Evolving Financial Terms of Mineral Agreements: Risks, Rewards and Participation in Deep Seabed Mining

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Seabed Resources as Mankind's Common Heritage

The ocean contains vast quantities of manganese, copper, cobalt, and nickel in the form of nodules strewn over much of the deep seabed beyond the limits of national jurisdictions. Optimistic about the chances of commercial nodule recovery, several international mining consortia have made extensive prospecting and high-technology development efforts over the last several years.¹

The concept that these minerals should be an international resource gained great momentum in the late 1960s, culminating in unanimous declaration by the United Nations General Assembly in 1970 that the resources of the deep seabed should be the “common heritage of mankind.”² Against this background, the task of giving substance to the common heritage principle fell to the Third United Nations Conference on the Law of the Sea (LOS), which has sponsored active negotiating sessions since 1974 and which recently completed its 1980 session.³

While the work of the Conference is not yet finished, the structure of the legal regime for seabed exploitation is largely agreed.⁴ Among the most difficult of its elements to negotiate were payments to the proposed International Seabed Authority (the “Authority”) that will be required of future seabed miners in respect of the common heritage principle. The schedule of these payments constitutes the fiscal terms of mining contracts, which are part of the “financial arrangements” for seabed mining. A linked set of issues involves the question of which countries will pay how much and in what form to establish the “Enterprise,” an entity which itself would mine on behalf of the international community. This paper focuses on the outcome of these financial negotiations. If the Law of the Sea Treaty ultimately enters into force and seabed mining proceeds under its aegis, these financial arrangements would set the basis for the first direct dealings of private or state mining corporations with an international organization having natural resource responsibility. As such, these terms may exert a precedential pull on future international agreements concerning the resources of Antarctica, the moon, outer space, or the airwaves, as well as on more traditional mineral agreements.

The apparent resolution of the financial problems is interesting not only for its potentially considerable economic significance but also insofar as it reflects and builds upon trends in recent mining contracts between Third World nations and transnational mining corporations. Along these lines, we shall argue that the novel financial structure of the proposed seabed contracts represents an advance over related attempts in land-based contracts to handle uncertain economic outcomes without generating pressures for renegotiation. We shall also contend that the funding of an unprecedented international mining entity relates directly to Third World aspirations of participation and control in resources development projects and international organizations.

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Winter 1980
The Context of Future Seabed Mining: "Parallel" System

Developed countries that see themselves as potential seabed miners have a genuine preference for an international seabed mining framework over one composed of only a few mining nations. Their strong choice for a seabed regime, however, as expressed in the early days of the Law of the Sea negotiations, was for a seabed Authority that would act essentially as a claims registry, more or less passively facilitating the orderly development of mining, with some revenue from the operations shared with the world community.

In the LOS forum, however, hammering out the conditions for seabed mining was tightly linked to renegotiation of the legal regimes governing a spectrum of other ocean uses, many of which were seen as crucial to developed maritime nations. Through those connected issues, the numerous coastal developing states in particular could exercise indirect bargaining leverage on the resolution of seabed questions. Among these linked issues were fishing rights, offshore hydrocarbons, the extent of national territorial seas and economic zones, ocean boundary delimitation, military and commercial navigation, continental shelves, natural and artificial islands, straits, archipelagos, protection of the marine environment, scientific research, and international dispute settlement mechanisms on these and related matters.

At the outset of the LOS negotiations, many Third World representatives wanted an international body to be the sole exploiter of seabed resources. With this idea in opposition to the claims registry concept espoused by most of the developed world, negotiations on the subject were fundamentally deadlocked. By 1976, however, Conference participants began to coalesce behind a "split-the-difference" compromise which became known as the "parallel" system. On one "side" of the system, private and state organizations could mine, while on the other side, the Enterprise would be established to mine directly on behalf of the international community. For this compromise to have meaning, it was necessary to ensure that the Enterprise could in fact carry out seabed mining. Among other things, it needed access to mining areas, technology, personnel, and finances.

The 40,000-60,000 square kilometer areas necessary to support individual mining operations would be made available to the Enterprise through an ingenious method similar to the "If I cut, you can choose first" means of fairly dividing a piece of cake. States or companies submitting mining applications to the Authority would be required to submit two prospected sites. The Authority would reserve one of them for the Enterprise and the applicant would mine the other. Provisions for technology transfer and training of personnel have also been dealt with in some detail as have the thorny issues of governance and control of the Authority and the Enterprise.

Our focus, however, is primarily upon two financial aspects of seabed mining that are principal ingredients of the parallel system. The first of these issues is the scheme of required payments to the Authority by miners operating on their side of the parallel system. The Authority would decide what portion of these funds to distribute directly to member countries and how much to reinvest in Enterprise mining operations. The second financial issue concerns the sources of funding for the Enterprise's first operation. Such a fully integrated mining-transportation-processing project may have capital requirements anywhere from $500 million (1976 dollars) to more than $1 billion.

The Chairman of the negotiating group on financial arrangements, Ambassador T. T. B. Koh of Singapore, has suggested a compromise representing the evolution of numerous specific proposals on financial arrangements offered by different countries, groups, and individuals over the last two years of bargaining. Koh's proposals are expected to be included in the eventual LOS treaty. These proposals contain detailed provisions both on the financial terms of contracts and on the means of financing the Enterprise. Although we postpone description of these financial particulars until later, it may be useful to offer a rationale for the negotiation of such specific provisions.

Specifying the numerical details of what, in effect, will be a mega-mineral contract between private harvesters of the seabed and "mankind" may seem premature for an unborn industry with an uncertain economic profile. Many Conference participants made this point, but a variety of political factors combined virtually to require
the negotiation of specific numerical provisions. The assurance of access to seabed resources is a major aim of much of the industrialized world. The type and magnitude of these financial obligations of their miners are important parameters of the access provisions. There was strong developed country sentiment against signing a treaty that contained a "blank check" on financial arrangements, especially given aspects of the parallel system which they regarded as unpleasant compromises.

If financial terms were left unspecified, their future negotiation would be conducted in a multilateral forum, some of whose members would be against ocean exploitation and none of whose non-mining countries would then have an overwhelming interest in seeing mining go ahead. Apart from countries that may have ideological reasons for a contrary stand, land-based producers of the seabed metals might try to block ocean mining through onerous financial requirements. A foretaste of this conflict was contained in a bitter Conference debate over a system to limit seabed production in order to protect land-based producers. Some developed countries felt uncertain about the degree of protection that the Authority's voting procedures would afford their economic interests. This group pressed for detailed financial terms.

Among most developing countries, there was a strong desire to secure precise and favorable terms for the financing of the Enterprise. In addition to feeling developed country pressure for detail, there was, perhaps, a fear that future Authority-multinational company negotiations would yield unfavorable outcomes. These factors led to virtual consensus on the need to specify simultaneously the financial terms of contracts and the mechanism for Enterprise finance. The practical difficulties of negotiating precise terms given the great economic and technical uncertainty, of course, remained.

Relevant Trends in Mineral Development

Numerous scholars have recently detailed the evolution of mineral development agreements between Third World Countries and transnational firms. It is not our purpose to repeat their analyses but rather to synthesize from them three key trends that are relevant to the negotiated terms of seabed mining contracts.

The first such trend in the financial terms of mineral development agreements is the move away from taxation instruments that impose relatively high risk upon the miner in favor of schemes which shift some of the risk to the government, with a corresponding rise in the tax bite expected from successful projects. The increasing reliance by governments on income taxes rather than upon royalties is a prime manifestation of this phenomenon. By the late 1960s, there was an "almost universal" shift in new mineral agreements away from high royalties and toward income taxes.10

Against the advantage of administrative simplicity, royalties pose widely-recognized disadvantages for both miners and governments. Since royalties vary with revenues and do not take capital or operating cost behavior into account, miners see a danger that with unexpected cost increases or depressed periods in unstable metal markets, royalties might easily erase or negate profit margins. Coming "off the top," royalties can magnify the financial risk of an operation.

Since royalties effectively reduce the price the miner receives per unit without affecting its extraction cost, they may induce changes in operating decisions that are rational for the miner but may be wasteful from the government's point of view. Royalties can cause "high-grading" of deposits, reduced production levels, and premature shutdown of operations. Another problem with royalties for governments is that they may not be very good at capturing excess economic returns. If revenues increase dramatically relative to costs, as may happen in volatile metal markets, a fixed percentage royalty will obtain a proportion of the increase, but a much higher levy might be possible. Along with the increasing sophistication of taxing authorities worldwide, which makes collection of profits taxes much more certain, these royalty properties are among the reasons underlying the shift away from reliance on royalties for revenue in mineral contracts. These factors figured prominently in the seabed debates.

 Mining profit taxes are usually fixed percentages of net income. These levies can also be based on the accounting rate of return on assets, the return on sales, the discounted cash flow, the internal rate of return, or other measures of economic performance.11 The type of profit tax
chosen can be of considerable economic significance for miners:

The principal financial criterion in judging an investment is the internal rate of return over the life of the investment. This has often led to misunderstanding since laymen often think of the rate of return as the accounting rate of return or the ratio of annual after-tax income to the net book value of assets. But a firm that has been making a capital expenditures aggregating several hundred million dollars for a number of years before the project begins producing any revenue will not be satisfied with, say, a 15 percent return on the book value of the assets. It must have a return that takes account of its capital expenditures during the years prior to the initiation of revenue.15

The innovative structure of the seabed financial terms will be seen to have been influenced by these investment evaluation factors.

A second resource trend involves the periodic renegotiation of the terms of mineral contracts. The rationale is often economic: the host country perceives that current financial or other terms are too favorable to the foreign investor. Renegotiation of a contract may be seen as a forceful assertion of control by the state. A more prosaic view would be, however, that renegotiation is a crude tool for redressing problems that arise from undue rigidity in the original contractual terms. If a financial structure is itself unable to capture a “fair” share of “excess” returns in unforeseen circumstances, one solution is a mandated change in the contractual terms. While this course of action is increasingly common, and even expected, it can be costly for both parties.16

A forced renegotiation can weaken the ability of the host country to commit itself convincingly to the course of action contained in the contract. To the extent that contractual terms are not seen as binding, uncertainty as to the actual conditions of exploitation will increase. A risk premium against the likelihood of forced contractual changes may be implicit in a higher rate of return required by a firm considering a mineral development project.

Before an investment is made, mining companies have leverage on contractual terms by virtue of their option simply not to proceed. Companies are acutely aware, however, that once a large, fixed capital investment is made in a country, there can be a dramatic shift in bargaining power to the host. If contractual terms cannot offer assurance that this power will not shortly be employed, firms may take possibly short-sighted measures to achieve early, high returns. Such actions themselves may increase renegotiation pressures. Firms may attempt to devise a variety of other protections, such as provision for third-party arbitration, the use of high-equity mixes, or involvement of banks and other companies in risk spreading syndicates that make changes in contractual terms more costly for the host. Nevertheless, shyness about investment in developing countries, embodied in the reported shift in developing country exploration expenditures from 60 percent of international mining company efforts a few years ago to less than 15 percent more recently, may be caused in part by this renegotiation fear.17

A third trend is the sustained effort of many developing countries to assert real “control” over their natural resources. Michael Manley, the former Prime Minister of Jamaica, expressed this common sentiment:

However much, in money terms, royalties or corporate taxes appeared to be, without national control, any concept of justice between a transnational corporation and the Jamaican nation would be incomplete.18

These aspirations were first given global voice in the United Nations General Assembly 1962 Resolution on Permanent Sovereignty Over Natural Resources.19 Since that time, desire for more real resource control has been expressed, with mixed success, in a variety of departures from the traditional mineral concessions. Among these are outright nationalization, acquisition of majority equity positions in local subsidiaries, or experiments with seemingly more acceptable relationships with multinational firms. These have taken the forms of joint ventures, service contracts, production sharing agreements, and technical assistance agreements. Behind these last methods, in particular, is a view of the contractual relation with a transnational company as an unpleasant technological and financial necessity, but one which should be supplanted as soon as is feasible by direct national exploitation.18 The Enterprise finance provisions reflect some of these ideas.

With these three developments in mind—increased risk sharing, costly renegotiation where

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contractual terms are rigid, and control aspirations—the structure of the LOS financial arrangements can be better understood.

**Design and Functioning of the Financial Terms**

The seabed negotiators wrestled with at least two potentially conflicting objectives for the financial arrangements. The terms should not deter investment in seabed mining either by their magnitude or by the changes they imply in the risk profile of operations. At the same time, they should ensure that the Authority receives a "fair" share of any financial benefits generated.

Potential seabed mining countries were primarily interested in encouraging investment. Although quite willing to share in the profits of successful projects, these countries were extremely sensitive to the possible adverse effects of the financial arrangements on low or moderate profit operations. Representatives of the developing world were far more concerned with maximization of the Authority’s expected share, but they also wanted a relatively stable stream of income to ensure the administrative functioning of the Authority.

Certain financial outcomes of seabed mining under any proposed arrangements were seen as intolerable by different groups. For example, many Third World representatives objected to the possibility that highly profitable operations might pay only modest sums or that some operations, even if they showed low returns, might pay little or nothing. Developed countries were quite concerned that unprofitable or marginal projects not be faced with excessive burdens, but were also mindful of the difficult political situation that could ensure if very successful projects paid relatively little to the international community.

These points of view had to be reconciled in the financial arrangements. A fundamental condition of seabed mining, however, is extreme uncertainty as to its technical and economic outcome. The technology of ocean mining is unproven. For example, a basic requirement of the proposed systems is a mobile mining platform which is to remain at sea for some twenty years, withstanding all storms which may occur. Even for stationary oil rigs in shallower water, this problem has not been completely solved, with some structures still collapsing in bad weather. The investment cost overrun and delay records of new, high-technology projects proposed to function in hostile environments are frequently unhappy ones. Operating costs are sensitive, among other things, to energy price changes, and revenues are at the mercy of notoriously volatile international metal markets. For example, from 1972 to 1975, copper prices nearly tripled and then plunged to their earlier levels.

This condition of uncertainty is exacerbated by the political impossibility of renegotiating the financial aspects of a comprehensive Law of the Sea Treaty until the entire agreement is formally reviewed some twenty or more years after its adoption. Renegotiation in the event of unexpected circumstances was opposed for the same reasons that countries desired specific numerical provisions in the text.

One outcome of land-based renegotiations, however, has been the emergence of contracts whose terms are less likely to generate pressures for revision. This is evident in the increasing reliance on profit-based taxes which can respond automatically to cost and revenue fluctuations, rather than royalties which are insensitive to costs increases and which can also fail to capture the full extent of windfall revenue increases.

Within a long-term, capital-intensive project, "profitability" is viewed in two complementary ways: on a year-to-year basis, and in terms of the entire project life, from initial investment to sale of scrapped machines. The investment decision is primarily a function of a company's *ex ante* beliefs about the likely economic success of the project taken as a whole. The projected pattern of cash outflows and inflows as well as the cost of capital tied up in the project are among the ingredients of this investment evaluation. Once the investment is made, however, a company becomes concerned as well with annual operating profitability. If the agreement contains profit sharing provisions which are responsive to both project-long and annual profitability variations, the investor can be reasonably protected in case of a poor yearly or overall financial outcome while the government can more than proportionately share in high returns.

The financial terms of contracts for seabed mining are designed to handle a variety of long-term and annual economic outcomes without generating pressure for renegotiation. There is an assurance of income to the Authority in the
terms applicable to operations in their early years or even if they never become very successful. In these low-profit situations a two percent royalty and a 35 percent share of profit would be due. For projects that are very successful, a four percent royalty along with a 70 percent levy on the marginal profit dollar would apply. In this sense, the system is quite progressive both over longer time periods and within years. It is important to realize, however, that risk remains for the miner that even the low terms may be too heavy for troubled projects. The Authority also bears the risk that some of what may turn out to be extraordinary high returns might go un-captured, even by the highest rates. Over a wide range of possible project outcomes, however, these fiscal conditions should work from the standpoint of each party.

Between the two sets of rates cited, there are several intermediate steps, some of which are triggered by annual profitability and some of which respond to the overall success of the project. At the beginning of commercial production, a two percent royalty applies along with sharing rates of 35 percent, 42.5 percent, and 50 percent on the annual profit increments representing up to a ten percent return on investment for the year, from a ten percent to a 20 percent return, and above a 20 percent return, respectively. This scale offers some within-year flexibility.

A second schedule of (higher) rates is triggered when the overall risk of the project is substantially reduced. The overall risk of a project involves the chances that the project-long return will fall below a target return as well as upon the magnitude of this possible shortfall. The risk that higher sharing rates would apply to a low return project is mitigated by the mechanism that triggers the second rate schedule. The second set of rates is imposed when the real cash flow of the project is sufficient to have recovered the original investment plus ten percent interest cumulated on the yet unrecovered portions. This implies that the overall (as opposed to the annual) project internal rate of return will be at least ten percent when the higher rates apply (or equivalently, that the net present value of the project will be zero at a ten percent real discount rate). Although required rates of return for these projects are apparently higher than this figure, the miner is assured that the second schedule will not apply to projects whose overall returns are low. These higher payment rates include a four percent royalty (when at least a 15 percent return for the year is achieved), and incremental profit sharing rates of 40 percent, 50 percent, and 70 percent on the profits representing up to a ten percent return on investment for the year, from a ten percent to a 20 percent return, and above a 20 percent return, respectively.

This combination of a trigger mechanism (which responds to project-long profitability) and incremental schedules (depending on the year’s profitability) is seen as advantageous to the Authority in at least three ways. Such a progressive system should be less of a deterrent to investment than one which responds less accurately to economic conditions. Overall incentive for investment should thereby be increased. Relatively higher rates for medium and high profit projects were negotiable in this more flexible system than would likely have been possible had Conference participants chosen a more rigid approach. Finally, the trigger mechanism is a reasonably accurate signal of lowered riskiness of a project since it takes into account the magnitude and timing of project cash flows. Higher sharing rates would not be artificially delayed once a project in fact could afford them. Other proposed trigger mechanisms (such as the simple recovery of some multiple of investment costs) can be shown in some cases to postpone higher rates past the time they are feasible. Depending on the economic success of the operations, total undiscounted payments to the Authority per contract are expected to range from a low of around $200 million (1976 dollars) for marginally successful projects to well over $2 billion for fairly profitable operations.

The fashioning of this system owes much to the evolution of the fiscal terms of mineral contracts toward provisions based on profit-sharing. Some renegotiated contracts also point the way to sharing methods which by their flexibility are less likely to require subsequent modification. With minimum royalty and profit-sharing rates to assure income for the Authority; with incremental profit-sharing rates within years to protect the miner from yearly downward fluctuations and to capture an additional share of annual upward fluctuations for the Authority; with a trigger mechanism that is sensitive to the recovery of
capital (including an interest "opportunity cost") and that realistically signals the imposition of higher royalty and sharing rates when project risk is lessened; with a provision that accounting be done in constant (real) dollars to ensure that fees are not eroded and that calculations of return and investment recovery are made in consistent and comparable monetary units; and with strict information and auditing requirements, the system is a sophisticated attempt to address the problems of uncertainty and difficulty of renegotiation when seeking simultaneously to attract investment and assure the Authority's share of financial benefits generated from mining.

Reflections of Trends Toward More Effective Control Over Resources

The outcome of the seabed negotiations reflects trends in recent mineral development agreements in Third World countries. Such agreements not only address fiscal aspects but often include other items that are relevant to Third World assertions of resource jurisdiction and control.

Since early seabed mining operations at least are expected to be vertically integrated and since the revenue sharing jurisdiction of the Authority was ultimately agreed to extend only to the international "part" of an overall operation, it was necessary to negotiate the portion of the operation's profits that would be attributable to the mining sector. Such "mining" profits were agreed to be a proportion of the total profits of the integrated mining-transportation-processing operation. This proportion will equal the fraction of the operation's total capital that is invested in the mining sector. A floor of 25 percent for this figure was negotiated. If there were a competitive market for nodules, of course, there would be no need for such a compromise. In such a case, the nodule prices and mining sector costs could be used directly to determine mining profits.

This "proportional profits" outcome is best interpreted as a solution to two separate problems. The first is a political one: what portion of the overall operation is within the sharing "jurisdiction" of the Authority? But the answer—"the mining sector"—did not resolve the second problem: how should the economic returns of an operation be defined and allocated to the sectors of an integrated project?

Some delegates argued that any "excess" returns for the entire vertically integrated operation should go to the mining sector, since without the nodules, the "common heritage input", the downstream sectors would dry up. Others argued that, for sharing purposes, profit should be allocated in accord with capital input, labor input, sectoral riskiness, or by arbitrary political criteria. To gain insight into the distributional compromise that allocated a minimum of 25 percent of the profits to the mining sector, we shall discuss the economic "rent" which may accrue to mineral exploitation, and thereby be available for sharing.

A mining projects must promise at least "normal" returns to be attractive to investors. But beyond the normal return that would just be sufficient to induce the investor to undertake and maintain a project, there may be "excess" returns or "rents." It is often the aim of resource owners to capture as much of these other rents as possible.32

The price of manganese nodules reported by a consortium would by definition involve somewhat arbitrary transfer pricing elements. Even if the buyers and sellers of the nodules were independent and autonomous, their relative market power could result in a shift of rents from one sector to the other. Thus the negotiators felt that the method of determining nodule prices or mining profits should be specified.

In the determination of nodule "prices," various methods could be applied that would follow the ore pricing practices in mining countries. The seabed negotiators considered emulating these practices to value the nodules. If nodules were priced on a "cost-plus" basis, it is likely that the "plus" element would include only an estimate of the required returns to the factors of production in mining. Major parts of any rents might be shifted to non-mining sectors. Conversely, the mining sector can capture the major part of other rents if the inputs in the non-mining sector are priced on a cost-plus basis and the remaining revenues are allocated to the mining sector. Naturally, the magnitude of the "plus" elements would determine the extent of any shift of rents.

By rejecting the cost-plus pricing of the nodules, the LOS financial terms reflected a shift to the mining sector of a proportional part of the possible rents. The arrangements call for sharing profits and hence rents in the various sectors
in proportion to the capital invested in each. The rough economic justification for this decision imagines independent, competitive sectors. If risk-adjusted marginal returns to capital in one sector were higher than in the others, investment would flow to that sector until the risk-adjusted marginal returns were equalized across sectors. Thus, over time, returns across sectors would be proportional to the capital invested in them. The "proportional" cost compromise also accords with the practice of many national tax systems.

The financial arrangements stipulation that the mining sector profit proportion cannot fall below 25 percent ensures that sectoral capital investment would not be made artificially low to shift returns away from the mining sector. To the extent that mining sector costs fall below 25 percent, a higher proportion of the returns than is represented by the mining investment will be allocated to the mining sector. The 25 percent floor applies to "three-metal" mining operations recovering copper, cobalt, and nickel. Comparable floors would be specified for substantially different operations such as these also recovering manganese.

The financial compromise in the parallel system attempts to provide an opportunity to earn income for Third World development efforts without discouraging seabed exploitation. Because of the common heritage nature of seabed resources, the LOS provisions are not simple replicas of production sharing or other mining agreements. Third World delegates were especially interested in arrangements for the Enterprise. Special terms for its operations were agreed in the areas of minesites, transfer of technology, and finances. The provisions for Enterprise finance were negotiated in tandem with the financial terms of contracts. Half of the funds necessary for the initial operations of the Enterprise will be obtained as long-term, interest-free loans from states ratifying the Convention. The Enterprise will have some control over the repayment schedule of these loans. For the remaining half of the financial requirements of its first site, the Enterprise will be given loan guarantees by ratifying States.

In line with trends in the concept of sovereignty over natural resources, many Third World delegates wanted the Authority to participate directly in the exploitation of seabed resources. For this purpose, necessary capital and technology are intended to be at the direct disposal of the Enterprise. Thus, not only would rents associated with resource exploitation accrue to an efficient Enterprise but so would normal returns to the full range of productive inputs. The total funds thus obtained would be available for distribution to member countries or reinvestment in Enterprise mining projects, presumably to generate more funds for later disbursement. Funds for the Enterprise can thus contribute directly and indirectly toward the more equitable global distribution of income that is envisioned as part of the New International Economic Order.

The financial and nonfinancial elements of these arrangements were favorably compared by many delegates with recently completed financial arrangements of the Third World mineral development projects. The influence of these other arrangements on the LOS deliberations was strong. In turn, the results from the seabed compromises may affect the terms of future mineral development projects as well as those of other "common" resources. As a model for sharing revenue in the face of great uncertainty when renegotiation is undesirable, the new seabed result contains much to recommend it.
NOTES


4. "Calling it a happy day, the chief American delegate, Elliot L. Richardson said, it was 'all but certain' that the text would be ready for signing in 1981," New York Times, August 30, 1980, p. 1.


10. M. Gillis, supra note 9, at 122.


13. See, especially, Smith and Wells, supra note 9.


15. R. Mikess, op. cit., p. 194.


19. Actually, two alternative payment schemes are envisioned for contracts. Both systems require a $500,000 application fee and the payment of $1 million per year until commercial production begins. The first alternative includes a five percent royalty levied on the market value of the processed minerals for the first ten years of production, with a 12 percent royalty assessed during the remaining years of the contract. This system was negotiated primarily for miners who are unable or unwilling to furnish detailed accounting data on costs and revenues; for example, it might apply to socialist states that neither use explicit price systems nor recognize the concept of profits. The second alternative, however, occupied the most negotiating attention and is the major focus of the above discussion.

20. Evidence for "required" rates of return for seabed mining projects and a discussion of various proposed trigger mechanisms are discussed in J. Sebenius "Net Proceeds Sharing," supra note 11.
