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Returns to Society from Offshore Hard Mineral Resource Development:

Special Interests Are Seeking to Monopolize Public Land Under the Sea by Doing Away with the 1953 Act

By DAVID W. FISCHER*

ABSTRACT. A combination of the recently proclaimed extension of the offshore U.S. *Exclusive Economic Zone* to 200 miles and the growing demand for critical metals has led to increased attention to offshore hard mineral resource development. The U.S. *Minerals Management Service* began to establish the rules to govern *offshore mining* under its *Outer Continental Shelf Lands Act of 1953* and its *1978 amendments*. However, others—including *environmental groups*, some *mining groups* and many *coastal states*—joined together to generate an alternative law to govern offshore mining. Both approaches seek to promote the public's interest in offshore *hard minerals*. This article examines the returns to society as a concept and as applied under each of these competing alternatives. It concludes by noting that socially derived criteria point to the Outer Continental Shelf Lands Act as the socially preferable approach to offshore mining.

I

Introduction

PRESIDENT RONALD REAGAN proclaimed U.S. sovereignty over the seabed, waters and all marine resources from the coastline to 200 nautical miles seaward.¹ This act added about 4 billion acres to the U.S., nearly doubling its present size of 2.3 billion acres. This area is called the Exclusive Economic Zone (EEZ) and extends U.S. control over such entities as fisheries, oil and gas and hard minerals. This paper is concerned only with the latter resources, hard minerals.

Interest in deep sea mineral development has been growing over the last two decades.² Minerals ranging from sand and gravel for construction materials to more exotic forms such as manganese and cobalt are known to be present in this newly acquired area.³ However, the exact extent of these hard minerals is not known since the breadth and depth of deposits cannot be determined easily.

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The technology for deep sea mining is still under development with various modes being considered, such as dredging, drilling, vacuuming and dragging.⁴ Costs are expected to be higher for deep sea mining compared to onshore mining.⁵

The basic reason for interest in such a high cost area is the growing imports for certain materials which are critical to the U.S. economy. Table 1 shows U.S. reliance on imports for selected metals that are known to be in the U.S. EEZ. Each of these can be summarized briefly as follows:

- **Manganese:** Consumption is tied to steel-making where a decline is expected since steel imports are growing and steel requirements for traditional products are being reduced. However, many of the newer high-strength steels have an above-average content of manganese. Imports will continue whether as ore or in steel form.⁶
- **Cobalt:** Consumption is linked to the demand for superalloys which is expected to grow, particularly in the transportation and tool sectors. Import dependence will continue.⁷

Table 1. U.S. Reliance on Imports for Selected Materials.

Manganese	100 %
Cobalt	95 %
Platinum	92 %
Chromium	73 %
Titanium	70 %
Nickel	68 %
Silver	68 %

Source: U.S. Bureau of Mines, 1986

- **Platinum:** Consumption is based on its use as catalysts in automotive, chemical and petroleum refining as well as corrosion-resistance in electrical, glass and medical industries. Each use is expected to grow and increasing competition for imports will result.⁸
- **Chromium:** Consumption is again linked to steel-making and steel-based products. While the chromium content of steel is stable, the demand for the ore is declining. Nevertheless, imports are the prime source regardless of form.⁹
- **Titanium:** Consumption is tied to the aerospace, construction and chemical industries which exhibit a growing demand. Imports have been growing in amount.¹⁰
- **Nickel:** Consumption is based in the chemical, electrical, aerospace and transportation sectors which are all growth industries. Imports are expected to grow.¹¹

- **Silver:** Consumption is centered in photographic, electronic, jewelry and medical industries. Imports have grown and increases are expected to continue.¹²

Other metals are of interest as well and are found in combination with the above in the form of metallic placers, metalliferous oxides and metalliferous sulfides on the deepsea bed.

The major land sources of most of the above minerals are centered in South Africa, U.S.S.R. and third world countries—places of high potential for supply interruptions, given current world tensions. Added to this security issue is the deficit in international trade which works against U.S. imports and the budget deficit in current accounts. Thus, any competing source of critical minerals within the U.S. would aid the economy in terms of materials, security, dollar outflow and revenues.

Given the importance of hard minerals to the U.S., it is not surprising that U.S. agencies and firms have begun to consider what is necessary to recover these hard minerals. Two concerns stand out: markets and tenure. The markets for critical minerals are not conducive to the development of high cost sources since they are in a state of disarray and decline. While costs of production have gone up, competition is growing from countries which subsidize minerals development. As to seabed tenure, industry repeatedly has demanded a legal tenure system that favors development.¹³

Thus, at the present time no deepsea mining is underway within the U.S. EEZ, although the U.S. Minerals Management Service is in the process of determining the regulatory regime for the U.S. seabed.¹⁴ Exploration for minerals under this general framework has been ongoing for some years off the Atlantic coast and in the mid-Pacific.

This paper concentrates on the question of the return to society for the granting of tenure to privately develop deepsea hard minerals. This question is currently under debate within the U.S. government and its outcome will determine the system upon which the return to society will be based. While many different facets of a deep seabed tenure system are important, this paper emphasizes a discussion of the reasonableness of the return to society as landowner.

II

Social Returns to Land

ONE OF THE EARLIER STATEMENTS on land tenure came from Henry George in his famous book, *Progress and Poverty*, published in 1879.¹⁵ George's precept centered on large landowners controlling blocks of land and obtaining unearned

rents for their use. The possessor of the land surface can be said to “own all” in that ownership of land extends power over everything connected to land, except in countries where mineral or water rights are reserved. For example, a large mining corporation can through its surface ownership control its employees in nearly every aspect of their lives. In this sense mere surface ownership provides an extension of control that is not warranted from production insofar as land was not produced by the corporation. Thus, any rents obtained by the owner from the use of such land was unearned. George’s solution to the issue of unearned rent was to tax it away through a “single tax” aimed at reducing control gained simply through land ownership. George also found acceptable a leasing system. Revenue to government from the tax fee or the royalty was less of an issue than ensuring that society guaranteed to a producer the fruit of his or her labor irrespective of land ownership.¹⁶

In George’s view social returns to land included separating land ownership from production to allow society to receive greater benefits socially as well as economically. While incomplete as a total theory of land and society, this effort clearly showed the social nature of landed property where such property is justified on the basis of its contributions to society. Whether land is owned or leased by a mining corporation, as well as the form and amount of taxation for such, are all part of society’s decision on the best use of its land and minerals resources. However, the social welfare is better served if the basis for deciding on the form of the tenure system for minerals reconciles the public interest with the private. All property is contingently owned subject to the inherent power of society acting through its government to interpret the rights and obligations of such tenure.

Mineral resources are part of the inventory of a nation’s stock of wealth. At any moment in time mineral resources are in a state of nature, recovery, processing, refining, use and possible recycling. Regardless of its status, in each period the owner will decide to produce it at that rate where the net revenue earned from the last unit produced just equals the net revenue that same unit would earn if its production were put off until the next period.¹⁷ If the owner produces the unit, depletion occurs; if the owner waits, conservation occurs. In this situation the owner is indifferent and *ceteris paribus* the choice depends on what brings in the larger return from the mineral. If all minerals owners behaved in the same manner, then society gains by having its mineral wealth maximized at each point in time.

This elegant construct is based on assumptions that must be met in order for social returns to be maximized. Among these assumptions should be included the system of tenure which influences the owner’s decision about developing

a mineral resource faster than society would prefer. For example, if the form of tenure places the developer in the status of tenant, then the developer has a shorter period of interest in minerals productivity than society, and depletion occurs. Unless the owner has full knowledge about the extent, depth and quality of the minerals resource, approves the rate of production, and prescribes the conditions of the site at the end of the lease, the tenant developer will not have the incentive to produce at a rate that maximizes the owner's return.

Even if the developer holds permanent title to the site, the area may be too small in relation to the investment in exploration and technology or the market place envisioned. In this situation the owner may abandon the site, develop off-site, and/or neglect impacts stemming from production. In this case the owner and society suffer jointly, and only aggregation of sites would provide an area conducive to maximizing society's return. Thus, an adequate tenure system from society's perspective is that which is appropriate to the resource in both time and space dimensions.¹⁸ The benefits of a society's minerals resource development program must be commensurate with the objectives of the developer for society to receive returns approaching a maximum. Thus, it is important to society to consider the nature of the ownership or tenancy used in relation to a mineral developer's objectives in determining returns due it.

Both the nature of mineral property and society's objective of maximizing its return center around the expected earnings from the development. The concept of land rent is sometimes used to express this aspect and may be defined as the "return that accrues or should accrue to land for its use in production."¹⁹ This precept includes earnings from land as a site for production as well as from its development through production. Rent can be seen also as the surplus from production after all costs are met, and therefore as a return to capital. If the rent were not required to keep the mineral land in production, it could be argued that society taxing it away would have no effect on production. The value of any such rent is normally capitalized into the selling prices of the mineral land when it is sold.²⁰ At this point the new owner's property is worth no more than the price paid for it, so any increase in value would then represent a return on investment. From society's perspective, however, increases in value would accrue to the mineral-bearing land.²¹

Industry looks at a mineral deposit, particularly one located over a wide, high cost area such as the deep sea, as a depreciating asset over time. Once discovered and developed it takes on value going beyond that of the value of the subsurface land without the mineral. Its mining consists of disposing of the mineral in increments, thereby reducing its values over time to the owner.²² However, to society the mineral can be viewed as an asset of appreciating value over time

going beyond the tenure of the original owner. Any calculations of rent will be determined in part by the expected value of the recovered mineral. Both the owner and society will calculate such rent and must come to a negotiated settlement of value for depletion, accounting and tax purposes.

Cost considerations play a major role in mineral development, especially in the deep sea. Through a comparison of the prospect of prices received over the life of the equipment needed and the mine, society and the would-be owner/developer determine the benefits and costs of a mining venture. If benefits are positive the mine would be developed, *ceteris paribus*. Thus, costs are an intrinsic part of the development calculation and can be readily influenced by society's rules governing such development. If society has a high demand for the mineral in question its view of social costs would be low so that earlier development would occur. If society's demand is high for other goods, such as environmental quality, then development would be targeted later when social costs would be lower. Therefore, both value and cost to society can be said to be relative depending upon what is included in the definitions. It follows that returns to society from deep sea hard mineral development cannot be set in absolute terms, but are relative as well.

III

Nature of a Social Optimum

THE ECONOMIC CONCERN over mineral development has existed since the beginning of this nation. The concept of its optimum development is related to the mineral, its tenure or nature of ownership, and the affected interests surrounding its development. The maximizing decision, described earlier, reflects the preferences of the developer and society for the mineral involved. Market prices for metals indicate society's preferences that center on the scarcity and utility of the mineral in question; therefore, under higher prices, *ceteris paribus*, the mineral's development will occur earlier. This precept is basic to market economics. Ise has described the process as follows:

Nature is 'niggardly' and does not provide most goods so generously that everyone can have enough without effort on his part The amount of petroleum, coal, gold, silver, copper, iron, nickel, barite and most other useful minerals is strictly limited, although the amount *brought to the market* can be increased within certain limits by devoting more labor and capital to mining.²³

While society can express its current preference for minerals through the market, the preference expected to be in effect when present allocation decisions result in the recovery of minerals is the one most relevant. Looking into the future involves uncertainty which is affected by the nature of the institutions

involved. Thus, the institutional structure surrounding market decisions must be included in any discussion of an optimum. Castle has decried the precept in this way:

The concept of an economic optimum rests on an implicit value judgment that cannot be verified by examining the evidence; the evidence indicates that the value judgment is incomplete and does not encompass all of the relevant values on which men base their actions. Furthermore, the economic state of conservation will depend on the institutional framework in which an individual is operating.²⁴

Therefore, economics by itself would be a misleading guide to a socially optimum deep sea mineral development. Embedded within the appropriate institutional framework, economics can be useful for describing the consequences of differing development regimes. Nevertheless, the institutional structure is crucial to the outcome of any economic value employed.

A simple definition of institutions would include the various formal and informal ways in which individuals and groups relate to one another. Taken together, they generate the system through which each can move toward satisfying his objectives. In this way at any point in time the system reflects the social values relevant to any decision, economic or otherwise. A social optimum becomes a bundle of values both objective and subjective that influence the outcome of the development process. Castle shows keen insight into this process by observing that:

When a particular institution appears to be an obstacle to, say, the enhancement of national income, certain information is suggested as being of value. The change in institutional arrangement needed to accomplish the enhancement may be developed, but this may involve a sacrifice in another value that the institution was created to preserve. Some appreciation of other values of this kind is necessary to the development of alternative institutional arrangements that will permit the realization of multiple values.²⁵

In the approach just noted above, the creation of a deep sea hard mineral governance system will change the values currently perceived to exist. The new tenure system will redefine the institutional framework of ocean development, and the potential gain from such a change must be balanced against the loss in other expected uses. A social optimum would be approached through allowing an alternative use to be considered at periodic intervals and searching for a range of uses in differing combinations for meeting a wider array of society's objectives. This flexible approach would be preferred to hardening ocean development to one set of permanent uses. If the values behind a "permanent" ocean use were known totally in its full set of consequences, the use may become unacceptable. Yet deep sea hard mineral development faces this very dilemma with a move to create ocean wilderness areas even before any exploration has occurred.²⁶

Onshore hard mineral development was assumed to be the highest and best use of the land surface. This assumption is based on two premises: 1) economic concentrations of minerals are based on discovery, and 2) these concentrations are the most valuable of all resources wherever they are found.²⁷ An example of this phenomenon can be seen in the General Mining Law of 1872 where a patented claim is withdrawn from federal land and title passes free from requirements to the claimant. Today this assumption can be questioned, particularly with attempts to approach a social optimum. Mineral deposits are often of lower grades and at deeper locations, requiring greater costs and hence lesser net value. In addition, other non-mineral resources have become more scarce and hence of greater value as seen in the prices for timber, fish and building sites. Finally, hard minerals are always present if left undeveloped regardless of the land or water surface use employed, whereas non-mineral resources of particularly high scarcity can disappear, perhaps irreversibly (such as aquifers, prime agricultural land, white-water rivers, endangered species and scenic vistas).

In order for alternative uses of potential mineral development areas to be considered, better resource information is required. Hard mineral information can be obtained only through exploration which in the deep sea is costly. To avoid all-or-nothing suboptimal decisions without adequate hard mineral information, mineral exploration should be allowed to occur throughout the Exclusive Economic Zone. While this obvious stance can be supported by many marine resource managers, most mineral firms involved will not undertake exploration without assurance that they be allowed to develop any mineral discovered. If such assurance is granted *a priori* the mineral development is the expected use and other uses become displaced regardless of their value. Even if no discovery is made, considerable expenditure of public funds is required in planning, and other planned uses are displaced, perhaps forever.²⁸

In a market economy the way to offset this concern is for the mining firm to offer to pay for exploration and mineral rights as well as accepting the obligation to pay for untoward impacts and displaced uses. In this way the firm gains the rights it wants and is forced to consider and pay for the impacts of its activities, and society gains returns for its resources, early demanded resource products, and mitigation of adverse impacts. The preference of both the firm and society are met so that an optimum is approached.

What remains to be sifted from this discussion is the set of features necessary for approaching the social optimum desired. Such criteria would include:

- availability where early recovery is encouraged to meet national needs for materials, reduced import dependence, reduced trade deficit and reduced budget deficit;

- efficiency where the value of the last unit of mining and governance effort expended would not exceed the total cost to produce it;
- equity which includes fair shares of the return from the activity to producer, society as land owner and other interests as directly affected;
- shared information which contains what is known about the resource, its environment, the technology, the expected impacts, and market use conditions;
- expected adverse externalities of the operation which would be reduced to socially acceptable levels;
- consultation with affected interests to maintain knowledge of what is at stake to whom and what alternative resources and uses exist for the same area.

While not exhaustive, this list of criteria would go far in ensuring that deep sea hard mineral development approaches iteratively an optimum return to society in the spirit of the above discussion. This list is further corroborated by a recent article noting that the conception and allocation of property rights for the deep sea has an “almost revolutionary” shift from the view of unrestricted use based on prior claim to constrained use based on equity considerations.²⁹ What remains now is to compare the current competing regimens for deep sea hard mineral development with these features to determine which approach may produce more returns for society.

IV

Alternative Regimes for Deep Sea Hard Minerals

AT PRESENT the U.S. law governing mineral development in the offshore is the Outer Continental Shelf Lands Act of 1953 (OCSLA) which came in response to the 1945 Truman Proclamation as well as the desire of the federal government to ensure orderly development of offshore oil and gas and other minerals. President Truman proclaimed that the natural resources of the subsoil and seabed of the Continental shelf were to be under the jurisdiction of the U.S. and he placed these resources under the Secretary of the Interior.³⁰ In 1953 congress ratified this Proclamation and concurred in the Department of the Interior having responsibility for marine resource development.³¹ In addition, Congress gave expression to the demands of oil-wealthy states for an extension of state boundaries to the seabed of the U.S. Territorial Sea, a width of generally three miles.³² This sea reserved mineral development to the coastal states while leaving the vast Shelf area beyond three miles to federal jurisdiction.

The Outer Continental Shelf Lands Act

Since the Outer Continental Shelf (OCS) was under the sovereignty of the U.S., the seabed was considered to be public land and any recovery of its resources by private persons was to provide for a fair return to the federal government. As noted in the act, such fairness was to be assured through the use of the competitive cash bonus bidding system for mineral leases, along with land rentals and royalty payments. Given the history of the competitive leasing system applying to known geological structures, the existence of onshore and nearshore petroleum-bearing structures was assumed to extend seaward into the OCS. Therefore, competitive bidding was applied to all oil and gas leases given there. The competitive cash bonus is made in the form of a sealed bid to the Secretary of the Interior and reflects the market value of the lease, including estimates of uncertainties about the resource, the economy, and the known work requirements of the lease.

This act uses a "fair market value" for the right to bid on a lease to recover minerals from the public seabed. "Fair market value means the value of any mineral computed at a unit price equivalent to the average unit price at which the mineral was sold pursuant to a lease during the period for which any royalty or net profit share is accrued or reserved to the U.S."³³ This value is used to determine a minimum threshold for the competitive bidding process; any bid which exceeds this calculated value is viewed as a bonus equivalent to land rent or surplus over and above any fixed rental and royalty calculations over the life of the lease.³⁴

In summary this act contains several elements that can be bundled together for determining its returns to society:

1. Mineral resource information: Government has the right to privately collected information concerning the characteristics and value of public mineral resources for determining minimum sale values.³⁵
2. Competitive leasing: Government only sells leases to public mineral tracts at public auction to the bidder offering the highest sealed bonus bid above the calculated fair market value. This bonus can take a variety of forms including portions of royalty, work commitment, net profits. The bonus can be deferred at Secretarial discretion.³⁶
3. Diligence: Government requires some fixed work commitment to ensure the operation moves forward to full mineral recovery.³⁷
4. Land rental: Government requires the public land surface, including the seabed, to be rented at a fixed rate per acre over a fixed period of time.³⁸
5. Royalty: Government receives a portion of the value of the minerals recovered and sold with a minimum value of 12½ percent.³⁹

6. Qualifications: Government requires a firm to prove it has the financial and technical capability to undertake an offshore mineral operation. This requirement reduces the opportunity for speculation.⁴⁰
7. Tract size and timing: Government sets a maximum tract size that can be extended to ensure an economic production unit; it sets a minimum lease period of five years not to exceed ten years for exploration in deeper waters; it sets the lease life for the operation.⁴¹
8. First refusal: Government requires 20 percent of the mineral be offered to it directly for an agreed market price.
9. Environmental studies: Government requires the study of the human coastal and marine environments prior to any mineral leasing, and it requires the consideration of this information in developing regulations approving lease conditions and operational plans.⁴³
10. Consultation: Government requires that affected coastal states be notified, and local governments on request are given information for planning purposes as well as being invited to make suggestions relative to mineral leasing.⁴⁴
11. Coordination: Government requires mineral leasing be coordinated with other uses of the sea and seabed.⁴⁵
12. Compensation: An amendment to the act required the government to establish an oil spill pollution fund and a fishermen's contingency fund for damage compensation through offshore minerals activity.⁴⁶

An opinion of the Solicitor of the Department of the Interior asserted that the 200 mile EEZ was a minimum jurisdictional zone so that the 1953 Outer Continental Shelf Lands Act (OCSLA), as amended, applied to all offshore lands contiguous to the fifty states.⁴⁷ Armed with this solicitor's opinion, the Department of the Interior has moved to apply the OCSLA to the entire OCS/EEZ area. Although this act had been applied exclusively to oil, gas and sulfur, the act does contain Section 1337(k) which states that leases for other minerals can be offered competitively to the highest cash bonus bidder. In addition, Section 1337(k) allows the Secretary to prescribe whatever conditions are desired with regard to areas offered, tract sizes, lease terms and royalties paid.⁴⁰ Therefore, the OCSLA gives the Department total discretion to develop the regulations governing hard minerals exploration and recovery.

A strict reading of the act could separate the above twelve items from this single paragraph on hard minerals; however, since the Department of the Interior would administer both programs it would be surprising to see an attempt to fail to follow the principles already established for oil and gas. Indeed, one would expect the Department to go beyond what was required by law in order to meet

criticisms based on its program in oil and gas and to offer deep sea hard minerals for lease in a timely, orderly way with full consideration for returns to society.⁴⁹

The Lowry Bill

Congressman Mike Lowry, Democrat, 7th District, Washington, introduced the National Seabed Hard Minerals Act in the Summer of 1986.⁵⁰ Its basic features include a large-scale mineral resource and environmental assessment program (Sec. 210, 503); establishment of federal-state task forces for all coastal states (Sec. 202); separation of environmental and mineral authority between two cabinet-level departments (Sec. 204); state veto over federal mining leases on the federally owned seabed (Sec. 307, 308); 90 percent of mineral revenues to the coastal states and a mitigation fund (Sec. 314); mining leases on a first in time-first in right basis over a long duration (Sec. 302, 310); royalties not to exceed 12½ percent payable only upon recovery and sale (Sec. 309), and subsidies for exploration by the industry (Sec. 503).

A studied reading of this act clearly shows it to be a patchwork of separate interests united only in their opposition to the OCSLA. Environmental interests are concerned with the impact of the development of deep sea hard minerals on the marine environment.⁵¹ Coastal states seek to direct deep sea mineral development on the basis of its assumed impacts, their assumed jurisdiction, and the desire for additional revenues;⁵² some mining companies fear open competition, payment of economic rent and lack of a guaranteed lease.⁵³ Each of these interests separately have sought to influence the U.S. Minerals management Service to adopt their particular viewpoint.⁵⁴

The features of this proposed regime should be compared to the criteria established earlier for approaching a socially optimal deep sea hard minerals regime:

- Availability: The emphasis on states' rights with their veto power, new extensive environmental studies and split cabinet-level authority would delay development; however, once agreement was reached the prospect of "free" guaranteed leases and low royalty payments would accelerate development.
- Efficiency: The system of governance and mining expected is quite costly in its duplication of authority, extensive consultation and requirement for best available technology (Sec. 309); however, the use of a "logical recovery unit" (Sec. 305) for mining boundaries allows for case-by-case determinations of mine efficiency.
- Equity: The lack of an economic rent for the use of public land, the presence of a subsidy, low royalties and the lack of revenues for the federal government militate against equity.
- Information: The extensive information required between separate govern-

ment entities ensures sharing of information, but the split jurisdiction also ensures adversarial roles and possible “hiding” of information.

- Externalities: The offshore adverse externalities from deep sea mining are expected to be small and temporary, and onshore impacts probably would be low from use of existing ports and processing sites; however, the extensive studies, consultations and expected disputes assume major adversities and invite litigation.
- Consultation: The system of elaborate consultations ensures knowledge of expected activities, impacts and alternatives, although confidentiality of proprietary information and the open invitation to disputes and litigation (Sec. 308, 407) work against openness.

From the above, it can be seen that the Lowry Bill falls short of approaching a socially optimal regime for deep sea hard minerals. Major conflicts are assumed and each group is attempting to stake out its respective area for the coming battles over mineral development. No unified approach is envisaged and high transaction costs are built into the process for arriving at permitting decisions. As economists know, the cost of transactions is in inverse relation to expected output. As transaction costs increase, the number of mining permits and hence produced minerals will decrease; thus the bill will work against the national interest in mineral availability. Finally, no attempt is made to secure for the public as landowner the economic rent for the exclusive right to develop hard minerals on the seabed.

V

Conclusion

FROM THE PRECEDING analysis of deep sea mineral regimes, certain characteristics regarding social returns stand out. The 1953 act was the first legislation applied to the seabed and subseabed. In this act the government retained ownership of the seabed and leased exploration areas. It was founded on a competitive basis to ensure the government receiving “fair market value” for the exclusive private right to explore for valuable minerals. Economic rent is accounted for through an upfront cash bonus bid as well as royalties, rents and taxes paid for the development of the minerals. Advance public notice for the sale of leases ensures that all interested parties have an opportunity to participate in the sale. Ownership is limited to the mineral itself and can be revoked if the lease conditions are violated. Diligence or work requirements, periodic payments, public consultation, environmental protection and damage compensation measures are all part of the lease conditions. The Lowry Bill is designed to retain the preference right permitting system, low royalties and no economic rent. It also constructs

an elaborate and rigid consultation and environmental studies system characterized by high transaction costs to offset early mineral development, and which will invite litigation.

Prima facie, the OCSLA is far superior to the Lowry Bill for ensuring adequate returns to society from deep sea hard mineral resource development: U.S. ownership of the seabed and mineral is recognized; mineral leasing is based on an open competition; fair market values are established to guide lease decisions; economic rent is captured; mining efficiency is encouraged through discretionary lease conditions; extensive public consultation is undertaken; environmental protection and damage compensation is recognized; finally, flexibility in decision making to implement lessons learned is used. Thus, it is surprising that growing interest exists for the Lowry Bill as the model for hard mineral resource development in the U.S. Exclusive Economic Zone.

The U.S. need for early deep sea hard mineral development requires a unified policy that recognizes optimum returns to society as owner of the seabed. Anything less will generate unearned rent for narrower interests and militate against national mineral and other economic needs.

Notes

1. Proclamation 5030, *Federal Register* 48:10, 605, March 10, 1983.
2. The first major study of marine resources was the Stratton Commission report. See Commission on Marine Science, Engineering and Resources, *Our Nation and the Sea*, U.S. Government Printing Office, (Washington, DC: U.S. Government Printing Office-hereafter USGPO-January, 1969).
3. M. A. Champ, W. P. Dillon and D. G. Howell, "Non-Living EEZ Resources: Minerals, Oil and Gas," *Oceanus*, 27:4, Winter 1984/5, 32.
4. M. J. Cruickshank and R. W. Marsden, "Marine Mining," *SME Mining Engineering Handbook*, Society of Mining Engineers, New York, 1973, 20-1-20-200.
5. See the cost information specific to each deep sea mineral in *Mineral Facts and Problems*, Bull. 675, USGPO, Washington, D.C., 1985.
6. T. S. Jones, "Manganese," *Mineral Facts and Problems*, *ibid.*, 483-497.
7. W. S. Kirk, "Cobalt," *Mineral Facts and Problems*, *ibid.*, 171-183.
8. J. R. Loebenstein, "Platinum-Group Metals," *Mineral Facts and Problems*, *ibid.*, 595-616.
9. J. F. Papp, "Chromium," *Mineral Facts and Problems*, *ibid.*, 139-156.
10. L. E. Lynd, "Titanium," *Mineral Facts and Problems*, *ibid.*, 859-880.
11. S. F. Sibley, "Nickel," *Mineral Facts and Problems*, *ibid.*, 535-552.
12. R. G. Reese, Jr., "Silver," *Mineral Facts and Problems*, *ibid.*, 729-740.
13. R. Kaufman, "Economic Potential of Hard Mineral Resources," Proceedings of the Exclusive Economic Zone Symposium on Exploring the New Ocean Frontier, U.S. Department of Commerce, Washington, D.C., May 1986, 149-163. See also R. J. Greenwald, "Current Hard Minerals Industry Activities in the EEZ," *op. cit.*, 39-45.
14. Advance notices of proposed rulemaking appeared in three *Federal Registers*: for prospecting, *Federal Register*, 49:47, 871; for leasing, *Federal Register*, 50:15, 590; for operating, *Federal Register*, 51:12, 163.

15. Henry George, *Progress and Poverty: An Inquiry into the Cause of Industrial Depressions; and of Increase of Want with Increase of Wealth: The Remedy*, (1879). (New York: Robert Schalkenbach Foundation, 1979).

16. See also John Ise, *Economics* (New York: Harper Brothers, 1946), 435–46.

17. A. Scott, *Natural Resources: The Economics of Conservation* (Toronto: University of Toronto Press, 1955), 5.

18. *Ibid.*, 128.

19. R. Barlowe, *Land Resource Economics*, 2nd Ed., (Englewood Cliffs, NJ: 1972), Prentice-Hall, 157. J. Ise has a discussion of rent in *op. cit.*

20. *Ibid.*, 171.

21. *Ibid.*, 172.

22. E. N. Cameron, *At the Crossroads: The Mineral Problems of the United States*, New York: John Wiley, 1986, 241.

23. Ise, *op. cit.*, 5.

24. E. N. Castle, "Criteria and Planning for Optimum Use," in *Land and Water Use*, W. Thorne, ed., American Association for the Advancement of Science, Washington, D.C., 1963, 287.

25. *Ibid.*, 299.

26. B. Mikulski introduced the Ocean Wilderness Act to preserve certain ocean areas in the U.S. EEZ. See H.R. 5347, 99 Cong 2S, August 1986; *Coastal Zone Management*, 17:31, August 15, 1986.

27. Office of Technology Assessment, *Management of Fuel and Nonfuel Minerals in Federal Land*, USGPO, April, 1979, 185.

28. *Ibid.*, 189–190.

29. A. V. Lowe, "Reflections on the Waters: Changing Conceptions of Property Rights on the Law of the Sea," *International Journal of Estuarine and Coastal Law*, 1:1, February 1986, 1.

30. Proclamation 2667, *Federal Register*, 10:12, 303, September 28, 1945.

31. 43 USC 1331–1356.

32. 43 USC 1301–1315.

33. 30 CFR 250.2(r).

34. 43 CFR 3400.0.

35. 43 USC 1352 (a)(1)(A).

36. 43 USC 1337 (a)(1).

37. 43 USC 1337 (a)(7).

38. 43 USC 1337 (b)(6); 30 CFR 256.

39. 43 USC 1337 (a)(1)(A)(c); 30 CFR 256.

40. 43 USC 1337 (a)(1).

41. 43 USC 1337 (b)(2)(B).

42. 43 USC 1337 (b)(7).

43. 43 USC 1346 (a)(1)(d).

44. 43 USC 1344 (c); 1345; 1352 (b).

45. 43 USC 1344 (a)(1)(D).

46. 43 USC 1812; 1842.

47. Office of the Solicitor, Memorandum MMS.ER. 0057, U.S. Department of Interior, Washington, D.C., May 30, 1985.

48. 43 USC 1337 (K).

49. The Minerals Management Service has created a new Office of Strategic and International Minerals which has organized new federal-state task forces to evaluate offshore hard minerals. See J. Wiltshire, "Innovative Trends in Marine Management: Hawaii's Manganese Crust Work

Group, "Proceedings of Oceans, Marine Technology Society, Washington, D.C., September, 1984, 886-889.

50. HR 5464, 99 Cong 2S, August 15, 1986.

51. A. Palmer, Environmental Policy Institute, testimony on HR 5464 before the Panama Canal/Outer Continental Shelf Subcommittee, House of Representatives, Washington, D.C., September 23, 1986.

52. A. Rocque, Coastal States Organization, testimony on HR 5464 before the Panama Canal/Outer Continental Shelf Subcommittee, House of Representatives, September 23, 1986.

53. C. McLain, Marine Development Associates, testimony on HR 5464 before the Panama Canal/Outer Continental Shelf Subcommittee, House of Representatives, September 23, 1986.

54. Comments to notices of proposed deep sea mining regulations under the OCSLA in the Office of Strategic and International Minerals, Long Beach, CA.

Redistribution—of Other People's Land

IN THE PHILIPPINES Heherson Alvarez, Secretary of Agrarian Reform, presented an ambitious five-year land reform program covering the nation's 25 million cultivated acres. To finance the program President Corazon Aquino planned to sell various government assets, including Philippine Airlines, worth at least \$1.2 billion. Land reform through redistribution has been attempted by various governments in the republic since colonial rule ended in 1898.

Asked if her family's 15,000 acre Hacienda Luisita, 50 miles north of Manila, would be subject to redistribution, she replied, "We will abide by any laws that are enacted." In other words, yes. The questioners remembered what happened in Guatemala when the voters elected as president Jacobo Arbenz, the nationalist backed by the Communists who won the nomination in a shootout with his only rival (idiots in the U.S. Congress say he was "democratically elected"!)

Congressional critics of right wing governments in Guatemala said that Arbenz's land reform included his family's land. It didn't. It redistributed only the holdings of the United Fruit Co., a United States-owned agribusiness, and those of a few large landowners who had backed Arbenz's opponents. His U.S. educated wife was schooled in Leninism by Virginia Bravo, a Chilean educator. But when the Arbenzes, in exile in Cuba, fell out with the Communists and obtained refuge in Mexico, Mrs. Arbenz became a bitter anti-Leninist. After her husband's death, she returned to her family's many-thousand acre finca in Guatemala, unaffected by her husband's land reform and administered the thousands of acres Arbenz himself obtained *during* his land reform. w.l.