

THE GROWING CRISIS IN THE STRATEGIC AND CRITICAL MINERALS OF THE UNITED STATES

*James Santini**

INTRODUCTION

The power, prosperity and progress of the United States has been made possible largely through the use of its rich endowment of mineral resources. The vigorous development and prodigious use of nonfuel minerals such as lead, zinc, iron ores, and copper¹ were essential in the development of the United States as an industrial leader. Although the country continues to possess a vast wealth of many such resources,² domestic development of these minerals has been severely curtailed in recent years. This decline in domestic development of nonfuel mineral resources threatens both the economic welfare and national security of this country.³ Various national commissions,⁴ academic foundations,⁵ and private research groups⁶ have warned us for twenty-five years to be aware of over-dependence on foreign mineral suppliers, of government policies and regulations that defeat domestic development and frustrate industry competitiveness, and of the consequences of insufficient research and development.

*Member, U.S. House of Representatives (D-Nevada); Chairman, House Subcommittee of Mines and Mining of the House Committee on Interior and Insular Affairs; Member, House Interstate and Foreign Commerce Committee. B.S. University of Nevada, 1959; J.D. Hastings College of Law, 1962.

I would like to thank Judith A. McMorrow, Raymond Carey and Charles D. Oliver, students of Notre Dame Law School, for their assistance in the preparation of this article.

1. Comptroller General, *Report to Congress*, "The U.S. Mining and Mineral Processing Industry: An Analysis of Trends and Implications," 96th Cong., 1st Sess. 1-16 (1979) [hereinafter cited as - *Comptroller General's Oct. 1979 Report*].
2. "Essentially, mineral richness is a function of land area. As would be expected of a geographically large country, the United States ranks first in reserves of copper, cadmium, lead, molybdenum and silver, and ranks high in many others." *Id.* at 1.
3. "With respect to the [n]ation's long-range position, we believe that the United States has cause for deep concern. It is our considered opinion that unless an urgent effort to upgrade minerals and mining technology is launched soon, we face the possibility that the growth in our standard of living will be limited due to mineral resource constraints within 20 to 30 years," *House Committee on Interior and Insular Affairs, Establishing a National Minerals Policy*, S. Rep. No. 390, 91st Cong., 1st Sess. 9 (1969) (statement by Walter J. Hickel, Sec. of the Interior). See also, *Comptroller General's Oct. 1979 Report*, *supra* note 1, at 57-67. See generally, "Strategic Metals, Critical Choices," *Time*, Jan. 21, 1980, at 64; "Our Growing Dependence On Others for Key Resources," *U.S. News*, Nov. 12, 1979, at 74; "Fidgets Over A Metals Policy," *Bus. Wk.*, May 7, 1979, at 130; "Fear Soviet Supercartel for Critical Minerals," *Purchasing*, Nov. 8, 1978, at 42; "Now the Squeeze on Metals," *Bus. Wk.*, Jul. 2, 1979, at 46; "The Defense Production Gap: Why the U.S. Can't Rearm Fast," *Bus. Wk.*, Feb. 4, 1980, at 80; "The World Wide Business Report Governing Non-Fuel Minerals," *Minerals Wk.*, Dec. 14, 1979, at 17; "Soviet Squeeze On Strategic Minerals," *Datamation*, Oct. 1978, at 147; "The Geopolitics of Nonenergy Minerals," *Air Force*, June 1979, at 76.
4. National Commission on Material Policy, *Material Needs and the Environment, Today and Tomorrow* (June, 1973); National Commission on Supplies and Shortages. *Government and the Nation's Resources*. (December, 1976).
5. See COMRATE, "Mineral Resources and the Environment," National Academy of Sciences, 1075, for an analysis of the complex interdependence between energy, mineral production, environmental concerns, and the need to reconcile the interests of government, industry and the consumer.
6. See, e.g., "Technology, Material Substitution, Recycling and Conservation," *Hearings before the Subcomm. on Mines and Mining of the House Comm. on Interior and Insular Affairs*, 96th Cong., 1st Sess. (1979) (statement of David Swan, American Mining Congress); [hereinafter cited as *Mines and Mining Hearings*].

In the face of this threat, Washington has remained virtually unconcerned. Although the government gives the strongest possible support to numerous national priorities such as public health, human rights, the environment and, all too late, energy, it gives no priority to fostering domestic hardrock or nonfuel mineral development.⁷ The United States purports to have a mineral policy, but neither a workable scheme of implementation nor a serious commitment to make the policy work has been made by our country.

The purpose of this article is to increase the nation's awareness of the mineral problems and urge Congress to make a serious commitment towards development of the nation's mineral resources.

LEGISLATIVE AND EXECUTIVE ACTION

In 1970, the United States Congress established a broad national minerals policy⁸ designed to assure the nation the benefits derived from an economically sound and stable domestic mining and minerals industry. The Mining and Mineral Policy Act of 1970 implicitly found that the long-range outlook for an adequate supply of minerals for the United States is a cause for concern,⁹ and further recognized that the future well-being and national security of the country is directly tied to the supply and availability of minerals.¹⁰ The Act established a continuing national policy to foster and encourage private enterprise in the development of an economically sound and stable domestic

7. "Government policies now serve more as a controlling factor in determining size, location, and timing of future mineral investments. As a result, investment in the minerals industries . . . is only about one-fifth of what it should be to meet future demand." *Mines and Mining Hearings, supra* note 6 (1979) (statement of Robert A. Kilmarx).

8. 30 U.S.C. §21(a) (1976). The Act reads:

The Congress declares that it is the continuing policy of the Federal Government in the national interest to foster and encourage private enterprise in (1) the development of economically sound and stable domestic mining, minerals, metal and mineral reclamation industries, (2) the orderly and economic development of domestic mineral resources, reserves, and reclamation of metals and minerals to help assure satisfaction of industrial, security and environmental needs, (3) mining, mineral and metallurgical research, including the use and recycling of scrap to promote the wise and efficient use of our natural and reclaimable mineral resources, and (4) the study and development of methods for the disposal, control, and reclamation of mineral waste products, and the reclamation of mined land, so as to lessen any adverse impact of mineral extraction and processing upon the physical environment that may result from mining or mineral activities.

For the purpose of this section "minerals" shall include all minerals and mineral fuels including oil, gas, coal, oil shale and uranium.

It shall be the responsibility of the Secretary of the Interior to carry out this policy when exercising his authority under such programs as may be authorized by law other than this section. For this purpose the Secretary of the Interior shall include in his annual report to the Congress a report on the state of the domestic mining, minerals, and mineral reclamation industries, including a statement of the trend in utilization and depletion of these resources, together with such recommendations for legislative programs as may be necessary to implement the policy of this section.

9. See [1970] U.S. Code Cong. & Admin. News, 91st Cong., 2d Sess. 5792.

10. *Id.* at 5793. See also, Letter from Walter J. Hickel to Cong. Jackson (July 9, 1969), reprinted in Sen. Reo. 390, 91st Cong., 2d Sess. 9.

mining industry and to encourage the orderly and economical development of domestic mineral resources. It further delegated to the Secretary of the Interior the responsibility to carry out this policy.¹¹ The Mining and Mineral Policy Act was to be the first step in the attainment of reasonable self-sufficiency through use of our domestic resources.¹² The United States, however, has failed over the last ten years to implement the policy statement contained in the Mining and Mineral Policy Act. In an effort to stimulate a comprehensive government-sponsored review of the factors hampering domestic nonfuel mineral development and in order to encourage compliance with the 1970 Act, twenty-five members of Congress met with President Carter in mid-1977. The group informed the President of the long term consequences of the difficulties encountered by the domestic minerals industries. In response to the data, which indicated a sharp increase in the United States' dependence on foreign nonfuel mineral supplies and a corresponding vulnerability on the part of the United States, the President ordered a comprehensive cabinet-level nonfuel mineral policy review (NMPR).¹³ The NMPR was intended to present an analysis of the main problem areas confronting the domestic minerals industry and to propose adequate solutions. The review was to be led by fourteen government departments and agencies of the twenty whose authorities and responsibilities directly or indirectly affect the health of the mineral industry and its ability to produce.

The NMPR was to have been completed within fifteen months of its creation, but the problem analysis was only completed in August, 1979. This draft report consisted solely of the Department of the Interior's delineation of issues involved in only a few of the identified problem areas.¹⁴ Unfortunately, even the NMPR draft release was found to be grossly inadequate by representatives from such diverse sources as the environmental community, the mining industry, public interest groups, and members of Congress. The report failed to delineate factors which have created a financially weakened minerals industry. Moreover, the report failed to comprehend the national security problems posed by United States' increasing dependence on imports of minerals.

11. *Supra* note 8.

12. *Supra* note 10, at 5794.

13. On December 12, 1977, President Carter created the Non-Fuel Mineral Policy Coordinating Committee to be chaired by Secretary of the Interior Cecil P. Andrus.

14. See U.S. Department of the Interior, *Draft Report: "Report on Issues Identified in the Nonfuel Mineral Policy Review,"* August 1979 [hereinafter cited as *Draft Report*]. Nine problem areas were selected with individual agencies having been assigned responsibility for investigating them and submitting their analyses for the report:

- (1) Major minerals supply problems (Minerals Review Committee);
- (2) Availability of foreign minerals to the U.S. and its allies (Department of State);
- (3) relationship of environmental quality, health and safety and the price and availability of minerals (Environmental Protection Agency);
- (4) the minerals resource potential of federal lands (Department of Interior);
- (5) financing, capital formation, and tax policies (Department of Treasury);
- (6) recycling, conservation, and substitution (Department of Commerce);
- (7) competitiveness of U.S. minerals industries (Department of Interior);
- (8) adequacy of minerals-related research and development (National Science Foundation); and
- (9) Adequacy of existing government capabilities to support Federal policymaking (Department of Interior).

The NMPR release illustrates clearly that there is not yet an awareness much less a consensus among the various government agencies and departments as to what are the problems and issues affecting the domestic minerals industry. Government officials specifically have failed to understand and examine the interrelationships among the multiple problems confronting the domestic minerals industry. This governmental myopia and the absence of coordinated department and agency efforts to obtain insight into the problems of mining or to accept responsibility precludes innovation and even hinders government support of domestic mineral resource development.

An example of the absence of coordinated executive policy is the refusal of both the Defense and State Departments to recognize the effect on national security of declining domestic mineral production and increasing dependence on foreign imports.¹⁵ The Defense Department does not concern itself with long term mineral adequacy required for the industrial machinery to support national security; the State Department does not concern itself with long term security of foreign mineral sources as an element of foreign policy. These departments consistently defer their responsibility to the Department of the Interior. Meanwhile, the Department of the Interior is not aware of the long-range defense needs and does not consider the immediate or potential impact upon domestic mineral demand when it takes actions such as the designation of uses of public lands. The result of the absence of long-range planning has been a tendency to rely upon the already inadequate national strategic and critical minerals stockpile,¹⁶ which was created by Congress to supply this country with necessary resources in the event of war.¹⁷

Although the United States has had a domestic minerals policy since 1970, it has not had a serious commitment to make this policy work. I will proceed to examine four specific problems: (1) the financial weakness of the minerals industry, (2) government regulations, (3) government land withdrawals and (4) mineral dependency and national security. These problems point out the need for a serious national action to strengthen our domestic mineral resource development.

15. See generally, *Mines and Mining Hearings*, *supra* note 6.

16. Created by the Strategic and Critical Materials Stock-Piling Act of 1939, 50 U.S.C. §§ 98-98h (1976).

17. The stockpile contains 79 mineral commodities, 34 of which at the present time do not meet quotas deemed necessary to sustain the country in the event of a war of three years duration. Furthermore, 10 of the mineral commodities are in a form which leaves them unavailable for immediate use. See General Services Administration, Federal Preparedness Agency, *Stockpile Report to Congress: October, 1978 to March, 1979*, (July, 1979). Moreover, because the mineral commodities are not routinely tested for quality, there are mineral commodities of questionable quality being held to satisfy stockpile goals. See, U.S. Comptroller General, *Report to Congress: The Strategic and Critical Materials Stockpile will be Deficient for Many Years*, 95th Cong., 2nd Sess. (1978).

ARGUMENTS FOR INITIATING AN EFFECTIVE NATIONAL MINERALS POLICY

Financial Weakness of United States Minerals Industry

Mining industries are abnormally sensitive to cyclical economic trends with the result that mining corporations in the United States fight a constant battle to remain economically secure in today's economy. Several factors contribute to the financial insecurity of mining corporations. First, mining and mineral processing is among the most capital intensive of all industries.¹⁸ The capital investment for a mining operation is staggering. For example, a 100,000 ton-per-year copper project today costs about 650 million dollars¹⁹ and a 500,000 ton-per-year aluminum project, from mine to refinery, costs about two billion dollars.²⁰

Inflation has contributed to the increasing capital costs of the mining industry. The Commerce Department's 1970-1979 price index for capital goods used in mining rose a staggering 179 percent compared to 118 percent for all manufacturing, and only eighty percent for the gross national product price deflator.²¹ During the period of 1970-1976, when inflation rose at an average rate of 6.5 percent, capital costs for new aluminum smelters rose twenty percent per year, and mine-to-refinery copper investments rose nineteen percent per year.²² As a result of inflation-prone capitalization costs, there has been a steady increase in the long term debt of mining companies. For example, in the ten year period ending in 1977, the long-term debt of ten major United States mining companies rose from eleven percent of total capitalization to thirty-two percent.²³

Minerals development is a high-risk expensive venture from exploration through marketing. Long lead times for development coupled with long range cash-flow projections into a volatile international market require deliberate decisions. The ultimate effect of these hostile economic conditions on this highly capitalized, inflation-prone industry is reduced profits. A 1978 survey of sixty-four industry groups found that the rate of return on net worth for nonferrous metal manufacturing ranked fifty-fifth in profitability; nonmetal ranked sixty-first; metal mining, the least profitable of all industry groups surveyed, ranked sixty-fourth.²⁴ During 1977, the combined mining sector reported an average return on invested capital of only 3.9 percent after taxes.²⁵

18. See Falkie, *Reflections on Government Policy*, 12 J. Int'l Law & Econ. 163, 164 (1978); See also: *Mines and Mining Hearings*, *supra* note 6 (Nov. 12, 1979) (statement of Edward S. Miller). Factors which contribute to high capitalization costs include remoteness of cities, facilities and equipment, labor, and lower quality ore requiring increased processing.

19. *Draft Report*, *supra* note 14, at 19.

20. *Id.*

21. Martin V. Alonzo, "The Economics and Finances of U.S. Mining: "Crisis and Remedy" AIME Minerals Economic Symposium at George Washington University, Washington, D.C. (Nov. 14, 1979).

22. See generally, "Mineral Development in the Eighties: Prospects and Problems," British-North American Committee, British-North American Assoc., (Nov. 1976).

23. Moody's Bond Survey, *Bond Ratings and the Outlook for the Mining Industry*, 1278-80 (April 24, 1978).

24. See generally, *Citibank*, Monthly Economic Newsletter, April, 1979.

25. *Comptroller General's Oct. 1979 Report*, *supra* note 1, at 31.

Mining operations are characterized by long payback periods and uncertainty as to costs;²⁶ mineral prices tend to fluctuate cyclically so that industries are uncertain whether any particular operation will prove profitable.²⁷ Yet, despite all of these indications that mining operations are a financially weak segment of American industry, the United States government has simply compounded the problem. A recent report to the Congress by the Comptroller General stated the difficulty:

In recent years, [however,] several U.S. Government actions have reduced the profitability of domestic mineral projects, making investment in such projects less attractive than they otherwise would have been. These actions and the efforts of foreign governments to encourage development of their minerals production have contributed to the failure of investment in domestic mineral production to keep pace with growth in U.S. demand. Consequently, U.S. manufacturers are having to rely more and more on foreign processed minerals to meet their needs.²⁸

Thus, the mineral industry has been weakened by inflation and the costs inherent in mining. Ironically government has not been sensitive either to the fundamental need of this industry or the economic problems it is facing; one particular problem has been government regulation.

Regulations

The American public is becoming increasingly sensitive to the complex problems accompanying government regulation. The problems of the regulatory system, which have been the target of recent congressional reform action,²⁹ can be exemplified by examining the effect of government regulation on the mining industry.

Two characteristics of government regulation stand out as the cause of regulatory problems. First, the regulators often do not understand the regulated industries; the mining industry is no exception to this problem.³⁰ Second, and unperceived problems arise through the implementation of new untested regulations which are narrowly designed to cure the apparent problem; these regulations unfortunately have unanticipated side effects. This second flaw in

26. *Draft Report, supra* note 14, at 19.

27. *See, Falkie supra* note 18, at 164.

28. *Comptroller General's Oct. 1979 Report, supra* note 1, at 73.

29. A cursory examination of some of the legislation introduced in the House on January 15, 1979 (96th Cong. 1st Sess.) reveals the following sampling of reform bills: H.R. 65 (To improve congressional oversight of federal programs and activities by requiring greater specificity in setting program objectives, budget and tax expenditures); H.R. 187 (To amend the Occupational Safety and Health Act (OSHA)); H.R. 372 (To amend OSHA); H.R. 400 (To reduce paperwork required by federal agencies and increase congressional supervision); H.R. 403 (To establish procedures to review administrative procedures contrary to law or congressional intent); H.R. 426 (To amend OSHA); H.R. 425 (To repeal OSHA); H.R. 430 (To require an economic impact report whenever new environmental regulations are promulgated or considered).

30. For an overview of the adverse affect of government regulations upon operating costs and revenues of domestic mineral projects *see, Comptroller General's Oct. 1979 Report, supra* note 1, at 38. For a critical examination of the cost ramifications of strict environmental (EPA) and worker health and safety (OSHA) regulations upon the American mining industry *see* Comptroller General, *Report to Congress, "Learning to Look Ahead: The Need for a National Materials Policy and Planning Process,"* 96th Cong., 1st Sess. (1979), at 37 [hereinafter cited as *Comptroller General's April 1979 Report*].

the regulatory system, the failure of regulators to have a full view of the effects of their regulations, was described by Walter Hickel, former Secretary of the Interior:

The broad spectrum of laws lodged in numerous agencies compounds problems in the development of constructive mineral policies. If the Nation's future national resources requirements are to be met through the wisest conservation and management of available resources, there is a positive need for integration of natural resources plans and programs, a need for consistency of treatment by the Federal Government of natural resources programs, and planning and management for the most effective use and productivity of all natural resources.³¹

Partially because of the failure of the government to comprehend the impact of government regulations, the costs of compliance with the multitude of regulations has risen tremendously in recent years. A recent Department of Commerce report estimates that to meet Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) regulations, the copper industry by 1987 will spend 4.5 billion dollars and will be forced to reduce expected 1987 production by thirty-six percent.³² The report further found that because of regulations, the cost of U.S. copper, by 1987, will have increased forty-three percent (1974 dollars), and 31,000 jobs that could have been available will be lost.³³ High cost compliance with stringent environmental regulations during the severely depressed copper market of 1975-1979 had a heavy impact on the financial condition of our copper industry.

In some instances, the costs of federal regulations have been the decisive factor in plant closures of profitable operations. A good example is the Monaca plant in Monaca, Pennsylvania, owned by St. Joe Minerals. Over the past five years St. Joe Minerals spent thirty-five million dollars to meet EPA emission standards for sulfur dioxide and particulates.³⁴ Subsequently, EPA and OSHA issued new lead standards that would have cost another twenty-five million dollars for compliance for recovery of secondary lead. The company could not justify the added costs in light of St. Joe's losses in zinc in 1978 and 1979 and in light of an anticipated loss of ten million dollars in 1980.³⁵ The plant was closed. Its closure further decreased United States zinc metal production from one million tons ten years ago to half that in 1979.

The highly competitive lead industry has also felt the effects of EPA and OSHA regulations. OSHA's own estimate is that compliance will cost the lead industry about 416 million dollars in capital expenditures and about 112 million dollars per year in operating costs.³⁶ Recently, the American company that has long been the leading recycler of scrap lead announced that it would close

31. *Comptroller General's Oct. 1979 Report*, *supra* note 1, at 69.

32. U.S. Dept. of Commerce, *The Potential Impact of U.S. Regulations on the U.S. Copper Industry* (April, 1979).

33. *Comptroller General's Oct. 1979 Report*, *supra* note 1, at 57.

34. *Mines and Mining Hearings*, *supra* note 6 (Nov. 28, 1979) (statement of Charles R. Carlisle, Vice President of St. Joe Minerals Corp).

35. *Id.*

36. *Comptroller General's Oct. 1979 Report*, *supra* note 1, at 40.

or sell all of its secondary lead smelters. It was apparent to the company that the capital employed in this business could be more profitably employed in other investments.³⁷ Not only is this major recycler withdrawing from the business, but it does so when the United States has already begun to ship substantial amounts of lead scrap outside the country. Ironically, this is happening when it is the government's announced policy to encourage maximum recycling. Unable to obtain EPA's reconsideration, the lead industry has taken the matter to the courts, questioning the premise of the standards for health protection as well as the technical and economic feasibility of compliance.³⁸

A further example is provided by the steel industry. There have been recent closings of plants during the last several years. Some plants were obsolete and no longer economical to operate, yet government policies do not encourage modernization. Dr. John F. Elliott, Professor of Metallurgy at Massachusetts Institute of Technology and a recognized expert in steelmaking, accurately characterized the problem when testifying before the Mines and Mining Subcommittee of the House Committee on Interior and Insular Affairs:

Like many segments of heavy industry, the American steel industry is finding it very difficult to obtain the large amounts of capital that are required for it to modernize. The reasons for this situation are many and varied: governmental policies, regulatory actions, antitrust laws, taxes, rules on depreciation and depletion allowances, tariffs and trigger prices. At this point, it is not appropriate to reconstruct the debates over the right and wrong, fairness or unfairness of these policies, regulations, laws, taxes, etc. It is more important to conclude that they have had a cumulative influence on the financial strength of the domestic steel industry and on the long-term viability of this important segment of our domestic economy.³⁹

The United States' steel industry estimates that through 1985 its investments in environmental control equipment will total 9.8 billion dollars (1978 dollars) and its operation costs will amount to 3.6 billion dollars (1978 dollars) per year.⁴⁰ When American industry no longer finds it as profitable to operate in the United States as in a foreign nation, the natural result is an increase in foreign investment. Such phenomena is beginning to occur within the mining corporations. The aluminum industry is investing in new plant capacity outside the United States, particularly in Australia and Brazil, largely because of our uncertain energy policies and environmental delays in new construction.⁴¹ Projections of the annual growth rate of United States demand for aluminum to the year 2000 vary mostly in the six to seven percent range, but domestic primary capacity is projected to increase only 1.4 percent.⁴² One study reports that by the year 2000, our aluminum metal imports will double,

37. Another company that processed arsenic-based materials stated that its engineering controls could at best achieve only a 50% confidence level of compliance with federal standards; it estimated capital costs of 35 million dollars, increased annual operating costs of over 10 million dollars and by doubling its work force to meet employee standards, an increased labor cost of 42 million dollars a year. *Id.*; See also, "Now the Squeeze on Metals," *supra* note 3, at 48.

38. An interesting sidelight is that in 1979 we shipped 7,000 tons of lead concentrates mined in the U.S. to the U.S.S.R. while at the same time United States smelting capacity was available and United States consumers were in need of lead.

39. *Mines and Mining Hearings*, *supra* note 6 (Oct. 18, 1979) (statement by John F. Elliott).

40. Arthur D. Little, Inc., *Steel and the Environment: A Cost Impact Analysis*, 1978 (May, 1978).

41. *Comptroller General's Oct. 1979 Report*, *supra* note 1, at 13.

42. *Id.*, at 9.

which, with increased ore and alumina (the intermediate product) imports, will cost the United States over seven billion dollars (1979 dollars) annually.⁴³

Regulatory costs are not the sole cause of the financial difficulties of the mining industries. Regulations, however, can be and often are the final factor which justifies a plant closure or development of foreign resources. Unless Congress understands the impact of government regulation on the mining industry, there can never be an effective national nonfuel mineral policy.

Land Withdrawals

The occurrence of economic concentrations of usable nonfuel minerals is a relatively rare natural phenomena. Between 1150 and 1200 mines supply ninety percent of the world's mineral requirements.⁴⁴ The geologic uniqueness of mineral deposits is even better exemplified by the rule-of-thumb that the average mining company can stay in business if it makes but one significant discovery every twenty to thirty years. But to make that discovery, the company must continue searching for newer sources of minerals. We will never know where all of our mineral deposits occur, but they will not be found unless the country encourages the search both for new discoveries and the technology to change nonmineable grades of minerals to mineable grades.

Given the anomalous nature of economic mineral deposits and the continuing need for domestic supplies of nonfuel minerals, it would seem natural that the government would encourage new exploration of mineral deposits in the United States. Instead, however, our government has taken action which inhibits exploration for mineable United States deposits. Most of the nation's mineral potential exists on our public lands in the West and Alaska. These public lands, however, have been largely excluded from mineral exploration.⁴⁵ There has been no estimate of what mineral production has been lost from discovered or undiscovered mineral deposits on public lands where mining was restricted or prohibited. This percentage will increase, for the Administration has withdrawn, recommended, or is studying the withdrawal of over 200 million acres of federal land for wilderness or other single use purposes. About 125 million acres of this total are in Alaska.⁴⁶

This withdrawal of public lands from mineral search occurs in spite of the recommendation of the Public Land Law Review Commission. In 1970, the Commission warned that "mineral exploration and development should have a preference over some or all other uses on much of the public lands."⁴⁷

The effect of the withdrawal of public lands from exploration has been demonstrated in the fuel minerals industry. Despite the growing power of OPEC, removal of public lands increased from sixteen per cent of lands

43. *Id.*

44. Engineering and Mining Journal, 1978 *EMJ International Directory of Mining and Mineral Processing Operations* (1978).

45. "Currently, the Federal Government controls more than 760 million acres (about half of it in Alaska), or about one third of the land in the United States. While access to these lands was once unrestricted . . . about 42 percent of these lands have been completely withdrawn from mineral activity, another 16 percent severely restricted, and 10 percent moderately restricted. These restrictions can seriously jeopardize or delay mineral exploration and development. For example, it has been estimated that Arizona contains 65 percent of U.S. copper reserves, but 70 percent of Arizona's land area is federally controlled," *Comptroller General's October Report, supra* note 1, at 19.

46. *See generally*, Minerals Wk., Dec. 14, 1979, at 18.

47. "One Third of the Nation's Land," A Report to the President and the Congress by the Public Land Law Review Commission, June 1970.

available for oil and gas exploration in 1968 to a startling sixty-four per cent in 1974.⁴⁸ This policy of nondevelopment of our national resources is in part the cause of our increased dependence on foreign fuel sources.

The Department of the Interior, often a proponent of more and bigger withdrawals of public lands for the sake of preservation, has been unresponsive to the growing trend toward complete withdrawal of public lands from exploration. Ironically, however, the Secretary of the Interior is responsible for the mineral management for public lands, for the health of our mining and minerals industry and most importantly, for the adequacy of national mineral supply.⁴⁹ Of all government agencies, the Department of the Interior should be most sensitive to the increasing needs of national minerals exploration. Our mineral base is our land base, and how we manage our lands will largely determine America's self-sufficiency in minerals. But our government has remained unresponsive.

The cumulative effect of the weakness of mining industries, government regulation, and withdrawal of many potential new sources of minerals has been to put our country's national security in unnecessary jeopardy.

Mineral Dependence and National Security

Oil is a severe and dramatic example of resource vulnerability. Before 1973, the notion of an oil embargo was dismissed by most as an irrational prediction. As late as 1976, some experts were still stating that the oil cartel would not work. Unfortunately, it has worked and its success is largely attributable to the United States' dependence on foreign fuel resources.

The domestic reliance of the United States on foreign produced minerals varies from metal industry to metal industry but the trend of imported nonfuel minerals is increasing, especially in processed minerals. For example, zinc metal imports have increased eighty-nine percent between 1968 and 1977 while zinc ore and concentrated imports have dropped seventy-seven percent.⁵⁰ The demand for ferroalloys, used in the iron and steel industry, is expected to rise through 1985 at an annual rate of 3.4 percent for primary chromium and three percent for silicon alloys.⁵¹ While the United States remains the world's largest producer of copper, copper imports have steadily increased, from 131,000 short tons in 1969 to 457,000 short tons in 1978.⁵² The annual United States growth demand for imported copper is also expected to increase at the annual rate of 3.5 percent between 1975 and 2000.⁵³ Significantly, the United States while nearly 100 percent reliant on foreign sources for critical and strategic chromium and manganese has largely lost its ferroalloy capacity as imports

48. Bennethum and Lee, "Is Our Account Overdrawn?" *Mining Cong. Journal* (Sept. 1975).

49. *Establishing a National Mineral Policy*. S. Rep. No. 91-390, 96th Cong. 1st Sess. 9 (1979), letter from Walter J. Hickel states: "This legislation does not provide any new authority. We believe, however, it is desirable to establish such a national policy and to carry it out. In establishing and carrying out such a policy, the administration, of course, would take into account other national policies such as those relating to the conservation of those resources and the protection of the environment and other resource values and more importantly, the nation[s] need to improve the health and the safety of those who are in these industries."

50. *Comptroller General's Oct. 1979 Report*, *supra* note 1, at 4-6.

51. *Id.* at 6-7.

52. *Id.* at 8.

53. *Id.*

of ferrochrome and ferro-manganese increased from a twenty percent of demand in 1970 to seventy percent in 1978.⁵⁴ Although imports fluctuate from year to year, there is every reason to believe that the import-export gap will widen as we continue to discourage mining of our mineral deposits and thereby encourage mineral imports.⁵⁵

The distribution of the world's hard-rock mineral deposits is diverse. The need for hard currency in the developing countries would appear to discourage concerted action in the form of cartels or price manipulation. There are increasing indications, however, that a collective course of action is being taken by developing countries.⁵⁶ In addition, there is the ever-present possibility that individual countries will act irrationally, even if against their own self-interests.⁵⁷

While most United States' imports come from mineral-rich developed countries such as Canada, Australia, and South Africa, there is no assurance that these countries will not enter into marketing agreements with other producers. Recently, Australia and Brazil, the first and second largest iron ore producers having the second and third largest reserves in the free world, entered into an agreement to maximize their bargaining strength in the market. While this does not constitute a cartel, other agreements between major producers seem likely.

In addition, it is anticipated that there will be increasing competition among developed countries for foreign minerals, particularly on the part of Europe

54. Statement of George Watson, Ferroalloy Assoc., Oct. 23, 1979, Sub Comm. on Natural Resources and Environment of the House Comm. on Science and Technology, 96th Cong. 2nd Sess. (1979).
55. Comptroller General, Report to Congress, "Need to Develop A National Non-Fuel-Mineral Policy," 93rd Cong. 1st Sess. 6-8 (1976). [hereinafter cited as *Comptroller General's July 1976 Report*]. See generally, Comptroller General, *Report to Congress*, "The Strategic and Critical Materials Stockpile Will Be Deficient for Many Years," 96th Cong. 1st Sess. (July 27, 1978), and Appendix I., *infra*.
56. For a government commentary on this issue, see, *Draft Report*, *supra* note 14, at 8-12; According to that U.S. Department of Interior Report, the principal issue is "[That] future supplies of several imported minerals critical to the United States and its allies are becoming less secure . . .", *Id.* at 8; The report notes that South Africa is a major supplier of chromite, ferrochromium platinum group metals, and ferromanganese. Should the U.S. supplies from South Africa become unavailable the United States will become materially dependent upon the Soviet Union for critical chromium and the platinum group metals. *Id.*; For a commentary on American industries' fears of foreign raw material cartels, see also *Mines and Mining Hearings*, *supra* (Oct. 18, 1979) (statement of E. F. Andrews); For a stark commentary on "The Eroding Global Security Environment, Vulnerability of Sealanes, Lack of adequate Logistic Planning, and Dependence on Foreign Flag Ships to Carry Raw Materials," see statement of Robert A. Kilmarx, *supra* note 7; see also, *Mines and Mining Hearings*, *supra* note 6 (Oct. 13, 1979) (statement of William Schneider, Jr.) for a commentary on cartel-like organizations and possible Soviet minerals control strategy; See generally note 3, *supra*.
57. In December 1974, the Nixon administration's Council on International Economic Policy reported, "Embargoes of raw materials are highly unlikely. They do not make economic sense in terms of producers' revenue objectives. The objective of increased revenue argues for selling at a high price rather than denying the product altogether. An embargo, however, may be undertaken for political reasons, as in the case of the Arab oil producers. If the politically inspired embargo is to be sustained, the producing countries must also have economic muscle. The Arab oil producers had both political desire and economic strength. This combination was not found in any other group of producer countries we have examined . . ." *Comptroller General's July 1976 Report*, *supra*, note 55, at 16-17, citing, Council on International Economic Policy, *Special Report*, "Critical Imported Materials," Dec. 1974; It is noteworthy that since 1974 the world has changed dramatically. The events in Iran have proven this to the developing nations of the world. The prior successes of the Arab oil producing countries and the apparent willingness of Iran to risk serious international consequences in order to stage a dangerous political demonstration by taking hostages posits a warning the United States can not ignore.

and Japan, who are 100 percent dependent for many of their mineral requirements.⁵⁸ Increased competition on the part of the buyers can only solidify the position of the producers. Like OPEC, which took eight years to achieve its goal of market dominance, the world's mineral producer associations could well attain the control desired.

The increasingly staunch stand of developing countries, who have threatened to deny raw materials to industrial countries if the latter do not accept demands that mineral processing be done by the suppliers, must be assumed to pose a long-term economic threat. There has also been a serious trend developing for American mining companies to shift their industrial processing operations to locations outside the continental United States.⁵⁹ The loss of not only United States mine capacity, but the increasing loss of United States processing capacity, in effect prompted by increasingly complex governmental regulation, is eroding our ability to make independent decisions.⁶⁰

The Soviet Union fully understands the implications of nationalism in the developing countries and the economic and national security vulnerability that comes with increased dependence on foreign mineral suppliers. The U.S.S.R. emphasizes maximum self-sufficiency, regardless of the costs. While we import fifty percent or more of twenty minerals, the Soviet Union is known to import only six, just two of which approach a fifty percent import reliance.⁶¹ They are clearly a major exporter, channeling their trade whenever possible into hard currency markets.

An example of Soviet sophistication is apparent in southern Africa. As *Chart I* indicates, south African nations are extremely important to the United States as a source of strategic and critical minerals. In 1979, the south African countries supplied about seventy-six percent of our cobalt (essential for jet engines, turbines, communication, and cutting tools), about eighty percent of our ferrochrome (least substitutable of all alloy metals for heat and corrosion resistance and strength; essential for stainless steel), sixty percent of our platinum group metals, and numerous other minerals in both large and small quantities.⁶² The United States is highly vulnerable in this part of the world which is so vital that it has been called the "Persian Gulf of Minerals." The Soviet Union is fully aware that it could assume a dominant position for control of much of the world's markets for five of the minerals for which we rely heavily on southern Africa. The Soviet Union and southern Africa together account for a major share of world production, trade, and in some cases reserves, for chrome, platinum metals, manganese, asbestos, and gold.

Soviet strength in these mineral resources provides a new insight into Russian and Cuban involvement in southern Africa. There is little doubt that Soviet long-range strategy is to secure increasing shares of future production

58. See, Statement of Robert A. Kilmarx, *supra* note 7 for an interesting analysis of the intractability of the European countries in the face of inadequate supplies of nonfuel minerals.

59. *Comptroller General's April 1979 Report, supra* note 30, at 24-25. While the reasons for this trend are complicated and involve complex economic considerations, the growing costs of health, safety and environmental regulation are high on the list of industry complaints.

60. *Id.* at 24.

61. Strauss, "Mineral Self-Sufficiency: The Contrast Between the Soviet Union and the United States," presented at The 1979 American Mining Congress Convention, Los Angeles, Calif. (Sept. 23, 1979).

62. *Draft Report, supra* note 14, at 9.

CHART I

Reprinted with amendments from U.S. Department of the Interior, *Draft Report: "Report on Issues Identified in the Nonfuel Mineral Policy Review"* (August, 1979) at 9.

Indications of Current and Potential U.S. Dependence on Central and Southern African Nations and the U.S.S.R. (All data is for 1978 unless otherwise indicated)				
	Chromium (Thousand Short Tons)	Cobalt (Short Tons)	Manganese (Thousand Short Tons)	Platinum-Group (Thousand Troy Ounces)
U.S. Consumption % imported	590 92 *	9,433	1,415 98 *	2,318 ** 91 *
Anticipated demand growth Annual rate to 1985 Expected 1985 demand	3.4% 746	2.9% ³ 11,522	1.6% 1,581	4% 3,133
Import Sources (1974-1977 average)	Chromite: South Africa 35% USSR 18% Ferrochrome: South Africa ¹ 38% Rhodesia 23%	Zaire Zambia	Manganese Ore: Gabon 36% South Africa 9% Ferrochrome: South Africa 30%	South Africa ⁶ USSR 42% 26%
Reserves	World Total: South Africa ² 3,700,000 Rhodesia 2,500,000 1,100,000	World Total: Zaire ⁴ 1,600,000 Zambia 500,000 USSR, Cuba 1,25,000 350,000	World Total: South Africa 6,000,000 Gabon 2,200,000 USSR 165,000 3,000,000	World Total: South Africa 790,000 USSR 580,000 200,000
Resources ***	World Total: South Africa 36,000,000 Rhodesia 25,000,000 10,000,000	World Total: Zaire 5,000,000 Zambia 1,000,000 USSR, Cuba 640,000 1,400,000	The USSR and South Africa account for more than 80% of identified world resources.	World Total: South Africa 2,800,000 USSR 2,000,000 Rhodesia 400,000 100,000
Substitutes and Alternates	Nickel, zinc, cadmium, aluminum, cobalt, molybdenum, vanadium, and titanium in various uses with either higher cost or some sacrifice in performance standards.	Nickel, but only with a loss of effectiveness; platinum, tungsten, and ceramics in various uses.	No substitutes exist for major applications.	Gold, silver, and tungsten in electrical/electronic uses; improved engines or fuels could reduce use in emission control catalysts in autos.
<p>* Remainder of consumption supplied from recycled material or stocks. ** Does not include approximately one million ounces of toll-refined secondary. *** Excludes deep-sea resources of cobalt and manganese in the form of manganese nodules.</p> <p>Source: U.S. Bureau of Mines, <i>Commodity Data Summaries</i>, 1979.</p>				
<p>1. U.S. ferrochrome imports in 1979 amounted to 80% from South Africa. 2. South Africa reports (in 1980) 3.1 billion tons of reserves, 81% of the worlds total. 3. The Bureau of Mines most recent estimate is 3.3%. 4. Zaire's cobalt reserves more nearly, in order of magnitude, is higher. 5. South Africa reports manganese reserves of 12.1 billion tons, 78% of the world's total. 6. 1979 imports were 60%.</p>				

from southern Africa. There are some analysts who estimate that known Soviet chrome and manganese deposits are dropping in grade and that exports outside the COMECON countries could stop in 1985.⁶³ The U.S.S.R. is already a dominant political influence in mineral-rich Angola and in Mozambique.⁶⁴ The ultimate political direction that Zimbabwe-Rhodesia will take remains uncertain, but Soviet influence in the area decreases the probability of a pro-United States government.

The East German/Cuban sponsored May 1978 incursion into Zaire's cobalt and copper producing Shaba Province was a principal cause of the 1978 world-wide cobalt shortage.⁶⁵ The Soviet Union, not surprisingly, bought much of the world's cobalt surplus immediately prior to the invasion of Zaire.⁶⁶ The producer price of cobalt quadrupled in 1978 while the free market price erupted with a 700 percent increase (from \$6.40 to \$50.00 per pound).⁶⁷ With 55-65 percent of United States' cobalt supply coming from Shaba and 75 percent from southern Africa,⁶⁸ a disruption of this source would have devastating effects upon our critical reliance on this metal for heat-resistant alloys in jet engines.⁶⁹

The impact of the commodity games that Soviet and pro-Soviet nations are playing in international mineral markets has already been felt. Last year the Soviet Union engaged in a puzzling six month buying splurge in world markets. Working through intermediaries, the Russians bought an estimated three hundred million dollars worth of lead, copper, zinc, aluminum, molybdenum, and cobalt, all of which they produce.⁷⁰ Earlier, the U.S.S.R. severely limited its exports of platinum and titanium, precipitating worldwide price increase.⁷¹ At best, there is an element of unpredictability in Soviet behavior in international mineral markets.

America's national security is at stake in the international game of mineral trade. We must have a better, more objective attitude not only in recognizing the need of domestic mineral development but also in the area of foreign policy.

63. See generally, note 3, *supra*.

64. See "Fear Soviet Supercartel for Critical Minerals," *supra* note 3, at 43-44.

65. *Id.* at 44. The Soviet involvement in Shaba Province in Zaire, which controls 60% of global cobalt resources, is significant because it would enable the U.S.S.R. to effectively control nearly 80 percent of the world's cobalt resources.

66. Wash. Post, "Soviets Reportedly Bought Up, Cobalt Before Zaire Invasion," (May 24, 1978); Christian Science Monitor, "Moscow's Maneuvering in Africa Causes Cobalt Shortage in West," (Jan. 16, 1979). See also, "Strategic Metals, Critical Choices," *supra* note 3, at 64; "Fresh Fears that the Soviets Will Cut Off Strategic Minerals," *supra* note 3, at 63 for general commentary on the growing self-sufficiency of the Soviet Union in strategic minerals.

67. "Strategic Metals, Critical Choices," *supra* note 3, at 64.

68. *Id.*

69. See "The Defense Production Gap: Why the U.S. Can't Rearm Fast," *supra* note 3, at 80; see also "Fear Soviet Supercartel for Critical Minerals," *supra* note 3.

70. See "Fear Soviet Supercartel for Critical Minerals," *supra* note 3, for a discussion of the prospects developing for the formation of a supercartel controlled by the U.S.S.R. which could wield global domination over several strategic minerals.

71. "Strategic Metals, Critical Choices," *supra* note 3, at 64.

CONCLUSION

The purpose of this article was to point out four major problem areas involved in development of our national minerals policy. First, the United States must confront the fact that its mineral industries are financially insecure and require government actions to increase the financial strength of the industry as a whole. Second, our country must recognize that government regulations, although vital, have become so burdensome as to place often insurmountable obstacles in front of mineral development. Third, we must acknowledge government responsibility in withdrawing potential sources of mineral supplies from domestic production. Finally, the United States must understand that nonfuel minerals, like fuels such as oil, have a tremendous although subtle impact on our national security. With this recognition, the United States can make a serious commitment to a national minerals policy.