions in downstream (processing) costs, with the result that overall venture costs would actually increase. It is also worth noting in this regard that published cost estimates for nodules processing have been based on the assumption that the processing plant and support facilities would be located in industrialized countries. Both plant construction and infrastructure development costs are known to be higher in developing countries, and the potentially adverse effects on venture economics would need to be considered.

The disaggregation of the operations of a nodules processing plant clearly shows that, while elements of the extractive metallurgy and direct and indirect support operations are practised in a number of developing countries, major additions would be required to support an integrated nodules production facility in any one location. Aside from required additions to existing plant facilities (if appropriate), the need to provide supplementary supporting services - particularly labour and the necessary infrastructure and energy supplies - will be a major factor in determining the practicability and desirability of siting nodules processing plants in developing countries.

In spite of the potential penalties to the venture associated with the increased costs of process plant construction and operations in developing countries, numerous possibilities exist for beneficial, synergistic effects to those countries. Thus, partial processing on land might allow more than one country to more fully utilize existing (or only slightly modified) production and support facilities, while producing products with a relatively high value added. In other cases, siting of a processing plant may provide the necessary stimulus for the development of indigenous resources which otherwise would not be utilized locally or exported profitably. For example, the geothermal resources of the Philippines could provide both low-cost power and steam to a nodules plant in amounts which would justify the development of a generation

and distribution system that would provide relatively low-cost electric power to other sectors of the economy. Hydroelectric resources might also be developed in support of nodules processing as is the case at Bougainville for laterites smelting. Moreover, it may be possible to utilize a common facility to produce marketable metals from manganese nodules and compatible, locally available land ores. The resultant economies of scale and more efficient use of plant and facilities could permit the exploitation of an otherwise marginal mineral resource. Thus, it may be possible simultaneously to reduce and extract nickel and cobalt from laterities and nodules. Additional research and pilot-scale demonstration work would be necessary to confirm the validity of this concept.

The aforementioned possibilities for synergism between nodules processing and exploitation of mineral resources on land are site-specific. If adopted, co-exploitation could provide benefits both to the venture - in improved economics - and to the local economies of the countries in which they were located. A more general consideration involves the building up of support services in a developing country. Where relatively well-developed infrastructures are in place to support existing mining operations, incremental costs to the venture would not be large, but neither would be the collateral benefits to a country. On the other hand, while development of necessary support services and the training of managerial, technical, and operating personnel would be expensive and require many years to complete, the benefits which would accrue to a country where they did not previously exist can hardly be overstated. Among the benefits, the establishment of an appropriate infrastructure could provide the base for subsequent development and support of other high technology, high value-added industries.