
BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

9235

Mining Law Reform And Balanced Resource Management

Most exploration and development of hard-rock minerals on public lands is governed by provisions of the Mining Law of 1872. As indicated by its age, however, that law is outdated with respect to contemporary concerns for environmental quality and properly balanced use of public lands.

Although numerous efforts have been made to reform the 1872 law, a substantial stalemate has developed over how that might be accomplished.

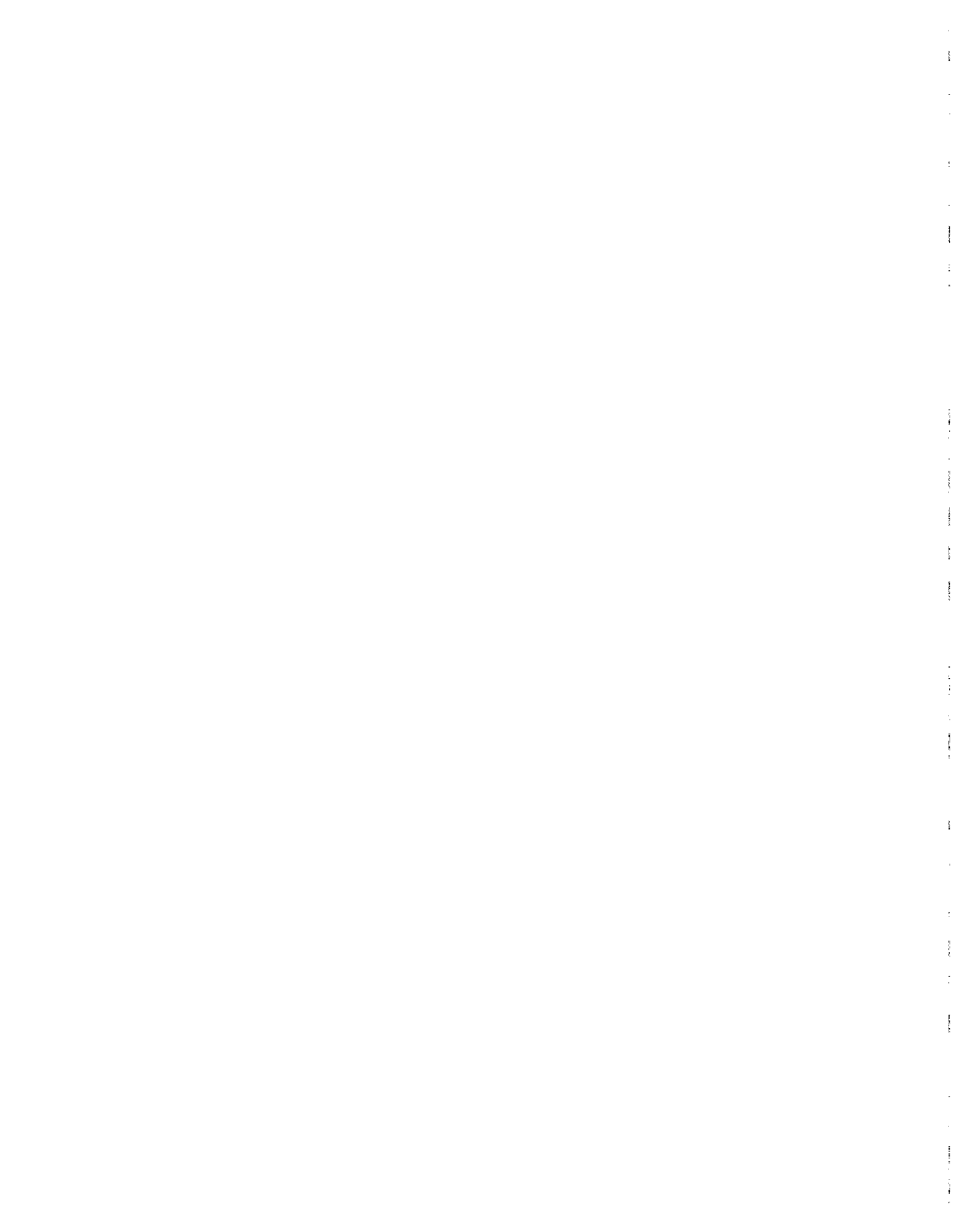
GAO proposes revisions to the 1872 mining law to bring it in concert with contemporary values, but also recommends retention of provisions that encourage exploration and development by the private sector.



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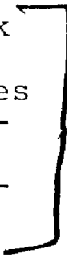
COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

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To the President of the Senate and the
Speaker of the House of Representatives

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This report provides an assessment of trends in hardrock mining in the United States and makes recommendations to reform the Mining Law of 1872 so that current needs and values associated with public land mineral resources can be accommodated. ~~This~~ report is particularly concerned with promoting reform that will provide for social and environmental necessities while not adversely affecting mineral availability in the United States.

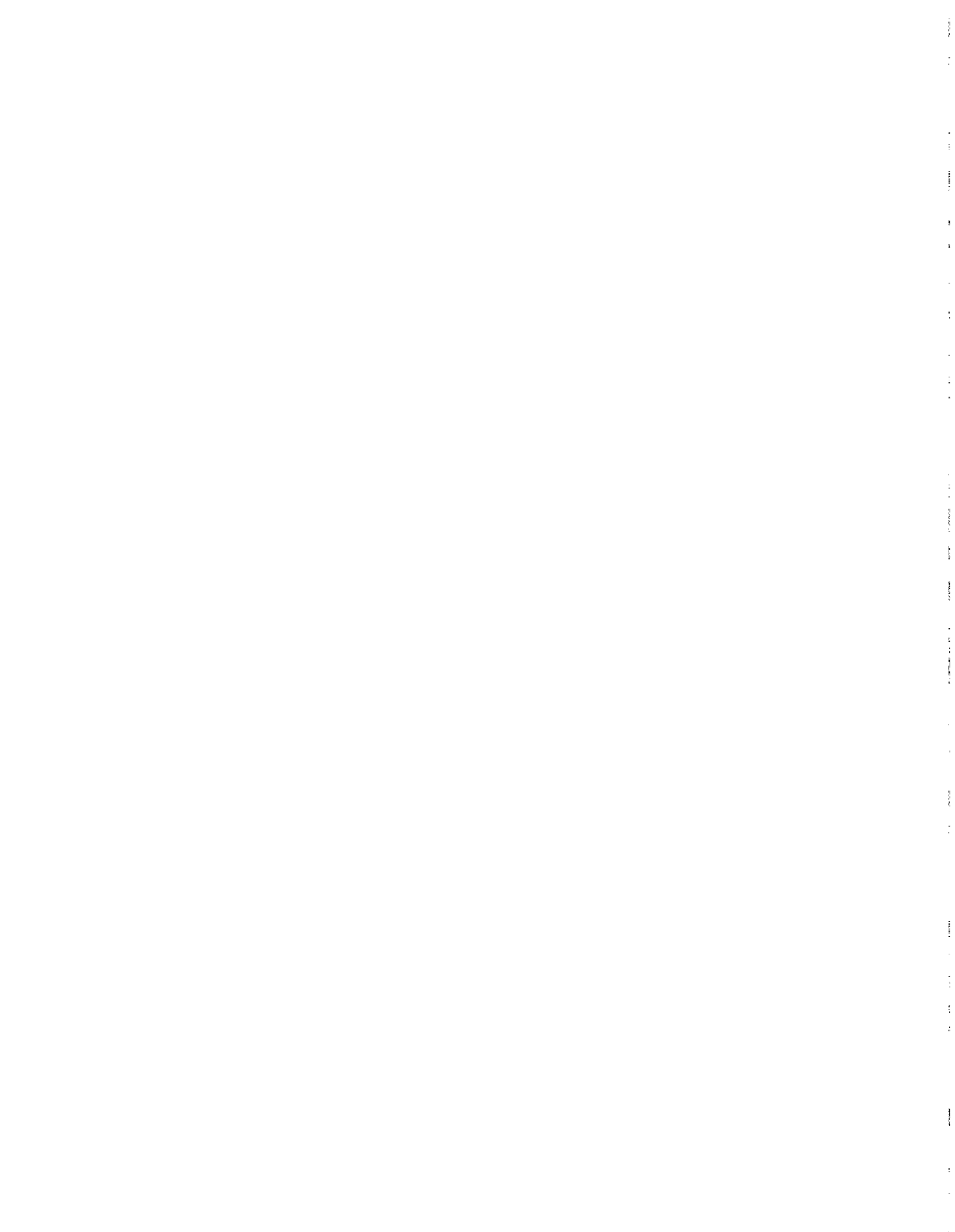


BACK

We made our review as part of our ongoing efforts directed at improving the Nation's capabilities to meet the materials requirements of our economy.

We are sending copies of this report to the Director, Office of Management and Budget, and to the Secretaries of the Interior and Agriculture.

Comptroller General
of the United States



D I G E S T

The Mining Law of 1872 should be reformed.

The law which provides the legislative guidance for developing mineral resources on Federal lands is outdated; its provisions are not appropriate for controlling today's mining activities.

It neither provides legislative guidance to assure stable development of Federal resources nor does it effectively manage public-land resources in concert with land-use and environmental values.

Under the provisions of the 1872 law, unappropriated public lands are open to mineral exploration and development. Anyone who locates valuable mineral deposits on public lands has the right to possession and profits. Furthermore, locators can gain title to the land if all the requirements of the law are met.

Withdrawals of Federal lands from mineral exploration and development have increased significantly in the past 10 years, often as attempts to compensate for outdated mining rights granted by the 1872 law. The lack of a regular procedure to evaluate minerals adequately before lands are withdrawn results in partially uninformed land-use decisions.

GAO reported in 1972 that domestic exploration was on a downward trend. This trend has continued. (See pp. 9-14.) Exploration is the initial step in the development of U.S. resources. The long lead time from exploration to development dictates that concern for mineral supplies in the next 10-15 years and beyond be focused on the adequacy of exploration today. Increasing

domestic consumption and heightened world demand for resources necessitate increased exploration and identification of domestic deposits beyond those presently in production.

Reform of the mining law appears necessary to reverse adverse trends in exploration and to assure future availability of domestic mineral supplies. Efforts to reform the law, however, are polarized between those wishing to repeal the existing law in its entirety and replace it with an all-leasing system, and those maintaining that retention of the incentive provisions of the 1872 law are critical to future supply stability.

If adopted for hardrock minerals, an all-leasing system could theoretically provide the necessary framework to insure a fair market value return for development of public minerals.

There are, however, substantial complications to applying an all-leasing system for hard-rock minerals:

--Hardrock deposits are characteristically found in irregular occurrences of unknown extent. To be viable, an all-leasing system would require an extensive inventory of mineral resources on Federal lands. There is no such inventory, and to attempt to make one would require very large appropriations, and take years to complete. (See pp. 29-31.)

--Small mining firms and individuals could be placed at a serious competitive disadvantage in bidding against large corporations. (See pp. 31-33.)

--Administrative costs would be exorbitant and would largely dispel efforts to gain a fair market value return for public land mineral resources. (See pp. 33-34.)

GAO studied reform objectives to determine how they could best be satisfied without encountering the adverse complications in a switch to a complete all-leasing system.

GAO found that:

- Objectives of resource development and environmental protection can be reasonably compatible. However, adequate protection of environmental quality must be included in the cost of doing business.
- Social and economic values that have evolved over the years no longer warrant development of domestic resources regardless of the consequences, and the law must provide guidance to reflect the changed values.
- The most feasible approach to mining law reform would be legislation containing provisions to assure compliance with today's needs relating to equity, environmental quality, and sound land-use planning, while retaining provisions to encourage exploration.

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MATTERS FOR CONSIDERATION BY THE CONGRESS

The Congress should consider mining legislation that is consistent with the multiple-use philosophy embodied in the 1976 Federal Land Policy and Management Act as well as Forest Service land management statutes. The legislation should embody a review of all existing land classifications (withdrawals) in concert with the Federal Land Policy and Management Act of 1976. It should also mandate a schedule for accomplishing this analysis.

Exploration

Maximum private exploration on public lands should be authorized and should be consistent with overall Federal land

management plans and environmental regulations as follows:

- Where disturbance to the land surface is anticipated, the explorer should be required to file a notice to the appropriate agency specifying anticipated exploration activities and plans for remedying the disturbance.
- Surface-disturbing exploration should require a permit and performance bonds to assure compliance.
- Approval of exploration should constitute a tacit agreement that mineral development could follow if a viable deposit were identified.

Development

To encourage timely and orderly mineral development:

- The Secretaries of Agriculture and the Interior should be granted discretionary authority to allow or prevent a patent for development of discovered mineral deposits on public lands.
- Permit holders should be granted a patent to a mineral deposit located on open, unappropriated public lands (without ownership of the surface) upon: (1) demonstration of a discovery of a valuable mineral deposit; and (2) submission and approval of a development plan showing how such a deposit could be mined within well-defined environmental parameters and within a reasonable time.
- Denial of a patent should grant the claimant the right to restitution for expenses involved in exploration, with all relevant exploration data becoming Government property; and the claimant should receive the priority right to develop the deposit

in the event of a future change in land-use priorities.

The revised law should establish the maximum level of accountability to balance Secretarial discretionary authority.

--In cases where a Secretary determines that mining activity should be precluded, that determination should be subject to court review, if challenged as unfounded or without merit.

--If the decision is made in favor of the challenger, that party should be awarded development rights or compensation as the court may decide.

--If, however, the Secretarial decision is sustained, and the appeal found to be frivolous, the challenger should be liable for any litigation costs.

Fair Market Value Return

The revised legislation should:

--Assure that the Government would be compensated for fair market value, at a rate comparable to payments received by private landholders.

--Require that payments be related to the value of minerals produced. It is essential that profitability be employed as a key factor in determining fair market value so that mining of the abundant low-grade ores is not discouraged.

--Provide for competitive bidding in cases where the Government is in possession of data showing that a valuable mineral deposit exists.

The Department of the Interior, should solicit views from all involved parties on ways to accomplish the fair market value return

objective and make recommendations to the appropriate congressional committees before finalization of mining law reform legislation.

Environmental and Multiple-Use Safeguards

Finally, the revised legislation should:

- Direct the development of a set of environmental regulations tailored to control of exploration activities separate from those provided for the development stage.
- Provide for Federal Government retention of title to the land surface.

GAO believes that this revised approach to mining law reform would satisfy the various objectives of mineral development, fair market value return, protection of the environment, and multiple uses of public lands, and continued opportunities for the Nation's small miners.

AGENCY COMMENTS

The Forest Service agreed that there is a need to reform the 1872 Mining Law. (See app. I.) The Forest Service took no exception to the general recommendations of our report but did caution about obtaining a fair market value return through royalties due to the potential impact on mining low-grade ores. The Department of the Interior questioned whether our proposal would limit both the Government's ability to recover a fair market value return and the Government's ability to ensure timely development of ore deposits. Interior also cautioned about using a discounted cash flow analysis to estimate a fair market value return. This report goes into detail about the importance of developing a method for estimating fair market value and timely development and recommends that Interior develop such a system, incorporating profitability as a key ingredient.

The Department of the Interior should obtain public comments before submitting to the Congress its recommendations as to how fair market value return should be calculated and then incorporated into future permits for mining development on public lands.

Interior agreed that there is a need for added control to protect the environment and to provide the incentive to explore. (See app. II.)

Interior said that the report did not take cognizance of four major guidelines provided by President Carter in his environmental message: A leasing system for publicly-owned hardrock minerals, explicit Federal discretionary authority over mineral exploration and development on the public lands, approval of mining and exploration plans prior to mining, and integration of mining and exploration plans.

GAO believes all of the guidelines proposed by the President have been adequately considered: Federal discretionary authority (see pp. 42-43 and 49); approval of mining and exploration plans, (pp. 48-49); and integration of mining into land-use plans, (p. 42). With regard to an all-leasing system, the report examines in depth in chapter 4 why GAO believes such a system is inappropriate for hardrock mining.

Other comments made by the Department of the Interior are addressed in the body of the report, beginning on page 50.



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ABBREVIATIONS

ANCSA	Alaska Native Claims Settlement Act	
BLM	Bureau of Land Management	⑧
EIS	Environmental Impact Statement	②④
EPA	Environmental Protection Agency	③④
GAO	General Accounting Office	⑧
USBM	United States Bureau of Mines	
OCS	Outer Continental Shelf	

CHAPTER 1

INTRODUCTION

During the past year, we have initiated a number of major reviews directed at improving the Nation's capability to assure adequate supplies of minerals for the economy. This review was a part of that effort. It was undertaken to evaluate Government management of federally-controlled mineral resources under the 1872 mining law, and to assess the implications for long-term mineral availability.

Natural resources are a fundamental component of the Nation's economic base. Although primary concern has recently been focused on energy supply conditions in the wake of the OPEC oil embargo, a continued, stable supply of hardrock non-fuel minerals is becoming a major national issue.

Several factors have stimulated the concern over future supply conditions:

- Increasing domestic mineral consumption and concern over dependence on potentially insecure foreign sources.
- Growing social and political restrictions that prohibit access to domestic reserves.
- Mounting difficulty in finding new mineral deposits.
- Expanding consumption in developing, mineral-producing countries.
- Increasing international competition for mineral supplies.

Since the Presidential Paley Commission Report in 1951, several studies conducted by a variety of concerned Government agencies and congressional committees have evaluated the national capability to meet future mineral requirements.

Executive and legislative branch officials are increasingly concerned over possible supply disruptions. Mining industry and Government officials are predicting greater gaps between domestic supply capability and demand unless positive steps are taken to stimulate exploration and development in the United States--more specifically,

on public lands that comprise about one-third of the total land area.

The Public Land Law Review Commission, a bipartisan study group, stated in its 1970 report to the President and the Congress that the 11 Western States, ^{1/} in which over 90 percent of the public lands lie, in 1965 produced over 90 percent of the Nation's domestic copper, 95 percent of the mercury and silver, 100 percent of the nickel, molybdenum, and potash, and about 50 percent of the lead. And, present knowledge about the geological content, combined with the geographic pattern of established mining districts, indicates that the public land areas of the West generally hold greater promise for future mineral discoveries than any other region. From the standpoint of current and projected mineral availability in the United States, the Federal lands play a vital role.

The Public Land Law Review Commission concluded that it was in the national interest to acknowledge and recognize the importance of mineral exploration and development in public-land legislation. The Commission also stated that a decision to exclude mineral activity from any public-land area should never be made casually without adequate information concerning its mineral potential. Table 1 shows the relative importance that Federal lands play in U.S. mineral production capability.

^{1/}Arizona, New Mexico, Colorado, Montana, Utah, Nevada, Idaho, Oregon, Washington, Wyoming, and California.

Table 1

Reserves, Resources of Selected Mineral Commodities and Potential Federal Land Contribution

	Reserves ¹ at Current Prices	Hypothetical Resources	Potential ² Federal Vs. Non-Federal	Imports Exceed 50% of 1976 Domestic Consumption*
Aluminum, Million ST	10	Very Large	Major	*
Antimony, Thousand, ST	120	Small	Major	
Beryllium, Thousand ST	28	Huge	Major	
Bismuth, Million lb	26	NA	Major	*
Cadmium, Million lb	220	NA	Major	*
Chromium, Million ST	NA	Insignificant	Major	*
Coal, Billion ST	437 (a)	Huge	Medium	
Cobalt, Million lb	540	NA	Major	*
Copper, Million ST	93	Large	Major	
Fluorine, Million ST	16	Small	Major	*
Gold, Million Troy oz.	100	NA	Major	*
Graphite, Million ST	NA	Very Large	Minor	
Gypsum, Million ST	350	Huge	Major	
Iron, Billion ST	4	Huge	Medium	
Lead, Million ST	59	Moderate	Major	
Manganese, Million ST	NA	NA	Major	*
Mercury, Thousand Flasks	430	NA	Major	*
Molybdenum, Billion lb	7	Huge	Major	
Natural Gas, tr. cu. ft.	228	Large	Medium (Onshore)	
Nickel, Million lb	400	Moderate	Major	*
Petroleum, Million bbl.	33	Large	Medium (Onshore)	
Phosphate Rock, Million ST	2,500	Very Large	Major	
Potash, (K ₂ Oeq.) Million ST	200	Huge	Medium	*
Soda Ash, Billion ST	30	Huge	Major	
Silver, Million Troy oz.	1,500	Moderate	Major	
Titanium, Million ST	32	Very Large	Medium	*
Tungsten, Million lb	240	Moderate	Major	*
Uranium, (U ₃ O ₈) Thousand ST	640 (b)	Large	Major	
Vanadium, Thousand ST	115	NA	Major	
Zinc, Million ST	30	Very Large	Medium	

¹ USBM Estimate 1973.

² Hypothetical Resources They Are Undiscovered But Geologically Predictable Deposits of Materials Which are Essentially Well Known as to Location, Extent and Grade and Which May Be Exploitable in the Future Under More Favorable Economic Conditions or with Improvements in Technology.

(a) Reserve Base (b) At \$30 Per lb.

Resource Appraisal Terms:

Huge: Domestic Resources are Greater Than 10 Times the Minimum Anticipated Cumulative Demand (MACD) Between 1971 and 2000.

Very Large: Domestic Resources are Two to 10 Times the MACD.

Large: Domestic Resources are Approximately 75% to Twice the MACD.

Moderate: Domestic Resources are Approximately 35% to 75% of the MACD.

Small: Domestic Resources are Approximately 10% to 35% of the MACD.

Source: Modifications of Data in Final Report of the National Commission on Material Policy, June 1973 for Department of Interior Task Force Report on Minerals Availability

PRIOR REPORTS

We have issued several reports that pertain to the issue of public-land mineral development. These reports focused on (1) the need to develop a national hardrock mineral policy; (2) environmental protection issues facing the Nation; (3) land-use planning, management, and control; (4) improvements needed in reviewing of public land withdrawals; and, (5) modernization of the 1872 mining law. This report is an extension of our past mining law analysis.

PURPOSE AND SCOPE

Increasing domestic demand for hardrock minerals and recent mineral shortages raise new questions and exert new pressures on future mineral availability. The key role of Government policy as a major determinant of mineral availability, combined with a continuing impasse over mining law reform, dictated a new look at possible revision of the law.

We examined records, documents, studies, and memoranda in both private and public sectors. We interviewed officials from both and received direct assistance from exploration, environmental, and general mining consultants.

Our review includes information obtained from visits with mining industry officials, geologists, State and Federal mining officials, and environmental-interest groups. The review is also based on data we obtained from a questionnaire on specific exploration and mining-law reform issues directed to officials of Western mining companies and mining organizations.

CHAPTER 2

PUBLIC MINERAL RESOURCE DEVELOPMENT AND

DEFICIENCIES IN THE MINING LAW OF 1872

DOMESTIC MINERAL DEVELOPMENT

Because U.S. public lands are generally highly mineralized and constitute about one-third of the total land area of the United States, they play an important role in determining domestic mineral availability. As overseer of these lands, the Federal Government plays a crucial role in assuring the stability of mineral supplies.

Development of the nonleasable and nonsalable mineral resources on Federal (public domain) lands has been carried out under the auspices of the Act of May 10, 1872, ch. 152, commonly called the Mining Law of 1872, as amended. Under the provisions of the 1872 law, public lands are described to be free and open to exploration for, and development of, mineral deposits. Locators of mineral deposits thereby have the right to exclusive possession of, and profits that result from, developing public mineral resources, and can even gain legal title to the land. The title is fee simple, and these people may legally use the land for purposes other than mining.

By providing the private sector the right to profit from mineral deposits located on public lands, the mining law effectively fulfilled two primary objectives--to encourage development of public land resources and to settle the Western States.

OUTMODED RIGHTS

The Mining Law of 1872 is silent with respect to potential, alternative uses of lands in the public domain, and does not cover what today are considered the basic social and economic costs of mining. It does not provide for a fair market value return to the public from resource exploitation and reflects the values of a time when the objectives of settlement and development took precedence.

Although it remains a basic objective of U.S. mineral policy to promote the exploration and development of domestic mineral resources, developmental rights granted by the 1872 law are no longer appropriate.

Demands for alternative uses of public lands have increased. Further, attitudes have evolved to the point where the American public will no longer accept natural resource development, regardless of adverse effects on the environment. There is also growing dissatisfaction with the lack of equity in sharing the benefits of public-land mineral development.

Reflecting these changed conditions, numerous private and Government groups have proposed revising or repealing the mining law to coincide with contemporary needs. Rights prompting the majority of concern today are as follows:

1872 MINING LAW

RIGHTS PROMPTING REFORM PROPOSALS

The law allows development of public resources with no assurance of a fair market value return to the public.

The law allows extraction of minerals on public lands without regard for the impact on the environment.

The law allows mining on valid claims to preempt other uses of the land at the discretion of the mining claimant, impairing balanced use of public-land mineral resources.

OBJECTIVES OF MINING LAW REFORM

Public benefit from public resources

The lack of a provision for a reasonable return to the Federal Government for minerals extracted--when other uses (such as timber management, agriculture, and grazing activities) result in revenues paid--has stimulated proposals that call for payment of royalties or leasing arrangements to satisfy this objective.

President Carter's 1977 message on the environment stated that "* * * we can no longer afford the waste and misuse of any natural resources * * *." He stressed the need for effective management and conservation of U.S. natural resources and called for replacement of the

"anachronistic" 1872 mining law with one more suited to contemporary needs, including a royalty payment from those users of public lands and mineral resources. Numerous bills before the Congress have called for the payment of royalties to insure a fair return to the Government for our mineral heritage. In the Federal Land Policy and Management Act of 1976, Congress declared it to be Government policy that "* * * the United States receive fair market value of the use of the public lands and their resources unless otherwise provided for by statute * * *."

Assuring public benefit from the extraction of natural resources on public lands is not incompatible with other natural resource objectives having to do with conservation, preventing waste, and encouraging maximum, ultimate recovery of hardrock mineral deposits. The challenge is in deriving a solution that provides a reasonable return to the public without simultaneously conflicting with the intelligent use of resources.

Protecting environmental quality

Under the 1872 mining law, mining is the highest and best use of public lands. This in effect, denies adequate protection of nonmineral uses. Adverse environmental effects are not at all controllable under that law. Hardrock mining activities have often resulted in substantial environmental damage, and history is replete with examples of water pollution, soil erosion, and disruptions to water flow, as well as a variety of upsets to growth of natural vegetation and intrusion into wildlife habitats. Clearly, environmental protection and land reclamation have become essential costs of doing business today, a fact that is not reflected in the 1872 law, and one that dictates the need for new legislation.

Land use

Public lands are not only the source of large amounts of hardrock minerals, but these lands are in increasing demand for other purposes such as recreation, timber management, wilderness preserves, and grazing. The range of demands for public lands dictates that their classification be based on a sound analysis of alternatives.

The act of June 12, 1960, commonly called the Multiple Use-Sustained Yield Act of 1960 calls for the multiple-use management of national forest lands, as does the Federal Land

Policy and Management Act of 1976 for the nearly one-half billion acres of land under the Bureau of Land Management (BLM). A revised mining law must be consistent with the principles of multiple use that are embodied in other legislation concerning public lands and resources.

PERSPECTIVE ON MINING LAW REFORM

Objectives and proposals

The mining law has proven deficient because it has not adequately dealt with many contemporary concerns. These deficiencies relate primarily to standards that have evolved over the years. Attempts to correct deficiencies in the mining law have taken a variety of forms, including large but relatively arbitrary withdrawal decisions. Many past attempts to compensate for deficiencies in the law have restricted mineral exploration and development. The absence of substantive reform continues to impede meeting objectives relating to mineral supply stability.

Current legislative proposals that are intended to solve problems associated with the 1872 mining law must be carefully evaluated with regard to their potential impact on various concerns, including future mineral availability.

CHAPTER 3

EXPLORATION AND MINERAL AVAILABILITY:

ADVERSE TRENDS

A look at the state of exploration in the United States serves well to demonstrate the implications of the continued stalemate in mining law reform. The effect of existing policies and regulations on exploration is a logical starting point, as well as a strong indicator of future supply stability, because:

- Exploration is the initial step in developing a viable and continuous domestic mineral supply.
- Exploration is a major determinant of natural resource recovery and output.
- The long lead time from exploration to development dictates that concern for future mineral supplies be focused on the adequacy of current exploration.
- Increasing domestic consumption and heightened world demand necessitate increased exploration and identification of domestic deposits, beyond those presently in production.

Increasing demands for minerals in our economy require additional exploration. Our July 1976 report to the Congress, entitled, "Need to Develop a National Non-Fuel Mineral Policy" (RED-76-86), found that

" * * * domestic mineral resources were not keeping pace with demand, despite the Nation's vast resources. Domestic exploration continued a downward trend in 1972, while the mineral balance-of-trade deficit was increasing and could approach \$100 billion by the year 2000."

There is general agreement that the declining trend in nonfuel mineral exploration in the United States is continuing. Reporting under the Mining and Minerals Policy Act of 1970, the Secretary of the Interior in 1977, warned that the United States is faced with a pressing economic need to stimulate exploration for mineral resources. Despite an increasing demand for minerals,

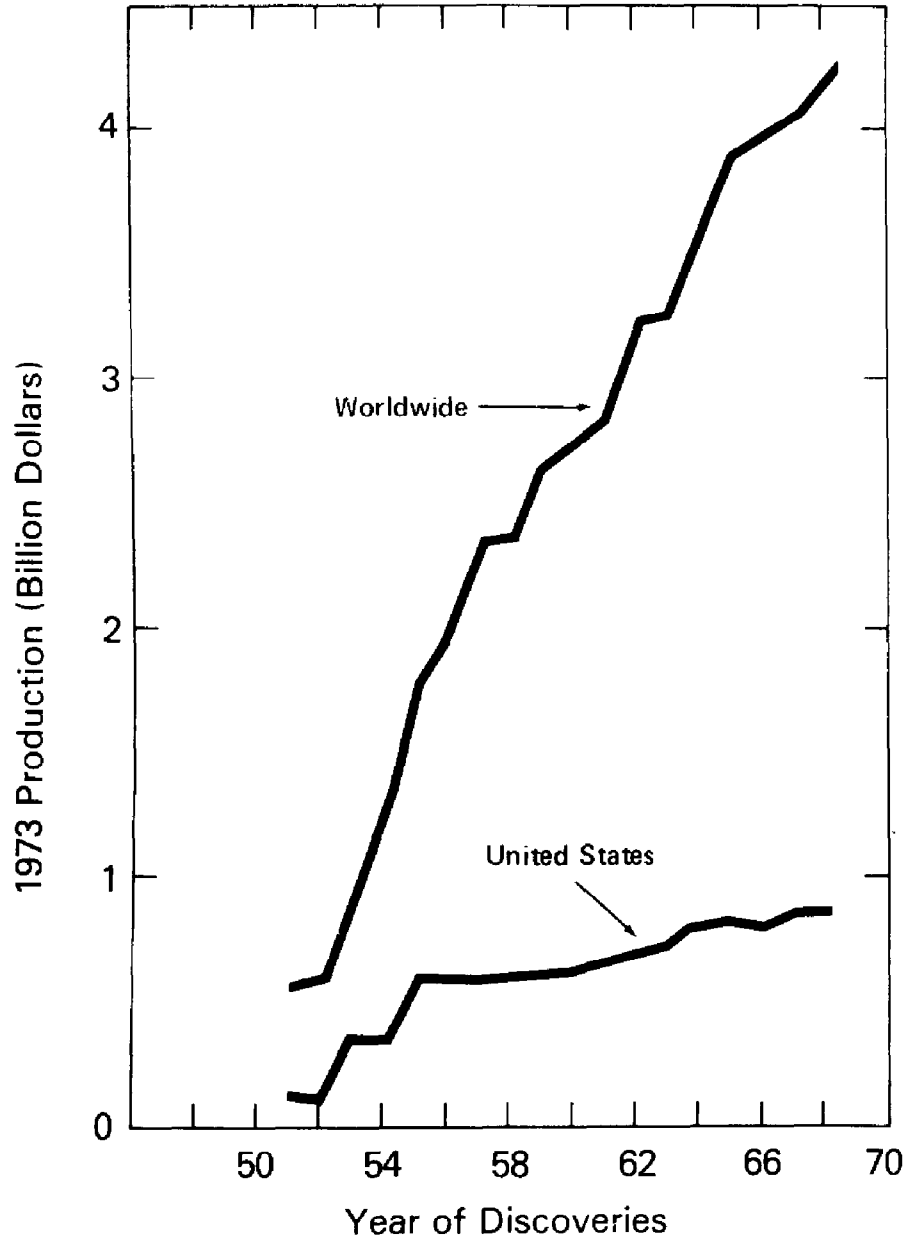
barriers to mineral exploration are being increased while the declining grade of scarce resources makes discovery difficult. Over the past 25 years, worldwide mineral discovery has increased at a relatively constant rate. However, since 1955, the relative U.S. rate of mineral discovery has fallen drastically. Figure 1 shows production in 1973 from discoveries made in previous years.

Numerous studies have been commissioned to evaluate the current status of exploration. Several findings of the most noteworthy are included here. They demonstrate the validity of exploration trends identified by the Secretary of the Interior.

The National Academy of Sciences' 1975 report, "Mineral Resources and the Environment," commented on the adequacy of domestic exploration:

"* * * knowing that exploration costs have increased very rapidly in the last 20 years, and will most probably continue to increase drastically, it appears that the current domestic exploration level is not adequate to satisfy the expected continued increase in demand. It is definitely not adequate to provide for a replacement of reserves at the producing mines."

Figure 1
Annual Rate Value of U.S. and Worldwide Mineral Discoveries, 1951 – 1968



Source: GEOSAT Workbook, September 1977

Figure 2 shows the area and expenditures for a typical porphyry copper deposit. Exploration costs generally are not published by U.S. firms but Canadian costs which are similar to U.S. costs are more readily available. The average cost of discovery in Canada has risen from \$2 million per deposit in 1955, to an estimated \$25 million in 1974.

Figure 2
Area, Time and Expenditure Requirements in Three Successful
Modern Exploration Ventures

	Stage #1 Regional Appraisal	Stage #2 Detailed Recon-	Stage #3 Detailed Surface	Stage #4 Detailed 3-D Physical Sampling
	One Region is Selected	One Target Area Selected	One Target is Selected	Target is an Ore Body
<u>Exploration For Porphyry Copper Deposit</u>				
Area Under Consideration (sq. mi.)	1,000-100,000	10-100	10-50	3-20
Cumulative Expenditures (\$)	5,000-100,000	10,000-75,000	50,000-150,000	500,000- 4,000,000
Cumulative Elapsed Time (mos.)	1-12	13-18	18-24	24-60

Source: "Mineral Exploration and Mine Developing Problems,"
Paul Bailly, Occidental Minerals Corporation.

Table 1 in chapter 1 indicates that the declining rates of exploration and deposit identification are not attributable to resource deficiency. The process of converting potential resources into economically-recoverable reserves is, however, closely tied to the rate of exploration for new deposits. Constraints on increasing U.S. reserves are not a result of limited resources.

U.S. Bureau of Mines statistics show that exploratory drilling for hardrock minerals has declined from 1966 to 1974 by 27 percent. The Bureau's 1973 yearbook on mining and quarrying trends stated, "The reported 20.8 million feet in exploration and development work in that year continued the annual trend of reduced activity that has persisted in the minerals industry since 1969." And, the most recent Bureau of Mines mineral yearbook reported that overall exploration work was down.

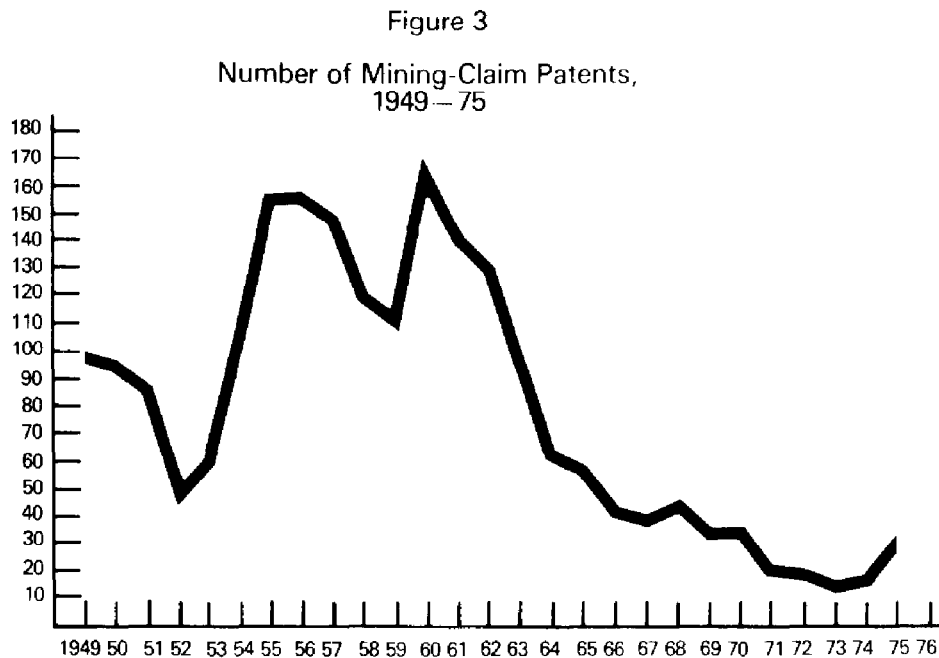
Because of the inadequacy of the current exploration level, the National Academy of Sciences, in its 1975 report, stated that there is a need for increasing exploration effectiveness, exploration efficiency, and the intensity of the exploration effort.

At an October 1976 workshop called, "Research Frontiers in Exploration for Non-Renewable Resources," sponsored by the National Science Foundation, 40 scientists involved in research and exploration for mineral deposits examined in depth the research essential to discovering additional mineral deposits. They reported that the projected growth in consumption of mineral commodities would require discoveries of new mineral deposits at a greatly accelerated rate in order to avoid shortages, exaggerated costs, and vulnerability to supply intervention. And they added that because a lead time of at least 10 years may be expected between the initiation of research activities and eventual production, the U.S. mineral supply for the late 1980s and beyond would be determined by current exploration.

The National Science Foundation has been involved in evaluating mineral supply problems of potential economic concern. Their 1976 report entitled, "Research Frontiers in Exploration for Non-Renewable Resources," reviewed recent tabulations of deposits in Arizona. The study reported a progressive decrease in the success rate of deposits discovered. The report also concluded "* * * that if present trends continue, mineral exploration will be progressively suppressed in the U.S. * * *. United States minerals * * * would eventually almost all be imported from other countries."

Finally, a 1977 report prepared for the Senate Committee on Energy and Natural Resources, commissioned to identify problems that must be solved and policy alternatives to be made available in new mining law legislation, revealed that the number of mining patents issued has dropped off to less

than 200 per year in the last 40 years, and documents a significant decline in the number of new patents issued in recent years. (See figure 3.)



Source: Senate Committee on Energy and National Resources
Committee Print, "Revision of the Mining Law of 1872."

The Senate Committee report attributes the decline to a number of factors, primarily:

- Increased difficulty in locating new deposits as surface clues become exhausted.
- Exclusion of various types of minerals from exploration under the mining law.
- Intensified enforcement of the law, including examination of all claims for which a patent is applied.

- Establishment of more definite standards for determining the validity of claims.
- Exclusion of areas from mining-law appropriations by withdrawals, reservations, classifications, leasing, and disposal of lands to States and others.

Our information supports the conclusions of the National Academy of Sciences, Department of the Interior, Bureau of Mines, and National Science Foundation. Current high-debt conditions have caused many industry exploration departments to be materially reduced. Some have been cut out altogether, and the overall trend has been one of decreasing emphasis on exploration and concentration on current production. And, because of the economic nature of the exploration process, the easiest found deposits are mined first, and those left to be discovered are more deeply buried and less obvious. Consequently, at a time when there is increasing need for new exploration, industry is decreasing its exploration budgets.

WITHDRAWALS

Restrictions resulting from efforts to compensate for mining activities permitted under the 1872 mining law have contributed to the decreasing trend in exploration, and constitute a deterrent to future discovery.

The bulk of land withdrawals that have occurred in the past 10 years have been attempts by land-managing agencies to compensate for deficiencies in the mining law relative to environmental protection. The result of the land withdrawals is not an integration of mining with other activities on the public lands, but rather the complete exclusion of mining activities.

An objective of U.S. mineral policy has been to encourage domestic production as a hedge against disruptions in foreign supplies. Because a principal ingredient of increased production is access to mineralized lands, present withdrawal practices are not consistent with U.S. mineral development policy.

In 1975, the Assistant Secretary of the Interior for Energy and Minerals, in testifying before the Subcommittee on Mines and Mining, House Interior and Insular Affairs Committee, stressed that piecemeal withdrawals when taken as a whole strongly restrict continuing mineral supplies.

We found that there is no single source of cumulative withdrawal statistics. No one Federal agency maintains records on all the withdrawals on public lands, and no cumulative records are maintained by any agency for the lands under its jurisdiction. And, since withdrawal actions can originate in a number of ways, there is no single public document from which withdrawal statistics can be derived. While BLM has the responsibility for disposing of minerals on most public lands, it does not maintain a comprehensive set of records showing what lands are available for mineral entry and what lands are not. Each land-managing Federal agency keeps its own records and, to some extent, sets its own requirements for mineral exploration and development within the lands under its jurisdiction. In some cases, these conditions vary with an individual ranger or district land manager.

According to the Department of the Interior, until the status of lands affected by the Alaska Native Claims Settlement Act (ANCSA) is decided, about two-thirds of Federal lands have moderate to prohibitive restrictions on mineral exploration and development. For areas not affected by ANCSA, about 50 percent of the Federal lands have similar restrictions.

However, both the Interior Department's Office of Audits and Investigations and our 1976 report, "Improvements Needed in Review of Public Land Withdrawals--Land Set Aside for Special Purposes" (B-184196), found that there is no current statutory authority for any agency to develop and maintain a comprehensive inventory, and that the Government does not know:

1. The number of acres formally or informally withdrawn from the mineral development laws.
2. The purposes for which these withdrawn lands are used.
3. The geographical locations of these withdrawals.
4. The number of "withdrawals" that are obsolete and should be revoked.

Investigations of public-land withdrawal problems have found that tracking down and documenting the amount of land withdrawn and the withdrawal conditions are extremely

difficult, if not impossible. The Office of Technology Assessment, in its 1976 Interim Report on Mineral Availability concluded, for example,

"* * * existing agency records make it very difficult to obtain an overall picture of the scope of the withdrawal problem. The primary source of data on Federal land management is the BLM's annual Public Land Statistics. This document, however, contains no cumulative withdrawal figures. It lists only the gross acreage of withdrawal and revocation actions during the fiscal year and does not indicate whether mining or mineral leasing has been precluded on the withdrawn lands. It also does not indicate whether the withdrawals and revocations overlap other existing withdrawals. Apparently, the information necessary to produce an aggregate analysis exists only in local agency land records, and neither the BLM nor any agency has any program or procedure for gathering, compiling, and analyzing such information, which would seem to be indispensable for the formulation of a comprehensive minerals and land management policy. At the present time, therefore, any attempt to construct an overall picture of restrictions on mineral activity requires a laborious and persistent individual effort, involving analysis of the gross acreages reported for each agency in the BLM's Public Land Statistics and individual agency documents (these sources usually conflict), identification of relevant statutes and regulations, and analysis of how they affect the gross acreages and parts thereof, searching for figures for each statute in Public Land Statistics hearings or any other source that comes to light, and tracking down rough estimates from various personnel scattered throughout each agency. The process is inexact and often involves difficult assumptions. Nevertheless, it is a necessary first step in any attempt to understand the effects of current Federal land management practices."

A principal criticism of the 1872 mining law is that the law does not balance the Nation's needs for minerals against other needs in a manner consistent with multiple-use philosophy. Withdrawals under present conditions can readily be criticized in the same manner. Table 2 shows the restrictions placed on these lands by various withdrawal activities.

Table 2

Classification of Federal Lands According to Limitations and Restrictions that Prohibit or Discourage Mineral Exploration and Development Under the Mining Law, 1974 Data

Degree of Availability	Category		Acres (millions)	Percent of Total
	Number	Description		
Formally Prohibited	A1	National Parks and Monuments	14.6	2.0
	A2	Naval Petroleum and Oil Shale Reserves	23.9	3.3
	A3	Military (other than Naval Reserves)	17.4	2.4
	A4	Indian Purpose Lands (Not Reservations)	4.2	.6
	A5	Wild and Scenic Rivers (Wild Category Only)	.5	.1
	A6	Reclamation and National Recreation Areas	5.7	.8
	A7	Atomic Energy Commission	1.4	.2
	A8	Small Tracts and Recreation and Public Purposes	.5	.1
	A9	Administration and Recreation Areas (Forest Service and Bureau of Land Management)	1.9	.3
	A10	Utility Corridor (Alaska)	2.9	.4
	A11	Oil Shale	3.7	.5
	A12	Wildlife Refuges	18.6	2.5
	A13	Alaska Native Claims Settlement Act (ANCSA) - Native Selections	120.0	16.3
	A14	ANCSA - D2 - Four Systems	80.0	10.9
	A15	Bureau of Land Management Primitive and Natural Areas	.4	.1
	A16	Proposed Withdrawals	2.6	.4
	A17	Miscellaneous	6.5	.9
	A18	Classification and Multiple Use Act	.7	.1
		Subtotal	305.5	41.9
Severely Restricted	A19	Application for Alaskan State Selections	55.5	7.6
	A20	Wilderness Areas	10.7	1.5
	A21	ANCSA - D1 Lands (Open for Metalliferous Only)	46.0	6.3
	A22	Utility Corridor (Open for Metalliferous Only)	2.5	.3
	A23	Proposed Wilderness (Primitive Areas - Forest Service)	3.8	.5
		Subtotal	118.5	16.2
Moderately Restricted	A24	National Trails	.1	-
	A25	National Parks and Monuments	5.1	.7
	A26	Power Site Withdrawals	15.2	2.1
	A27	Forest Service Roadless Areas (Wilderness Review)	55.9	7.6
		Subtotal	76.3	10.4
Slight or no Restrictions	A28	Leased Areas (Some Overlap)	73.8	10.0
	A29	Bureau of Land Management Wilderness Review Areas	24.7	3.4
	A30	Stock Driveways	2.5	.3
	A31	Tentatively Approved Alaskan State Selections	13.0	1.8
	A32	Other	119.6	16.3
		Subtotal	233.6	31.8
		Grand Total	733.9	100.0

Source: "Final Report of the Department of Interior Task Force on the Availability of Federally Owned Mineral Lands," Vol. 1, 1977.

Based on discussions and records obtained from a broad sampling of industry and Government officials, we found general agreement that the mineral policy objective of encouraging mineral exploration is one that is currently impaired by withdrawal actions. Explorers are unwilling to devote the amount of time and money necessary to look for viable deposits in the absence of assurance that they will be able to develop them. A majority of industry representatives said that decreased investment and increasing reluctance to explore on Federal lands were due to the uncertainty over possible, subsequent withdrawals.

ENVIRONMENTAL LEGISLATION

Historically, mineral extraction from mining claims has been carried out with little concern for environmental protection. However, in the past decade, environmental regulations have been implemented at the local, State, and Federal levels to overcome past abuses. Stringent controls are appropriate and long overdue. The absence of a consistent policy for maintaining and enhancing environmental quality, however, has unduly discouraged investment in the mineral industry.

In addition to the EPA, numerous Federal agencies propose and implement environmental laws. And local governments have become increasingly involved in environmental protection.

Our 1977 report, "Environmental Protection Issues Facing the Nation," (CED-77-92) documents the duplication and overlap that have resulted from increasing numbers of Federal programs. GAO reported that

"* * * industry is concerned because the enlarged Federal participation has created new and growing bureaucracies at the Federal, State, and local levels. The resulting corporate paperwork associated with environmental laws and regulations * * * imposes heavy burdens on the highly skilled manpower in private industry capable of dealing with it."

In our current investigation, we found that the lack of clear authority within the 1872 mining law to establish environmental standards has resulted in regulatory administration that is in itself a strong deterrent to

the continued economic viability of the mining industry as well as to effective environmental control. We found that the cumulative impact of regulatory requirements has discouraged exploration and investment in the mineral industry far beyond that necessary to achieve the intended environmental protection.

Industry's concern with environmental regulations covers the entire production spectrum, from exploration to milling. Companies appear frustrated by both the long delays encountered in the processing of applications and the numerous Government agencies involved. Inconsistencies in regulatory enforcement among agencies and even within agencies are adding to the confusion and overhead costs of all companies.

For example, many uranium producers found environmental obstacles the major hindrance to expanding their operations. The concern of most companies was not that environmental standards were excessive (in terms of each company's capability to conform), but that the regulations were overly time-consuming, confusing, and elusive. Most companies requested that either the Energy Research and Development Administration (now the Department of Energy) intervene in the regulatory process, or that a new federally-operated clearinghouse be established.

The 1977 report to the Commission on Federal Paperwork on Environmental Impact Statements (EIS) sheds light on other problems associated with environmental regulations. The report states that:

"There is a growing consensus that the more serious problems are related, not to EIS weight or volume, but to administrative and procedural issues. Individual agency EIS regulations vary widely as to terminology, preparation procedures, and review periods, for example. Other generic problems include overlapping Federal, State, and local Governmental requirements: lack of prior coordination between Federal EIS preparation and State and local Government decisionmaking; and duplicative paperwork requirements. The voluminous EIS containing thousands of pages has become legend, the more information contained in the EIS, the longer it has taken to prepare and read, and the longer it has delayed project implementations."

* * * * *

"The EIS process is known to cost Federal agencies, State, and local governments, and private industry several hundred million dollars per year; * * * that EIS's are too long to be of any use to Federal agencies or the public * * * hence, the EIS is not utilized in decisionmaking as the law requires; that * * * the paperwork generated by the process will continue to be merely a chore for the agencies which must write them, for project applicants who must supply a plethora of environmental information (and await project approval), and for members of the public who wish to comment on the EIS * * *. And that * * * the situation is exacerbated by the fact that once an EIS is prepared (and a decision is reached on the project), the EIS has usually remained on shelves in Federal agencies and has not been used in the preparation of a new EIS with related subject matters or geography."

The Council on Environmental Quality has recently issued regulations effective for Federal agencies in July 1979, which will streamline the EIS process and provide standardized procedures for all agencies to follow. We support this effort.

The U.S. copper industry has attracted capital in the past decade due to an unfavorable political climate in other copper-producing countries of the world. However, an improving investment climate is once again attracting capital to these countries, and it is in these countries that the major new projects are going ahead. The Commodities Research Unit, an international consulting organization, in its April 1977 report assessing the operating environment for the copper industry and specifically assessing the confusion which meeting environmental regulations causes, stated:

"* * * low [political risk] in U.S. copper investment is being eroded by a high environmental risk. On balance, we see much more expansion of copper production abroad than in the U.S., and the commensurate decline in U.S. self-sufficiency. As U.S. copper demand grows, most of it will have to be met through imports. Historically, the U.S. has been about 90 percent self-sufficient in copper. We doubt that this high level of self-sufficiency can be sustained

unless there is a reversal in the investment environment trend which has become increasingly unfavorable in recent years. It is worth noting that the U.S. was about 90 percent self-sufficient in oil up into the late 1960's. Today, 40 percent of our oil is imported. Such profound changes can occur very rapidly * * * . No major copper projects are currently underway or planned in the U.S. On the other hand, several copper projects are advancing abroad."

Adverse trends in exploration are in large part due to actions taken to compensate for basic, inadequate, legislative guidance provided by the 1872 mining law. Principal among these are: (1) withdrawal actions that have removed vast areas of mineralized Federal lands from any kind of mining activity and made other lands appear to be uncertain investments and (2) the regulatory morass that has developed as a result of attempts to provide adequate environmental safeguards.

CHAPTER 4

MINING LAW REFORM: ALTERNATIVES FOR MEETING OBJECTIVES

The 1872 mining law could not possibly have provided for the variety of present-day environmental and social concerns. And, the increasingly obvious shortcomings of the 1872 law have spurred numerous proposals from both the Administration and congressional committees to amend it.

Although there is general agreement regarding reform objectives, an impasse has developed over the approach.

Congressional and Administration proposals currently being considered to amend the law have the objectives of:

- providing a fair market value return to the public for any minerals mined,
- protecting the environment, and
- providing for informed and balanced land-use decision-making to facilitate orderly and timely mineral development.

Widespread acceptance of these objectives reflects changed conditions, new values, and increased demands for the use of public lands. New legislation will be needed to meet them.

Disagreement about how to achieve these objectives is the primary cause of the stalemate in mining law reform. Some wish to replace the 1872 mining law with an all-leasing system. Others maintain that retention of certain tenets of the 1872 law, especially the claim-patent provision, is critical to future mineral-supply stability and that the objectives can be met short of going to an all-leasing system.

Substituting an all-leasing system for the existing claim-patent system would represent a significant change in the means of access to public mineral resources. Proponents claim that, for hardrock minerals, a leasing procedure could insure a fair market value return to the public. Opponents claim that a leasing system for hardrock minerals would adversely affect mineral availability by

creating onerous bureaucratic red tape and eliminating the incentive to explore. They further maintain that an all-leasing system would not be any more successful in assuring a fair market value return than other alternatives.

PRECEDENTS FOR ALL-LEASING SYSTEMS

The 1920 Leasing Act

A number of statutes provide for mineral leases for certain minerals and to certain of the public lands. The principal leasing law is the Act of February 25, 1920, ch. 85, commonly called the Mineral Leasing Act of 1920 as amended which applies to oil, gas, oil shale, coal, phosphate, sulfur (in two states), potassium, sodium, native asphalt, solid and semisolid bitumen, and bituminous rock, when found on public lands. The Mineral Leasing Act for Acquired Lands of 1947 extended the 1920 act authority to acquired lands. Various other authorities for leasing of hardrock minerals on most acquired lands were centralized for administration by the Secretary of the Interior under Reorganization Plan No. 3 of 1946.

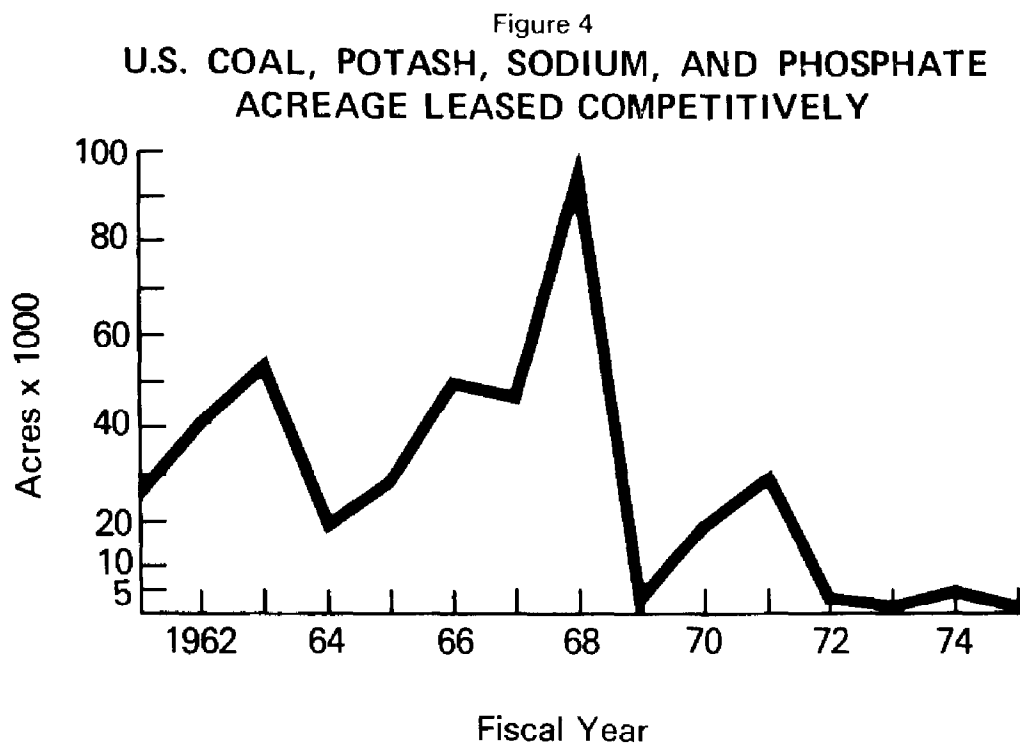
Under the leasing system, a distinction is made between areas where workable deposits of minerals are known to exist and areas where they are not known to exist. Where workable deposits are known, interested parties must bid competitively for mineral development rights. Noncompetitive leasing is used in the other cases.

Generally, prospecting permits are awarded on a first-come-first-served basis. These permits grant the owner a preference right to lease the mineral once a discovery is made. No bonus is paid for the prospecting permit, but an annual rental is charged and royalties are paid once a lease is issued and production actually occurs. On lands having public-domain status, the Secretary of the Interior has discretion on whether or not to issue prospecting permits and can also prescribe operating terms and conditions.

All minerals on acquired lands are leasable, and most outstanding leases on acquired lands are obtained as noncompetitive, preference right leases, because the discovery of hardrock minerals usually requires extensive prospecting and exploration. Hardrock minerals occur irregularly and lack grade uniformity. Due to the nature of their formation, known areas are scarce and becoming more difficult to identify.

Competitive leases generally are found on bedded mineral deposits which can be more easily discovered and evaluated.

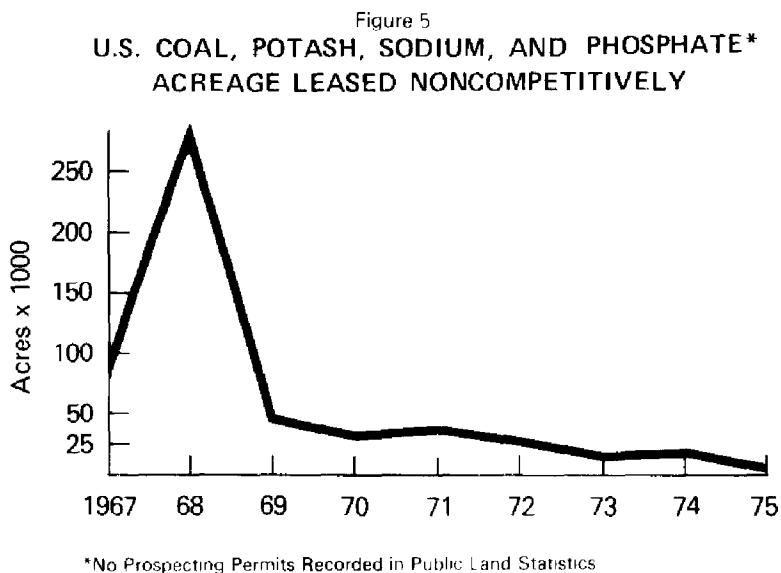
Since 1961, the acreage made available through competitive leasing for coal, potash, phosphate, and sodium has fluctuated sharply, all the while moving in a declining pattern. (See fig. 4.)



Source: Mining Engineering, May 1977.

According to the data obtained from the Department of Interior, total acreage under lease for phosphate, potash, and sodium has decreased since 1968 while coal acreage under lease has increased about 15 percent in 9 years. In 1975, about 88 percent of total domestic production of potash was from Federal leases; in 1975, these supplied about 52 percent of domestic consumption. In 1976, only 33 percent was supplied from leased Federal land. Sodium is expected to drop from 94 percent of demand in 1971 to 55 percent in 2000. Likewise, phosphorus supply is projected to drop 45 percent, and potassium 20 percent.

Not only has competitive leasing been curtailed during the last decade, but there has been a low level of noncompetitive leasing. (See fig. 5.)



Source: Mining Engineering, May 1977.

As an example of production restraints attributed to leasing irregularities, we found that there have been no prospecting permits issued in the Viburnum lead belt since May 1974, even though this area of southeast Missouri has been the source of production of 80 percent of the Nation's lead, 20 percent of the zinc, substantial silver, copper, and small quantities of cobalt and nickel in the early 1970s. The cutback has been attributed, in part, to long delays in processing applications. Applications to the Bureau of Land Management are taking 2 to 2-1/2 years or more to process. During our review, we found that existing BLM mineral-leasing backlog was estimated to be about 430 staff years, and the existing staff limited to 6 persons.

Government regulations require permission to operate mines and companies cannot afford to close down while waiting. Consequently, most exploration is currently being undertaken on private land. In addition, management of the leasing program, and the problems experienced in issuing of exploration permits, have resulted in increased reliance on foreign sources of supply.

The web of environmental regulations that has developed in the past decade reflects the need to end extensive adverse impact on the environment as a result of mining activities. However, administrative and overhead costs have mushroomed as a result of overlapping and confusing regulations. Streamlining the environmental regulation processing will facilitate appropriate environmental control and increase exploration.

Related to this problem is an inconsistency between land management agencies regarding environmental-impact statements. In the Viburnum lead belt, the U.S. Forest Service wants to require a clause (as a condition of its approval of permit applications) stating that issuance of a lease will depend on a prior environmental impact statement, the findings of which shall determine whether and under what terms the lease may be issued. Officials of the Conservation Division of the U.S. Geological Survey, the Bureau of Land Management, and the Bureau of Mines all feel that such a provision would negate the intent of the mineral-leasing act to assure the award of a lease for discovery of minerals under permit. But the Forest Service prefers to keep it. Representatives of various companies seeking prospecting permits have refused to accept the Forest Service stipulation. Companies are typically accustomed to dealing with geologic odds in locating a mineral deposit capable of being mined, and that is a risk they have to take. However, they will not authorize the expenditure of funds for exploration under a prospecting permit unless they are entitled to a lease if a discovery is made. They believe that constraints have to be known before funds are committed.

Public-land, energy-resource management

Public lands contain about one-half of remaining U.S. energy resources and a fair market value return to the public is intended to be provided through a leasing system. Meeting future energy needs in the United States depends upon proper management of U.S. public land resources and proper management by leasing depends on reliable resource information.

Our 1977 report to the Congress, "National Energy Policy: An Agenda for Analysis" (EMD-77-16), in discussing critical leasing prerequisites stated:

"In order to properly manage energy resources on public lands, the Government must establish certain policies * * * a reliable inventory of energy resources on public lands should be prepared before leasing

decisions are made; * * * economic and environmental implications must be carefully considered before leasing decisions are made; * * *."

And, in reporting on leasing other energy resources, we have concluded that:

- For Outer Continental Shelf (OCS) leasing, a Government-financed and -directed exploring program is essential because information on reserves is inadequate.
- More reliable resource information is needed before designating Federal lands as known geothermal resource areas, and leasing regulations should be changed to promote early exploration and development of leased lands.

Our 1974 report to the Congress

In 1974, in reporting to the Congress on the need to modernize the 1872 Mining Law, we suggested improving the administration of mineral development on public lands in two broad areas: (1) mineral exploration and development must be made compatible with alternate uses of the land; (2) payment should be made to the Government, in the form of a fair market value return, for any mining operations on public lands.

We proposed that these improvements could best be implemented by adopting an all-leasing system for public land use. Under the leasing system, the Federal Government would retain title to mineral and surface rights and could control land use in a manner consistent with public needs and national interests.

We continue to support the principle of achieving a fair market value return for resource development on public lands through all-leasing systems. For reasons explained below, however, it now appears prudent to modify implementation of that principle with regard to hardrock minerals.

IMPEDIMENTS TO LEASING HARDROCK MINERAL RESOURCES

Inventory/data problem

Minerals currently classified as leasable tend to occur in fields or readily mappable, bedded deposits. Hardrock

minerals, however, are different because not only are they more difficult to locate, but a detailed inventory is an arduous task. The mining literature is full of instances where several companies drilled a deposit and determined that there was no ore, only to watch another company subsequently interpret the drill-hole data differently, explore further, and discover an economic ore deposit.

Locatable, or the so-called hardrock, minerals most often occur in the form of veins or lodes which, though they may be found in the same general area or belt, are often relatively small, separate, and isolated geological occurrences. Although broad areas can be identified as favorable for deposits, it is difficult, if not impossible, to predict with any degree of precision where the deposits may occur in recoverable quantity and quality in the subsurface. Thus, to identify such tracts as suitable for competitive bidding would require extensive and highly expensive exploration work.

An alternative to having industry conduct such exploration in the United States is the increased participation by the Federal Government. However, cost is perhaps the most persuasive argument against a detailed Federal exploration program. The Strategic Minerals Development Program between 1939 and 1949 inventoried roughly 500,000 acres for about \$30 million, or in terms of 1975 dollars, over \$70 million. According to an unofficial Bureau of the Mines tabulation, it is estimated that about 700 million acres of public land would need to be inventoried under a comprehensive Federal program. Of this total, approximately 360 million acres would be eligible for mineral exploration and inventory in the lower 48 States.

Because of the variety of conditions encountered, the range of exploration costs is very great. Costs to target a mine from a 100,000 square-mile area to a 1 square-mile area may range from a few hundred thousand to several million dollars over a period of years. A case study of three modern exploration ventures prepared by the Occidental Minerals Corporation and based on Occidental programs as well as figures published by other companies show this range to be from \$200,000 to \$4 million over periods from 2 to 5 years. While definitive cost estimates for a comprehensive, Federal, hardrock-mineral exploration program are not presently possible, the preceding examples show clearly that such costs would be great, probably reaching into billions of dollars.

Lack of data can cause severe problems for resource leasing programs, however. Our recent studies have documented that data deficiencies are adversely affecting both the OCS oil- and gas-leasing programs and the Federal coal-leasing program. We think that the most cost-effective and timely manner for overcoming the data problem for hardrock minerals is to retain some form of the self-initiation concept embodied in the 1872 mining law.

Industry structure--
the small miner

Small miners can be characterized as anything from a lone prospector with pick and shovel all the way to large corporate ventures. Although there is disagreement over the importance of small miners in the actual mineral-production cycle, their exploratory value to industry is widely acknowledged. In 1977 the U.S. Bureau of Mines evaluated the small miners' role in identifying deposits in the United States and found that:

- Small miners discovered significant mineralization that led to the development of many major mines which, although currently nonproductive because of unfavorable production economics, or exhaustion, supplied a large proportion of the Nation's early needs for mineral raw materials.
- Small miners discovered the important mineral deposits that led to the development of the majority of currently operating major mines.
- Small miners have also discovered a large number of mineral deposits which could account for significant future mineral production.
- Small miners currently produce many important but little-known minerals required in limited quantities.
- Small miners often supply the tips and leads that direct the exploration personnel of major mining companies to location of mineral deposits.

The American Mining Congress' Public Lands Committee, in interviewing Colorado miners, found that virtually every uranium discovery had been made by an individual prospector, but that in the two cases where the Government put lands up

for lease, "not a single little guy could bid." Another Colorado miner noted that for every large company's exploration division, there are a hundred part-time geologists, weekend prospectors, and working small miners locating claims and making discoveries. He also noted that small miners contributed data to the ongoing inventory of areas of mineralization on the public lands.

Another recent American Mining Congress study of major mining companies, made to determine how many of their mining properties were the result of referrals from small miners, showed that 80 to 90 percent of property submittals in the 6-year period, 1970-1975, were from small miners. Our independent poll of Western mining companies and organizations confirmed the vital role that small miners play in ore deposit identification and referral to producers.

Small miner contributions relate to exploration and deposit identification, but their role in production cannot be overlooked. A Bureau of Mines survey in 1975 demonstrated that significant quantities of total local mineral production were produced by small miners. Small miners produce many of the lesser known minerals; for example, 100 percent of the crude asbestos, 55 percent of the barite, 51 percent of the feldspar, 100 percent of the garnet, 100 percent of the graphite, 24 percent of the gypsum, 49 percent of the mica, 63 percent of the perlite, 65 percent of the dimension stone, produced domestically in 1975 came from small mining operations.

The Colorado Mining Association reports that over 50 percent of Colorado's mining operations employ less than 10 persons each and that these operations add significantly to the State's economy and mineral production. They further report that small operators produce minerals from mines that large enterprises would find uneconomical to devote resources to, and that those minerals would not be developed if it were not for the small miner.

Interviews we conducted with numerous mining company officials, consultants, bankers, and Government officials, support the thesis that small mining operations are an important factor in mineral exploration and that they represent a highly cost-effective means of assisting in the conversion of resources into reserves. Their cost effectiveness and success are believed to be attributed in large part to land availability, tenure, sheer numbers exploring, versatility, and

underlying these, the financial incentives of existing claim/patent provisions.

The Department of Interior, in commenting on our draft report, agreed on the important contribution made by small miners and said,

"If we accept the scale definition of the United Nations Institute for Training and Research of 400 tons per day, more than 70 percent of all producing U.S. metal mines in 1975 were small miners and more than 71 percent of metal and nonmetal mines together were small mines."

Evaluation of all-leasing proposals indicates that such systems would put the smaller miners at a significant disadvantage in competing with large companies. An analysis, commissioned by the executive branch, of a pending leasing proposal concluded that delays and costs would undoubtedly drive many small miners and smaller mining companies out of business with subsequent unemployment, production losses, and the loss of social and economic capital. Given the small miner/exploration connection, the impact of an all-leasing system on mineral supply could be extremely adverse.

Administering hardrock leasing

Land management agency officials agreed with a 1976 Office of Technology Assessment report pointing out that the lack of information prevents land management agencies from adequately considering appropriate uses of public lands, and that mineral resource development is handicapped in its competition with other possible uses of Federal lands. The Federal Land Policy and Management Act of 1976 emphasizes that resources on public lands managed by BLM must be systematically inventoried and that future use be governed by comprehensive land-use planning.

Another potential problem area concerns the matter of administrative discretion. It represents a principal distinction between the claim/patent system and an all-leasing system. And, it is the absence of this discretionary authority under the claim/patent system that constitutes the source of conflict in land-use and environmental protection problems. On the other hand, laggard administration has impeded public land mineral development. Under current hardrock-leasing procedures (for acquired lands) there is uncertainty over

the appropriate amount of land or minerals to be leased, and inadequate staffing to handle even the limited leasing programs. Applications for hardrock leases, routinely taking 2 to 2-1/2 years or more to process, constitute a real deterrent to timely exploration and development.

Administrative procedures called for under a leasing system would conflict with the President's efforts to simplify regulatory processes and would require vast increases in appropriations to manage. A consultant, commenting at the request of the executive branch on proposed leasing legislation, said that the proposed leasing system would cause administrative costs to mushroom. He stated further that under such procedures, both miners and the Interior Department could be buried in paperwork, and the only way to administer it would be to proceed so slowly that miners would be effectively stopped from operation.

FAIR MARKET VALUE RETURN-- TAXATION FORMULAS

Providing a fair market value return for minerals extracted from U.S. public lands is a principal objective of ongoing efforts to reform the 1872 mining law. But some attempts to achieve this objective can also adversely affect mineral availability.

Although a fair market value return can be estimated in different ways, the need to insure that provisions adopted do not adversely affect mineral availability is critical. Taxation policy, often used to achieve fair market value return, can have major impacts on exploration activity and efficiency. As the following examples show, tax provisions intended to capture fair market value can unintentionally impair mineral availability.

The Canadian experience

Until the 1970s, both the Federal and Provincial Governments of Canada generally encouraged exploration and expansion of the mining industry. However, in 1972, the Canadian Government introduced new tax regulations in an effort to establish equity in taxation, and provide a fair market value return to the public, in the belief that Canadian mining no longer required incentives.

The combined effect of Federal and Provincial taxation initiatives on the mining industry in British Columbia was

significant. Exploration and development dropped drastically from the pre-1972 levels. (See figure 6.) Claim-staking declined 85 percent from an annual average of 72,481 claims during the period from 1968 to 1972, to 11,751 in 1975. All of the large tonnage, low-grade reserves became uneconomic, and no new major mines were developed until Afton Mines, Ltd., acquired a royalty reduction from the Government to encourage construction of a smelter.

On December 13, 1974, the estimated ore reserves at Granduc copper mine in British Columbia were reduced 8.5 million tons as the American Smelting and Refining Company (Asarco) no longer considered it economic under market and operating conditions.

In its 1976 report, "Mineral Development in the Eighties," the British-North American Committee stated that industry response to the Provincial royalty tax actions of the British Columbia Government in 1974 resulted in a sharp drop in exploration activity in the province--by as much as 40 percent in 1 year. Overall, exploration was shifted to the Yukon Territory and a significant part (estimated at \$2 to \$3 million) was being channeled into the Western U.S. Only coal that witnessed strong demand and a threefold price increase survived as a viable sector for new exploration and development work.

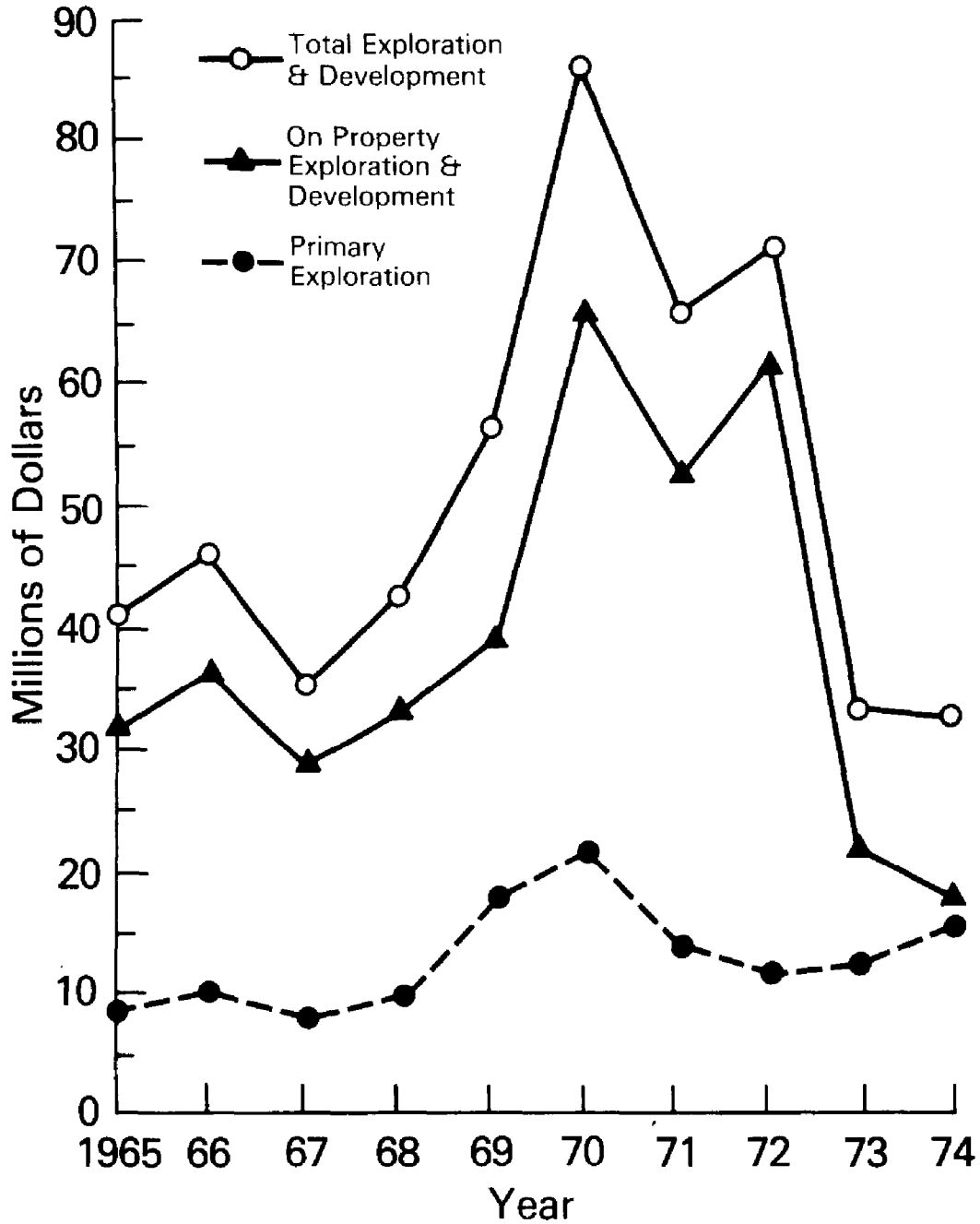
In a 1975 report, "Canadian-United States Resource Programs," the U.S. Geological Survey estimated that 3,500 out of 10,000 jobs were lost in British Columbia during the period 1973 through 1975 because of mine closures and exploration cutbacks. These jobs represented a large percentage of persons employed in British Columbia's metal-mining industries.

Survey reported:

"The serious nature of exploration cutbacks and unemployment in British Columbia's mining industry bespeaks the need for coordinated informed decisions on mineral policy. Actions concentrated on the problem of the moment--whether it is environmental degradation, soaring prices, monopoly profits, domestic shortages and embargo threats, or decline in domestic production because of overseas competition --can lead to unpredicted and disastrous results when imposed at the same time. The effect of simultaneous imposition of policy options should be considered

Figure 6

HARDROCK EXPLORATION/DEVELOPMENT EXPENDITURES BRITISH COLUMBIA MINING INDUSTRY 1965—1974



Data: Mining Association of British Columbia
Source: Northwest Mining Association

before the actions are taken. The need for multi-disciplinary analysis of mineral resource policy problems is of paramount importance."

As another Canadian example, in 1974, Saskatchewan potash producers were faced with an effective total tax rate of 75 percent of the value of production, and, as a result, a number of producers cancelled expansion plans. Hudson Bay Mining and Smelting Company cut its 1975 exploration budget in Saskatchewan and Manitoba from \$3 million to \$1.5 million. The Saskatchewan Government, in November 1975, reacted to the potash producers' cutback by introducing legislation to expropriate at least half and possibly more of the industry.

Severance tax in Arizona

An Arizona Economic Information Center Study, "The Copper Industry's Impact on the Arizona Economy," shows the effect of increased severance tax rates in Arizona that were imposed to increase revenues. 1/ The report states in part:

"Proposed increases in severance taxes imposed by the State of Arizona on the State's copper industry, under 1973 conditions, would tend to decrease employment in the industry by 700 persons and annual payrolls by \$11 million for each 1 percent in the total effective rate. Increases to as much as 6.5 percent as have been proposed by some under expected 1975 conditions could lower copper industry payrolls by more than \$99 million yearly and cut employment in the industry by about 7,600. The increase in severance taxes from 2.0 to 2.5 percent enacted last year has probably already resulted in payrolls that are \$300,000 per month lower than they would have been and caused the loss of more than 300 jobs."

* * * * *

"The short-run impact of potential tax increases on Arizona copper resources would be relatively

1/A severance tax applied on the basis of gross values would be a fixed charge against production and have little or no relationship to profitability.

slight, resulting in the loss of some 3 million tons of copper contained in about 750 million tons of ore. This would be equivalent to one of the larger copper deposits currently being mined in the State. The longer-term effects would be much greater, with higher taxes preventing the economical use of from 33 to 44 million tons of copper contained in low-grade rock. This would reduce Arizona's indicated copper resource by a third."

Mining taxation in Bolivia and Indonesia

The effect that alternate types of taxation had on hardrock exploration activity and production was demonstrated in a 1977 study comparing the nature of mining activities in two countries, Bolivia and Indonesia. 1/

The study showed that mineral exports are a critical source of foreign exchange in both countries, accounting for about 90 percent of the value of Bolivian exports and 64 percent of Indonesian exports in recent years. Bolivia imposes two taxes on what is in effect about 18 percent of the value of production, and Indonesia imposes a total of four taxes on what equals approximately 17 percent on the value of production.

Although the total tax bills are similar, mineral taxes in Bolivia are heavily output-related, and those in Indonesia are largely based on value of production and income. And, the differences in structure have had significant implications for investment in exploration and mineral development.

Output taxes in Bolivia have encouraged industry to mine high-grade ores which, due to the tax policy, are more profitable, and to leave in the ground lower-grade ores that the tax policy has rendered low profit. Consequently, Bolivia experienced a tax-induced efficiency loss and a waste of mineral reserves.

The study concluded that

1/"Taxation, Mining, and Public Ownership," by Malcolm Gilles, Harvard Institute for International Development.

" * * * on a roughly comparable level of economic activity in the state-owned firms in both nations over the period, a roughly equivalent value of taxes was collected. However, the manner in which the revenues were collected likely had markedly dissimilar consequences. This is particularly true with regard to the implications for exploration and efficiency."

The study further concluded that

" * * * tax factors have definitely played a role in dampening exploration activities in Bolivia relative to Indonesia. To the extent that the tax system had adversely affected exploration, it is due to exclusive reliance on output related taxes * * * tax factors militate against allocative efficiency in both countries, leading to both tax induced high-grading of ore bodies and wastage * * * in countries where the mining sector is expected to play an important role in the development process, a high premium should be placed on efforts to develop the type of tax administration and compliance capacity that would allow heavier emphasis on mining taxes geared to income rather than output."

ROYALTY SYSTEM TIED TO PROFITS

The method of taxation used to obtain a fair market value return from mineral production on public lands should be one that produces the least possible influence on the day-to-day operations of viable mining ventures. The method used should ideally be "neutral" with respect to both the mineral marketplace and other land-use objectives.

While no taxation system can be totally "nondistortionary," a royalty system, related to realized profits of mining operations would be most desirable. Alternative taxation policies, based on output rather than profits, would most likely result in shifts in investment patterns toward mining properties with higher operating costs (economic inefficiency), and suboptimum use of natural resources because otherwise marketable lower grade ores might be left in the ground or "wasted."

The appropriate fair market value payment would likely vary from one mineral to another, depending on forecasted

market conditions. But payments should be related to the value of minerals produced and should be comparable to those received by private landholders. Payments to private landholders are made in a variety of ways including royalties, rentals, outright land sales, or percentages of profits. The Department of Interior should be responsible for collecting the necessary data to calculate the fair market value return, including provisions to assure timely mineral development, and then applying such provisions to actual developmental permits. The Department of Interior should solicit views from all involved parties on the most feasible and equitable procedure to accomplish the fair market value return objective and recommend its views to responsible congressional committees prior to finalization of mining law reform legislation.

In situations in which the Government possesses adequate data on the location of valuable mineral deposits, fair market value return can be provided for under an all-leasing system as is the case for other Federal resources.

However, for the vast majority of hardrock minerals on public lands for which information is inadequate to implement an all-leasing system, a procedure predicated on actual mineral market value and operations' profitability would represent the most efficient means of securing fair market value return.

ENVIRONMENTAL PROTECTION

The 1872 mining law directly conflicts with multiple-use policy because under it the development of a valuable mineral deposit ordinarily represents the highest economic use of public lands. Land management agencies do not have a clear-cut authority to control the environmental impacts of mining. Withdrawals from mineral entry have been used to curtail mineral access, but they also have contradicted multiple-use policy because a withdrawn area precludes mineral entry.

The Secretary of the Interior, in transmitting his 1977 annual report, "Mining and Minerals Policy" under the Mining and Mineral Policy Act of 1970 stated:

"Our survival as an independent, free, and healthy nation demands that we establish and execute national energy and minerals

policies which will provide for both the material needs of Americans and the protection of our environment. Our efforts to formulate these policies are founded on the strong belief that the proposition facing our Nation is not one of either resource development or environmental protection. Rather it is that we can protect both our standard of living and our quality of life."

New legislation must be consistent with multiple-use concepts to fulfill this mandate. It must facilitate multiple uses of public lands, including mineral and nonmineral uses, and provide the authority to require adequate environmental protection.

The removal of vast amounts of raw materials from the earth's surface can result in substantial environmental damage and the need for regulatory control is obvious. However, exploration activities themselves can also cause substantial environmental damage and should be regulated. Consequently, a set of new environmental regulations specifically tailored for proper control of exploration effects is greatly needed for all the Federal lands. Exploration activities must be addressed separately to facilitate the accumulation of information on public mineral resources by the private sector.

Exploration should be consistent with overall Federal land management plans and environmental regulations. Where material disturbance to the surface is anticipated, the explorer should be required to file a notice with the administering agency. The notice would specify the anticipated extent and impact of exploration activities, and plans for remedying any material disturbance of the surface. The notice would be reviewed, and amended as necessary, within a set period of time by the administering agency.

Surface-disturbing exploration would have to await issuance of a properly-conditioned permit. In cases where no material disturbance is anticipated, no permit would be required. Performance bonds would be required to assure compliance with the approved plans. Exploration accomplished without permit, if found to have caused material disturbance of the surface, would make the explorer liable for punitive damages, at least sufficient for costs of surface rehabilitation.

Crucial to the elimination of problems experienced in the past is the need for the executive branch, led by the Office of Management and Budget, to reconcile inconsistent environmental standards and regulations. It is the Government's clear obligation to assure future environmental protection. But, it is equally the Government's responsibility to coordinate its protection efforts properly.

LAND-USE PLANNING

Effective land-use planning depends on information on all potential uses of public land, including development of mineral resources. Geological Survey's mineral-resources assessment program is the Government's largest attempt to directly provide scientific data on potentially mineralized areas. We have recently recommended a substantial acceleration of Survey's assessment program.

As shown in chapter 3, large portions of Forest Service and Bureau of Land Management lands have been withdrawn from mineral exploration or other development considerations. Our 1976 report, "Improvements Needed in Review of Public Land Withdrawal--Land Set Aside for Special Purposes" (B-184196), found that over half of the withdrawals examined were not needed for purposes stated in the withdrawal. Many withdrawals have been made without adequate mineral availability data. Consequently all such decisions should be reviewed.

In the course of reviewing past classifications, evaluations should be made in the true spirit of multiple-use land management, with no priority for, or against, mining. If either Government assessment or private exploration confirms a discovery of a valuable mineral deposit, the Secretary of the Interior or the Secretary of Agriculture should exercise discretion and determine whether development is permitted and under what conditions. The presence of a discovery would not--as in the past--lead automatically to developmental rights. If mineral development is to be permitted, and the decision is predicated on privately-developed mineral data, the discoverer would be given preference for development. The conditions would provide for a fair market value return to the Government. Compensation to the Government would be made at a rate comparable to that paid to private landholders, and should be derived from the value of minerals produced, using profitability as a key determining factor.

If a determination is made that mining is not to be permitted and if the discovery of valuable minerals involved reliance on privately-gathered mineral information, the private discoverer should be fully reimbursed for costs of exploration and data collection. That data would then accrue to the Government's data bank.

To insure objective and impartial public-interest decisions in such land-use classifications as well as in review of past classifications, new incentives to both private and Federal agencies are called for. Strict Secretarial accountability must be provided for to balance powerful Secretarial discretion. And, the provision for Secretarial accountability is critical. In our 1977 report, "Government Regulatory Activity: Justifications, Processes, Impacts, and Alternatives" (PAD-77-34), the importance of accountability for decisionmaking in the public interest was addressed:

"A primary feature of democratic or representative government is that government decision-makers can and should be held responsible to elected officials and ultimately to the electorate for decisions made and policies followed. It is this accountability, rather than the good will of the decisionmakers, that must serve as the basis for assurance that activities are conducted in the public interest. In the case of economic regulation, official accountability is essential to both the substance of a decision and the means by which it is reached. To assure such accountability, it is necessary that the public and its representatives have information regarding the means by which a decision is reached, the bases for that decision, the identity of that person(s) responsible for the decision, and the means by which action can be taken to modify or reverse the decision. From the perspective of accountability, the merit of a particular form of agency organization can be determined by the extent to which it meets these conditions."

In cases where mineral development is decided against, where privately-gathered data has been involved, and the decision is found to be imprudent or without merit, the private party should be awarded either development rights or compensation as the court may decide. If, however, the decision is found to be prudent and balanced, and the appeal found to be frivolous,

the claimant could be liable for litigation costs incurred by both parties.

Finally, the new law should provide that the miner has the right to use as much of the surface as is needed for mining purposes only and that land title remain with the Government. The surface-use authority would cease and revert to the Government after passage of a reasonable time to extract the minerals and reclaim the land. Reclaimed tracts would then be available for other purposes.

SUMMARY

The Mining Law of 1872 needs to be revised to provide new controls with respect to the mining of public mineral resources. Reform must be predicated, as well, however, on a firm understanding and evaluation of its implications for minerals availability.

The problems posed by the irregular structure of hardrock mineral deposits combined with the absence of adequate deposit data must be fully recognized. And, administrative costs to manage hardrock leasing, given the largely unknown nature of deposits, are likely to be exorbitant even relative to those for typically bedded deposits. While an all-leasing system could be the means for securing fair market value return at such time as adequate data has been accumulated on hardrock mineral deposits, present conditions favor encouraging up-front exploration by the private sector.

We believe that our approach to mining law reform would satisfy these legislative objectives: (1) It would combine the time-tested incentive features of the claim-patent system with provisions to assure the receipt of a fair market value return, (2) encourage orderly and timely mineral development, (3) provide for protection of the environment, and (4) it would not disturb the structure of the mineral industry, assuring continued opportunities for the Nation's small mining firms.

Finally, the new law should provide that the Government retain title to the land so that after mineral deposits are exhausted and the lands reclaimed, the affected tracts could be used for other public purposes.

CHAPTER 5

SUMMARY OF CONCLUSIONS AND MATTERS FOR CONSIDERATION

BY THE CONGRESS

SUMMARY OF CONCLUSIONS

U.S. mineral resources are a vital component of the domestic economic base. The need to assure continued adequate supplies of hardrock minerals for the Nation's growing economy has been a recognized and accepted policy objective of the Congress as well as of past and present Administrations.

The Secretary of the Interior has warned that the United States is faced with a pressing need to stimulate development of mineral resources on the public lands. The Secretary's assertion has been supported by private industry and public affirmation, and is a basic premise of independent commission studies on mineral availability. Future supply stability hinges on continued exploration for new mineral deposits. However, we found current levels of exploration to be inadequate to provide for future consumption, and as a 1976 National Science Foundation report concluded "* * * if present trends continue, mineral exploration will be progressively suppressed in the United States."

Because U.S. public lands are generally highly-mineralized and constitute about one-third of the total U.S. land area, they play an important role in domestic mineral availability. Responsibility for managing these lands, vested in the Government, conveys to Federal land managers a major responsibility for U.S. minerals supply stability.

The 1872 mining law which provides the legislative guidance for developing nonleasable, nonsalable Federal resources, is outdated and its provisions are inappropriate for controlling today's mining activities on public lands.

In granting free access to public resources, the 1872 law provides inadequate legislative guidance to assure development of natural resources in an environmentally- and socially-acceptable manner, and it does not provide for a fair market value return to the public. The law is basically inadequate for managing public-land resources in concert with contemporary concerns related to mining activity.

Trends in exploration activity have shifted downward and are inadequate to provide for future consumption. These trends can be attributed to a sharp rise in restrictions to access to mineral-bearing public lands, restrictions resulting from efforts to compensate for deficiencies in the 1872 law.

Reflecting general agreement that the 1872 law needs substantial revision, or complete reform, a variety of proposals are pending to do so. Principal congressional and Administration proposals under consideration have stated objectives of

- providing a fair return to the Government for the mineral wealth that is the property of all Americans;
- establishing clear authority for control of activities that have an adverse impact on the environment; and
- providing for informed and balanced land-use decision-making.

Attempts to reform the law however are polarized between those wishing to repeal the existing law entirely and replace it with an all-leasing system, and those maintaining that retention of the incentive provisions of the 1872 law is imperative.

If adopted for hardrock minerals, an all-leasing system could theoretically provide the necessary framework to assure a fair market value return for development of public minerals. Such a system would parallel that which has been adopted for disposition of federally-controlled energy resources (oil, gas, coal, etc.). Under such a system, it would also be possible to assure environmental safeguards as well as a balanced management of the public lands consistent with the multiple-use philosophy reflected in other basic land management laws.

There are, however, substantial complications to applying an all-leasing system for hardrock minerals. Complicating factors include:

- In contrast to the bedded mineral deposits currently under lease in the United States, hardrock deposits are characteristically found in irregular occurrences of unknown extent. To be viable, an all-leasing

system would require an extensive inventory of mineral resources on Federal lands. There is no such inventory, and to attempt to make one would require very large appropriations and would take years to complete.

--Relatively small mining firms and individuals have been responsible for the discovery of the majority of mineral deposits under production today. Retaining the "small miner" component of the industry is considered important for a variety of reasons. However, an all-leasing system could place the small miner at serious competitive disadvantage in bidding against large corporations, which in turn could cause elimination of small firms.

--Administrative costs would be exorbitant and would largely dispel efforts to gain a market value return to the public for public land mineral resources.

The problem then becomes one of how else we could revise the mining law of 1872 and still meet reform objectives. The revision further should not unnecessarily impair exploration and development of mineral resources. We studied various reform objectives and how they could best be satisfied without encountering the adverse complications which would be entailed in a switch to an all-leasing system.

We found that:

--Objectives of resource development and environmental protection can be reasonably compatible. In the process of developing domestic resources, adequate protection of environmental quality simply must be included in the cost of doing business.

--Current social and economic values that have evolved over the years no longer warrant development of domestic resources regardless of the consequences, and the law must provide the legislative guidance to reflect the changed values. These shortcomings of the mining law, however, do not appear to be rooted in the claim-patent self-initiation concept, which has provided the incentive to mine on Federal lands, still a basic objective of the U.S. mineral policy.

--Inclusion of comprehensive legislative provisions to assure compliance with today's needs relating to equity, environmental quality, and sound land-use planning, while retaining a modified claim-patent procedure, would represent the most feasible approach to mining law reform.

MATTERS FOR CONSIDERATION BY THE CONGRESS

We recommend that the ^{Senate} Congress amend the Mining Law of 1872 to meet the goals of timely mineral resource development, fair market value return for public resources, protection of environmental quality, and informed land-use decisionmaking.

To meet these goals, we recommend legislation which is consistent with the multiple-use philosophy embodied in the 1976 Federal Land Policy and Management Act as well as Forest Service land management statutes. ~~The law~~ should:

--(1) Reaffirm the concept of reviewing all existing land classifications (withdrawal) decisions in concert with the Federal Land Policy and Management Act of 1976 and (2) mandate an implementation schedule for accomplishing review/reclassification analysis.

(2)--Authorize the exercise of maximum private initiative to explore on public lands.) However, exploration activity would have to be consistent with overall Federal land management plans and environmental regulations. Where material disturbance to the surface is anticipated, the explorer should be required to file a notice with the administering agency. The notice would specify the anticipated extent and impact of exploration activities, and plans for remedying any material disturbance of the surface. The notice would be reviewed, and amended as necessary, within a set period of time by the administering agency.

Surface-disturbing exploration would have to await issuance of a properly-conditioned permit. Approval of exploration constitutes a tacit agreement that mineral development (under approved environmental guidelines, and pursuant to development permits) can follow should a viable deposit be identified. In cases where no material disturbance is anticipated, no permit would be required.

Performance bonds would be required to assure compliance with the approved plans. Exploration accomplished without permit, if found to have caused material disturbance of the surface, would make the explorer liable for compensatory damages, at least sufficient for costs of surface rehabilitation.

(3) --Grant discretionary authority to the Secretaries of Agriculture and Interior to either permit or prevent the development of mineral deposits on public lands. Permittees, upon application, would be granted a patent to a mineral deposit located on open unappropriated public lands (without ownership of the surface) after: (1) satisfactory demonstration of a discovery of a valuable mineral deposit and (2) submission and approval of a development plan that demonstrated that such a deposit could reasonably be expected to be mined within well-defined and acceptable environmental parameters and a reasonable time frame. Denial of a patent would grant the claimant the right to restitution of expenses involved in exploration, with all relevant exploration data becoming Government property. In addition, the claimant would receive the priority right to develop the deposit, in the event of a future change in land-use priorities.

(4) --Establish the means for responsible exercise of Secretarial discretionary authority. In cases where a Secretary determines that mining activity should be precluded, that determination should be subject to court review if challenged as unfounded or without merit. If the decision is made in favor of the challenger, that party should be awarded damages as the court may decide. If, however, the Secretarial decision is sustained, the challenger should be liable for any court costs.

(5) --Assure that developers of public mineral resources compensate the Government for fair market value that is at a rate comparable to payments received by private landholders. Payments should be related to the value of minerals produced. It is essential that profitability be employed as a key factor in determining fair market value so that mining of the abundant low-grade ores is not discouraged. The appropriate fair market value payment will likely vary from one mineral to another depending on forecasted market

conditions. The Department of the Interior should be made responsible for collecting data necessary for calculating fair market value returns, accompanying provisions to assure timely deposit development, and then applying the fair market return provision to actual developmental permits. The Department of the Interior should solicit views from all involved parties on the most feasible and equitable procedure to accomplish the fair market value return objective and make recommendations to appropriate congressional committees prior to finalization of mining law reform legislation.

(6) --Provide for competitive bidding in cases where the Government is in possession of data showing that a discovery of a valuable mineral deposit exists, for example, in reclassifications of previously withdrawn areas where the existence of a mineral deposit has been identified.)

(7) --Direct the development of a set of environmental regulations specifically tailored for proper control of exploration activities.) Exploration controls should facilitate the accumulation of information on public mineral resources by the private sector, and be compatible with the financial capabilities of primary explorers including small miners in the United States. *and*

(8) --Provide for Federal Government retention of title to the surface, allowing the claimant to use that portion of the surface required for mining activities, and encouraging multiple uses (range, recreation, watershed, etc.) either simultaneously or at the termination of mining and reclamation activities.)

AGENCY COMMENTS

The Forest Service agreed that there is a need to reform the 1872 mining law. (See app. I.)

The Forest Service took no exception to the general recommendations of our report but did caution about obtaining a fair market value return through royalties due to the potential impacts on mining low-grade ores. The Interior Department questioned whether our proposal would limit both the Government's ability to recover a fair market value

return and the Government's ability to ensure timely development of ore deposits. Interior also cautioned about using a discounted cash flow analysis to estimate a fair market value return. Our report goes into detail about the importance of developing a method of estimating fair market value and timely development and recommends that Interior develop such a system, incorporating profitability as a key ingredient. We recommend that the Department of the Interior obtain public comment before submitting to the Congress its recommendations as to how fair market value return should be calculated and then incorporated into future permits for mining developments on public lands.

Interior agreed that there is a need for added control to protect the environment and provide the incentive to explore. (See app. II.)

Interior said that the report did not take cognizance of four major guidelines provided by President Carter in his environmental message: A leasing system for publicly owned hardrock minerals, explicit Federal discretionary authority over mineral exploration and development on the public lands, approval of mining and exploration plans prior to mining, and integration of mining and exploration plans.

All of the guidelines proposed by the President have been properly considered: the exercise of Federal discretionary authority in deciding whether exploration and development are appropriate is critical in the face of increased demands for use of public lands, and is provided for in this report (see pp. 42-43 and 49); the approval for mining and exploration plans prior to both exploration and development is also essential and is called for (see pp. 48-49, and, we specifically addressed the need to integrate mining into land-use plans (see p. 42). With regard to an all-leasing system, the report examines in depth in chapter 4 why we consider such a system is inappropriate for hardrock minerals.

Interior said our report recommended two public land inventories--one of all existing nonmineral-use classifications and the other of mineral deposits. We did not recommend two inventories in this report. We recommended a review of past withdrawal classifications, and we refer to our published report, "Interior Programs for Assessing Mineral Resources on Federal Lands Need Improvements and Acceleration," July 27, 1978, (EMD-78-83) which calls

for speeding up Interior's current mineral resource assessment (see p. 42). This report stresses the fact that mineral deposits are irregular in occurrence and the need to involve the private sector in developing viable mineral reserves data (see p. 44).

Interior commented that the draft report did not address pre-patent right requirements, whether permits would be issued competitively or noncompetitively, whether the Secretary would have administrative discretion to require operational information, nor did it specify the pre-discovery work and permit terms. Revised language clarifies pre-patent requirements and rights. We believe that the proposed Secretarial requirements pertaining to operational information and when permits can be issued competitively are clear (see pp. 48 and 50). Matters of permit terms, renewability, pre-discovery work and such were intentionally not addressed in this report as they are technical points and should be decided upon by responsible land management administering authorities.

Finally, Interior felt that a decision against mining after a workable deposit has been discovered would be inadequately compensated for by reimbursement of exploration costs. Our proposal provides that a Secretarial decision to deny mining development after exploration has resulted in the identification of an economically viable deposit must be well-founded or the matter can be taken to the courts with damage awarded as the court may decide, if the decision is determined to be unfounded or without merit. However, it may be that further evaluation required to determine the propriety of actual development might reveal information that had not previously been known or considered with respect to environmental safeguards or land use priorities requiring the Secretary to deny the permit. We have recommended everything we felt reasonable to minimize the risk associated with exploration investment, but there is no way in which risk can be avoided entirely. Our proposals to insure the maximum degree of rationality in these decisions are described on pages 48 and 49.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
P.O. Box 2417
Washington, D.C. 20013

2800

NOV 6 1978



Mr. Henry Eschwege, Director
Community and Economic Development Division
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

The following are our comments on your proposed draft report entitled "The Impact of Mining Law Reform on Hard-Rock Mineral Availability." We regret being unable to get our comments to you by October 26 as you requested and hope that our late response will still be useful.

Clearly there is need for modernizing the hard-rock minerals disposal system for Federal lands. The report well addresses most of the deficiencies in the 1872 mining law and one of the principal effects resulting from those deficiencies (withdrawals).

One deficiency not specifically covered relates to the fact that under the guise of the 1872 mining law, claimants have been and continue to build and use residences for purposes unrelated to mining and mineral processing operations. It is very difficult, under existing law, to establish the fact that such unauthorized use is occurring and ought to be stopped. The courts have been reluctant to enforce the law (30 U.S.C. 368) which says, "Any mining claim hereafter located under the mining laws of the United States shall not be used, prior to issuance of patent therefor, for any purpose other than prospecting, mining or processing operations and uses reasonably incident thereto." Instead of dealing with the problem directly, the courts have first required the land management agency to establish, through an administrative contest procedure, that a mining claim is invalid. Only then will most courts order the termination of an unauthorized use

and permit the land management agency to remove a building in trespass. We believe that an inordinate amount of time, expense and manpower have been required to deal with these trespasses and that a legislative remedy is needed. If you agree and would be willing to discuss the problem in your report, we will be glad to provide further details and our suggestions for language to be incorporated in a bill. We believe that a legislative remedy for misuse of the 1872 mining law would be consonant with one of the principal objectives for mining law reform: specifically, that of avoiding or reducing unjustifiable impacts on the environment.

With regard to the proposal that a rent-royalty provision be included in the legislation, it might be pointed out in the report that such payments are charged against the cost of producing the minerals, just as are taxes. Since the additional costs cannot always be reflected in increased prices--at least for the marginal producer--some mineral deposits and ores of lower grade will become uneconomic to extract. This, in turn, reduces hard-rock mineral availability. As the report points out (pp. 36, 42-43), hard-rock mineral deposits tend to occur irregularly, lack grade uniformity and are difficult to find because of their small size. These facts suggest that the idea of imposing additional costs for such nonrenewable resources needs to be approached cautiously. Otherwise, incentives to discover and develop hard-rock mineral deposits may be adversely affected.

The following comments are addressed to specific parts of the draft report:

DIGEST

P. iv, last sentence - We doubt that imposing a payment for rents and royalties will reverse the adverse trends in exploration and future availability of hard-rock minerals. In fact, it could accelerate those trends, if not used with care.

P. viii, first full sentence - A schedule for review of all existing withdrawals has already been established by Section 204 of the Federal Land Policy and Management Act of 1976.

P. viii, next to last full sentence - Add "deposit" after "discovery of valuable minerals." Galena is a valuable mineral, but its mere presence does not establish a basis for granting patent--only the discovery of an economically viable mineral deposit would warrant patenting.

GAO note: Page numbers in apps. I and II refer to the draft report and may not correspond to this final report.

CHAPTER 2

P. 10, Protecting Environmental Quality, first sentence - We suggest that the word "adequate" be inserted ahead of the phrase "protection of nonmineral uses." Some protection is already accorded under Forest Service mining regulations (36 CFR 252) and through Federal and State laws concerning maintenance of air and water quality.

CHAPTER 4

Pp. 35, last partial sentence, extending to p. 36. We suggest the word "hard rock" be substituted for the word "locatable." Technically, there are not "locatable" minerals on acquired lands because the 1872 mining law does not apply to lands having "acquired" status.

P. 36, 2nd full paragraph, last sentence - The sentence would more accurately read: "On lands having public domain status, the Secretary of the Interior has complete discretion. . . ."

P. 36, last paragraph, first sentence - The sentence would be improved and would draw the proper distinction between "acquired" and "public domain" lands if it stated: "All minerals on acquired lands are leasable, subject to the concurrence and stipulations of the surface management agency, and most outstanding leases on acquired lands. . . ." (Underlining shows the phrase suggested for addition.)

P. 40, first full paragraph, 2nd sentence - We suggest the sentence be introduced with a phrase and corrected to read: "In the Viburnum Lead Belt, the U.S. Forest Service required a clause as a condition of its approval of permit applications stating. . . ." (Underlining shows suggested language to effect the changes.) It might be noted also, that some of the companies have been willing to accept the clause, albeit grudgingly.

P. 43, first partial sentence - We believe the word "deposit" was intended to be added after the words "economic ore."

P. 48, "Administering Hard-rock Leasing." - There is an obvious error in the understanding of the authors here. "Administrative leasing delays" cannot be attributed to "absence of provisions of the 1872 mining law to protect public lands. . ." Hard-rock leasing is carried out pursuant to other laws.

P. 48, last full sentence - The word "resource" should be substituted for "research."

P. 58, 3rd paragraph, 3rd sentence - We suggest that the sentence be revised to read: "Development of environmental regulations specifically tailored for proper control of exploration activities is greatly needed for all Federal lands." As the sentence reads it suggests, erroneously, that no environmental regulations exist affecting hard-rock minerals locatable under the 1872 mining law. The Forest Service has had such regulations since September 1, 1974. The Bureau of Land Management has not yet issued regulations, though it has declared its intention to do so and now has authority for them in the Federal Land Policy and Management Act of 1976.

We appreciate the opportunity to provide comments on the report and hope they will be helpful.

Sincerely,


Acting Chief, Forest Service



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

DEC 20 1978

Mr. J. Dexter Peach
Director, Energy and
Minerals Division
General Accounting Office
Washington, D.C. 20548

Dear Mr. Peach:

We appreciate the opportunity to comment on the GAO draft report, "The Impact of Mining Law Reform on Hardrock Mineral Availability."

This GAO report tackles a difficult issue: How to replace the 1872 Mining Law with a system that will increase environmental control of mineral development on public lands while at the same time providing incentives that will encourage the private sector to continue the search. The report rightly recognizes that there is need of added control of mining to protect the environment. It takes as a given the need of fair market value return to the public of profits gained. We agree with both.

However, this approach fails to take cognizance of four of the guidelines provided by President Carter in his Environmental Message. He said a new mining law also should provide for a leasing system for publicly owned hardrock minerals, explicit Federal discretionary authority over mineral exploration and development on the public lands, a requirement for approval of operation and reclamation plans before mining can begin, and integration of mining into land use plans.

The GAO proposal would retain a modified claim-patent system by giving patent only to the mineral estate and retaining surface ownership in the Federal Government.

While this concept could provide sufficient incentive for private exploration efforts, two aspects warrant further



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study: 1) Whether this would limit the Government's ability to recover a fair market value return, and 2) Removal of the Government's ability to ensure timely development of an ore deposit.

The report discusses the lack of accessibility to Federal lands, and says the bulk of land withdrawals have occurred in the past 10 years as an attempt by land managing agencies to compensate for deficiencies in the Mining Law relative to environmental protection. The estimate in the report that as much as two-thirds of Federal lands have been withdrawn from operation of the Mining Law of 1872 is high. This estimate includes Alaskan lands, and disposition of these lands has not yet been finalized. A better assessment is contained in the 1977 Mining and Minerals Policy Report which says, ". . . until the status of lands affected by the Alaska Native Claims Settlement Act (ANCSA) is decided, about two-thirds of Federal lands have moderate to prohibitive restrictions on mineral exploration and development. For the lands not affected by ANCSA, about 50 percent of the Federal lands have similar restrictions."

The GAO report recommends two public land inventories -- one of all existing non-mineral use classifications and the other of mineral deposits. This would be prohibitive from a budgetary and manpower standpoint. The report should also review the difficulties inherent in predicting the locations of discrete, undiscovered mineral bodies. Minerals concentrations do not in themselves make minable deposits and a great number of variables affect development. A section expanding upon what is involved prior to development would aid in the understanding of how the risks in mining differ substantially from those of other ventures.

The report, in several places, mentions the absence of a regular procedure to evaluate the mineral potential of Federal lands before withdrawing them from mineral entry. This is not entirely accurate. For those lands being considered for withdrawal for wilderness, the Geological Survey and the Bureau of Mines prepare mineral assessment reports for consideration by the managing agency. The determination by the managing agency for recommending withdrawal is, therefore, based to some extent on the mineral development potential of the lands.

In recommending a modified patent-location system, the GAO report does not address the issue of pre-patent right

requirements. It is unclear whether prediscovery work would be done under permit, license or some claim system; whether the Secretary would have administrative discretion to require operational information and to take appropriate action based on such information; and how much production would be allowed before patenting. The recommendations regarding exploration permits are not specific about such details as: 1) how it would be decided whether a permit for an area would be issued competitively or noncompetitively; 2) the initial term of a permit; 3) whether a permit would be renewable; 4) the specific rights a permit holder would have upon making a discovery; and 5) what he must be able to show in order to be granted a patent.

The report discusses the possibility of a no-mining decision after a workable deposit is discovered. Understandably, environmental considerations might require this. However, the solution offered to a no-mining decision, reimbursement of exploration costs, does not take into consideration prior exploration failures by the same party, nor how that decision might affect a commitment on the part of the private sector to continue the search.

In this regard, the report should recount the increasing odds against discovery and how a single find may be a culmination of years of no discovery. Although most parts of the private sector in long-range planning attempt to balance new development with projected needs and conditions, there is no assurance that discoveries of workable deposits can be made according to any timetable. Reimbursement of exploration dollars does not satisfy the total investment. Unique to each discovery are the less tangible but very real investments of expert talent, innovative concepts and judgments, the elements of risk and luck, and time that is lost.

Exception needs to be taken to the report's proposal of using the discounted cash-flow method for determining the public's return of the fair market value of mineral deposits. Although industry may run preliminary DCF analyses using early estimates of cost to reduce the uncertainties of continued risk, the analysis on which management makes its final decision must await the input from a number of detailed evaluations and tests. These usually take years and cost millions of dollars to complete.

At that time, it seems too late for the Government to step in and determine its rate of return. An operator

can always argue that his rate of return must be commensurate with the degree of risk being taken on the particular deposit. Moreover, numerous problems invariably arise during project life that affect both the cost of production and the value of return. The use of a DCF method of determining royalties would need to be updated almost continuously to be fair.

If it meant that the DCF method is to apply prior to the above condition, the uncertainties are many as exemplified by the recent dramatic rise in the price of uranium over a three-year period and the drop in the price of copper that has disrupted U.S. copper mining.

The report, we believe, might expand upon the advantages of a straight percentage royalty and rent system. With all of the uncertainties involved in mining, we believe that it is important for the Government to minimize those that it can. The report should also identify how all added costs have an impact in determining what is ore, the type recovery systems used, grade cutoffs, and ultimate recovery.

Since only a small portion of all exploration efforts will ever result in the discovery of a deposit worth developing, successful efforts have to be rewarded with more than what would normally be considered a fair return if exploration is to be encouraged.

The term "small miner" is used often in discussion of the 1872 Mining Act or hardrock mining in general, but there seems to be no general agreement on a definition of a "small miner." If we accept the scale definition of United Nations Institute for Training and Research of 400 tons per day, more than 70 percent of all producing U.S. metal mines in 1975 were small mines and more than 71 percent of all metal and nonmetal mines together were small mines.

GAO seems to assume that there is only one alternative to the 1872 Mining Act (except its own proposal) -- an all-competitive leasing system. No new system proposed during the last Congress was totally competitive.

The fundamental issue between reform and no-reform advocates is how much discretion the Federal Government should have in regulating hardrock mining on the public lands.

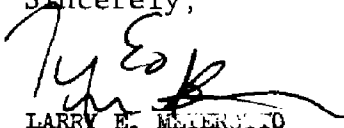
Page by page comments:

- (1) Page vi. Change the third sentence of first indentation to read: "There is no such inventory, and to attempt to make one would require very large appropriations, mostly for detailed drilling that would take years to complete."
- (2) Page vii. Change the second indentation to read: ". . . current social and economic values that have evolved during the last few decades have reversed the previously held idea that development of domestic resources should proceed regardless of the consequences. A new mining law must provide the legislative guidance to reflect these changes in values."
- (3) Page 1, line 15 (in first indented line) should read: "Increasing domestic consumption and concern over growing reliance on foreign sources for basic mineral commodities."
- (4) Page 2, line 1. What is the Paley Commission? What did it study? What were its basic findings?
- (5) Page 2, third paragraph. Over what period of time do the production data apply? What are the 11 States? Is Missouri among the 11 Western States included? Later, the report mentions that 90 percent of domestic lead comes from Federal lands in the lead belt of Missouri. This conflict should be resolved.
- (6) Page 18. Second paragraph. Drilling for uranium exploration alone in 1977 totaled 49.2 million feet, an all-time high.
- (7) Page 21, lines 5-7. Change to read: "Exclusion of areas from mining law appropriations by withdrawals, reservations, classifications, leasing, and disposal of lands to States and others."
- (8) Page 24, lines 3-6. Sentence is garbled and needs rewriting as the meaning is unclear.
- (9) Page 31, lines 5-6. Change: "Energy Research and Development Administration" to "Department of Energy."

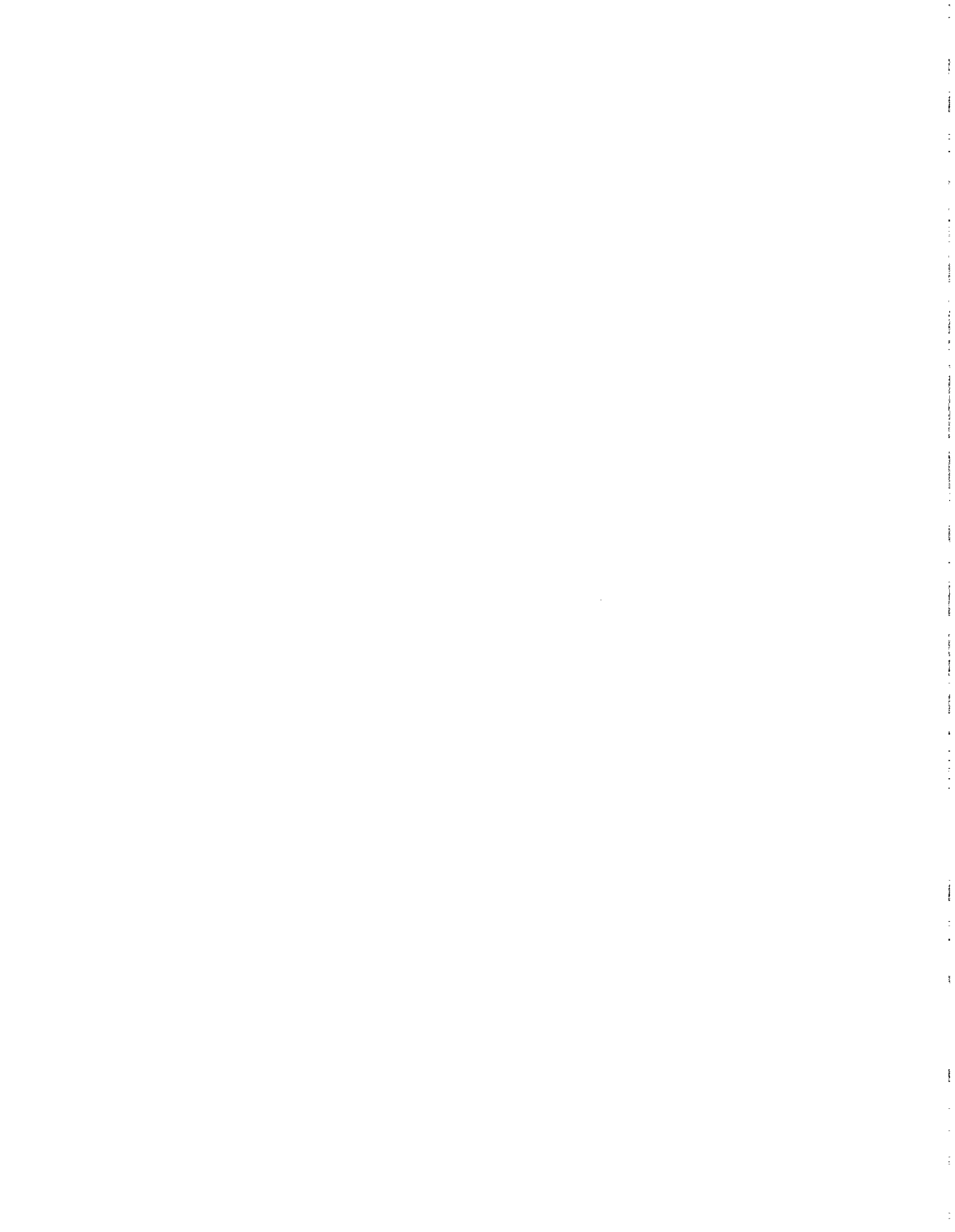
- (10) Page 35. Section on bottom of page dealing with 1920 Leasing Act should include coal as it is included among the leasable minerals on Figures 4 and 5.
- (11) Page 37. Figure 4, combining coal, potash, sodium and phosphate leases, is unrealistic. There are different factors involved in each case. Coal leases predominate in acreage and in the sixties there was a flurry of coal leasing. After 1971, there has been a moratorium on coal leasing. The same comment holds for Figure 5 on page 38.
- (12) Page 38. How have the projections of diminishing percentages of potash, sodium and phosphate given in paragraph 1 been derived? By whom? They appear to be arbitrary and unsubstantiated.
- (13) Page 40. First full paragraph that compares environmental impact statement policies of Forest Service, BLM, and USGS appears to incorrectly state the objectives of the Conservation Division, U. S. Geological Survey. We suggest further consultation with the Conservation Division regarding this issue.

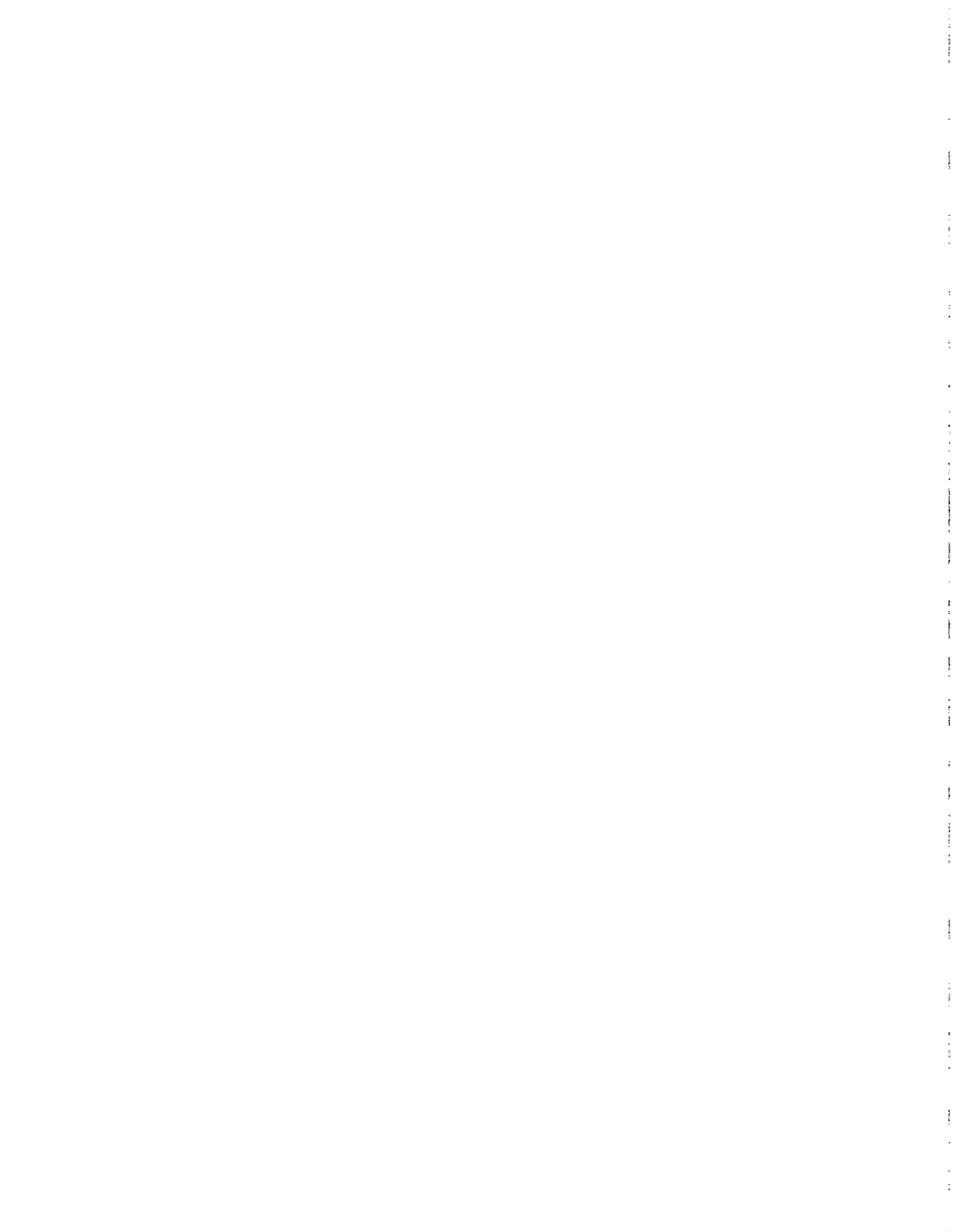
If we can be of any further assistance, please advise.

Sincerely,


LARRY E. METERSHIO
Deputy Assistant Secretary--
Policy, Budget and
Administration

(00817)





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