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January, 1984

### Mineral Facts and Fictions,

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## Mineral Facts and Fictions

*Richard W. Wright*

I shall focus my comments on several facts and fictions that are often confused in discussions on hardrock mining and that are important to sort out if there is to be any progress in resolving the debate. Most of my comments are condensed from the study that I authored for the U.S. Congress' Office of Technology Assessment, Management of Fuel and Nonfuel Minerals in Federal Land (1979), to which I refer you for a more complete discussion.

Two major facts make it difficult, but not impossible, to achieve optimum coordination of mineral and nonmineral activities: first, most mineral deposits are not easily identified; second, many nonmineral resources are not easily valued (OTA pp. 184-185).

Mineral deposits, especially in long-explored areas such as the lower forty-eight states, generally are hidden beneath the surface and can be found only through costly and risky exploration. Moreover, changing geologic concepts, economics and exploration, mining and processing techniques can make areas attractive that once were thought to have little or no economic mineral potential. This has occurred for copper in southern Arizona, taconite in Minnesota and the Carlin-type gold deposits. Identification of mineral deposits depends on continuing access for exploration and cannot be satisfied by one-time surveys by the government or by industry. Modern exploration uses sophisticated techniques that cost hundreds of thousands or millions of dollars, with only about a ten percent chance of success. Thus, mineral firms are not likely to explore a given area unless they are assured of the right to develop and produce whatever they may find. (OTA pp. 46-67.)

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On the other hand, it is difficult to place a value on many nonmineral resources -- scenic beauty, endangered wildlife and plant species, air and water quality, ecosystem functions, wilderness and local lifestyles -- and also to predict what impact mineral exploration and possible subsequent development will have on these resources.

How, then, do you make a decision on whether to allow exploration, with the right to develop, in an area with important but difficult-to-value nonmineral resources, when there is at best a ten to twenty percent chance of finding an economic mineral deposit of unknown value? (OTA pp. 189-190.)

Historically, an absolute preference was given to mineral activity, based on two fictions which continue to enjoy widespread currency in the mining industry today. They are, first, that economic concentrations of minerals, unlike other resources, are "where you find them," and, second, that these economic mineral deposits are always the most valuable resource wherever they are found. (OTA pp. 185-189.)

It is true that economic concentrations of the more valuable minerals are rare (they are more valuable precisely because they are rare). Subeconomic concentrations are more widespread, and often become economic as higher-grade deposits are depleted, or as improvements are made in technology. Moreover, many minerals, especially the hardrock minerals, are recyclable and can be substituted for by other minerals or synthetics.

Many nonmineral resources are similarly rare or "where you find them" and are subject to the same economics of more expensive, lower quality alternatives: watersheds, aquifers, hydroelectric power-sites, old-growth hardwood timber, prime agricultural land, white-water rivers, etc. Some nonmineral resources are, even more than mineral resources, "where you find them" since there are no alternatives at any cost: unique landforms (the Grand Canyon), cultural sites (Mesa Verde), endangered species, etc.

The premise that mineral activity is always the most valuable use of a tract of land was based originally on the high net value of high-grade surface or near-surface mineral deposits in contrast to the generally low or minimal commercial land values of the arid, remote and unpopulated western regions. Little thought was given to noncommercial land values. Today, many if not most mineral deposits are of much lower grade and are located at greater depth than mineral deposits discovered in the past. They are most expensive to find and mine, and their net value thus is often much lower than in the past. On the other hand, many of the commercial nonmineral

resources (timber, forage, game, water) have become scarce and hence much more valuable due to growth in the population and the economy. In addition, there is growing appreciation of many noncommercial nonmineral resource values: recreational, esthetic, ecological, scientific, cultural, option preservation, etc. It is far from clear that in every instance these nonmineral resource values would be outweighed by any possible mineral deposit, no matter how common the mineral or how marginal the deposit.

A third argument is often made by the mining industry that we shouldn't be concerned about mining's effect on nonmineral resources since mineral activities disturb such a miniscule fraction of the nation's land -- only one-quarter of one percent. This is also a fiction, derived from a failure to appreciate the limits of the U.S. Bureau of Mines (USBM) studies on which it is based. USBM Circular 8642, published in 1974, concluded from a survey of the mineral industry that only 0.16 percent (3.65 million acres) of the nation's land had been utilized by the mining industry between 1930 and 1971. A partial update, USBM Circular 8862 (1982), raised the figure to 0.25 percent (5.7 million acres) for the period 1930-1980. But the bureau's figures do not include land explored and worked for oil and gas, although oil and gas activity is the most extensive mineral activity (approximately 130 million federal acres were leased in 1982, but probably only one-tenth of this was being actively worked). They do not include land affected by exploration, although much larger areas are affected by exploration than by development and production. For each operating mine, there are exploration pits, drill sites, roads and other impacts scattered over an area much larger than the mine area, as well as similar impacts from the ten to 100 unsuccessful exploration projects that occur for each successful project. The figures do not even include most of the land affected by development and production. They include only the areas actually excavated or used for waste disposal. They do not include areas used by mills, processing plants, roads, powerlines, pipelines and so forth and the much larger areas affected by these ancillary facilities, especially the roads. They do not include the surrounding areas, often very extensive, in which wildlife, scenic viewing and recreation may be affected as the result of the physical, visual and aural impact of the mine, its road network and other facilities. (OTA pp. 180-181.)

The USBM figures themselves demonstrate an accelerating magnitude of surface disturbance as mining moves increasingly from underground to open-pit and surface mining. Half again as much disturbance

occurred between 1972 and 1980 (2.05 million acres) as occurred in the previous forty-two years (3.65 million). Finally, as industry itself has often stated, mineral activity in the United States is concentrated in federal land areas, which contain almost all of the nation's most significant natural and recreational resources (OTA pp. 41-45, 176-178). Figures on aggregate land disturbance in the nation as a whole do not help resolve specific problems of proposed mineral activity in federal land areas with important non-mineral resource values.

I hope I have demonstrated that an absolute preference for mineral activity is not justifiable. But that does not mean that there should be an absolute preference against mineral activity, which is what the land withdrawal process represents. Why not allow carefully limited exploration and development, with restrictions scaled to the importance and sensitivity of the nonmineral resource values? Such restrictions could be stricter during the exploration stage to protect nonmineral resource values from being destroyed when there is only a ten percent chance of finding an economic deposit (e.g., nonroad access, with certain sensitive areas off-limits), but some of which (e.g., nonroad access) could be relaxed if an economic deposit were found. Distinctions based upon the type of deposit being sought (and found) -- e.g., platinum versus gypsum -- could also be made.

The problem is that the Mining Law of 1872 does not allow such a balanced approach. If land is open to activities under the Mining Law, there is no authority to prohibit certain impacts. There is only authority to mitigate those impacts as much as possible consistent with the preferred mining use. Moreover, the land is open for development of any hardrock mineral, no matter how common, and no matter how valuable the nonmineral resources that will be affected. It is open not just for gold or copper, but also for vermiculite for kitty litter or gypsum for wallboard. It is open for development no matter how marginal the economics of the deposit may be, and the right to explore and develop overrides any nonmineral resource value. It is open for anyone to come in to explore whenever and for whatever, without any weighing beforehand of relative values by the federal land manager. There is no control over entry, except such mitigating conditions as the overworked land manager may be able to devise. There is no requirement of any payment for destruction of surface resource values that may occur during exploration or development -- not even for a dam or ranger station. The law perversely requires unnecessary and damaging "assessment" work to maintain claims. If an economic

deposit is found, the discoverer may obtain title to the surface as well as the mineral deposit, thereby creating a private "inholding" that may be used for any purpose without even mining the deposit. Such inholdings can make it much more difficult to manage the surrounding federal land, especially if they are in critical locations. (OTA pp. 190-206, 214-215.)

Leasing, or a modified claim system with some control over access and with the right to impose restrictions to prohibit impacts, would allow a more balanced approach. Until recently, the leasing laws were administered in the same fashion as the Mining Law: an all-or-nothing approach, either open with an absolute preference given to mineral activities under each lease or withdrawn (officially or through no-leasing decisions). But the authority has always existed to adopt an in-between position along the lines of the one outlined above, and recent administrations, until the current one, had made considerable progress.

None of the objections to leasing seem persuasive to me. First, leasing is not "basically inappropriate" for hardrock minerals. It is used by many countries and most of the western states for hardrock as well as non-hardrock minerals. It is used for hardrock minerals on federal acquired land, including the major lead-zinc deposits in Missouri. There is not a large difference between the nature and costs of exploring for and developing hardrock versus nonhardrock minerals. The geologic configurations for many of them are very similar. Exploration for oil and gas in the western Overthrust Belt is not so dissimilar from exploration for copper or uranium in Arizona. Development of leasable synfuels is not so dissimilar from development of molybdenum. (OTA pp. 52-55, 65-66, 104-106.)

Second, leasing of hardrocks need be no more competitive than it is now for the nonhardrocks. Competitive leasing generally exists only for known deposits or structures, which means that only very rarely would hardrocks be leased competitively. Prospectors and small miners would not be shut out. They would, as is now the case for almost all leases of non-hardrock minerals (other than coal and oil shale, the locations of which are known), receive leases on a first-come, first-served basis, exactly as occurs under the Mining Law, but without needless location and "discovery" work, and with much more secure tenure for exploration. (OTA pp. 108-112, 116-124.) It should also be noted that the greatly increased expense and sophistication of modern exploration has reduced the role of the individual prospector as a significant source of discoveries. (OTA pp. 49-52, 67-75.)

Third, the transition from the claim/patent to the leasing system could be accomplished as easily as it was in 1920 when the non-hardrocks were converted from the claim/patent to the leasing system: all valid claims would simply be converted to prospecting permits or leases.

Fourth, administration of hardrock mining under the Mining Law provides many more opportunities for litigation than under the leasing laws -- e.g., lode versus placer, location requirements, extralateral rights, millsites, pedis possessio, assessment work, discovery of a valuable mineral deposit on each twenty-acre claim, and so forth. (OTA pp. 116-134.) Finally, given all these archaic provisions in the Mining Law, plus the presence of environmental challenges similar to those under the leasing laws, it is extremely doubtful that a properly enforced Mining Law would involve less administrative costs than a leasing system.

Certain features of the current leasing systems are not as centrally important as some people in industry and the environmental community would have us believe. For example, a leasing system need not require payment of royalties on the value of the mineral produced. From the standpoint of the federal taxpayer, such payments are a bogus issue, since they almost all are turned over to the western states rather than to the general treasury. Moreover, the western states can and do take care of themselves through severance, property and sales taxes. (OTA pp. 260-282.) Much more important than royalties are rentals to cover the unavoidable "opportunity costs" associated with damage to or preclusion of nonmineral resource values and activities as a result of mineral operations. (Royalties comparable to those on state and private lands might be needed to avoid making the federal lands artificially attractive.) (OTA pp. 147-150.)

One last issue with respect to which fiction is often substituted for fact concerns the extent and significance of withdrawals of federal land from mining. The important question is not how much total land is withdrawn, but rather what are the reasons for each particular withdrawal and are the reasons sound in each case? But much mileage has been given to claims that two-thirds of the federal land is closed or "locked up" to mineral activity. These claims stem from Bennethum and Lee's article "Is Our Account Overdrawn?" in the September 1975 issue of the Mining Congress Journal. That article, although useful in focusing attention on the withdrawal issue, contained many significant flaws. It treated land as closed which was actually open with slight or moderate

restrictions. It used incorrect acreage figures and double-counted. It failed to separate out the effects of the massive but temporary land selection process in Alaska. It treated land as closed to mineral activity simply because it was not available under the Mining Law, even though it was available under some special leasing law or from a state or the Alaskan natives.

The OTA study carefully compiled and cross-checked all the available data to correct for these and other flaws in other analyses, and the analysis was fully explained in a lengthy appendix (OTA pp. 331-369). Authors of the other withdrawal studies agree that the OTA analysis is the most thorough and accurate. Unfortunately, however, the OTA analysis itself is often misquoted and misunderstood. A common example is the reference and table in Bruce Netschert's paper, which is taken from a Department of the Interior publication. The table cites OTA figures from an early draft, rather than the final corrected figures in the official published report. It also states that OTA included Indian reservations as federal land; OTA did not. It states that OTA included federal acquired lands in the closed category, but this is true only with respect to the Mining Law. OTA noted correctly that hardrock minerals on much acquired land are available through leases, although not under the Mining Law.

The figures from the final OTA report were:

	Formally closed	Highly restricted	Moderately or slightly restricted
Due to usual actions	16%	6%	44%
Due to Alaska land selections	<u>18%</u>	<u>--</u>	<u>16%</u>
Total	34%	6%	60%

These figures were for the availability of hardrock minerals in federal land from any source, not just under the Mining Law, in 1975. They show that less than one-fourth of the federal land was unavailable or highly restricted for hardrock mineral activity in 1975 because of usual types of land withdrawal actions. The percentage rose to forty percent when the withdrawals related to the massive but temporary land selection process in Alaska were included. (OTA p. 217.)

In testimony before Congress in 1980, I estimated that the total amount of federal land unavailable or highly restricted for hardrock mineral activity might



have risen by then to forty-five to fifty percent since the Alaska land withdrawals were still in effect and the RARE II and BLM wilderness review programs were underway (although substantial amounts of acreage in both programs had already been released). I also estimated that the percentage would drop to thirty-three percent or less when these programs were completed. (Hearings on H.R. 2743 Before the Subcommittee on Energy Resources and Materials Production of the Senate Committee on Energy and Natural Resources, July 29 & 31, 1980, pp. 153-169.) I believe these estimates are still fairly accurate, and that we have moved down to or below thirty-three percent as the Alaska land selections and the RARE II and BLM wilderness review programs have wound down in the last several years. Although there has not been any new, thorough analysis of the hardrock situation, that situation probably is comparable to the oil and gas situation. For the latter, a new analysis, similar in approach to the OTA study, recently has been completed by an industry-environmental task force brought together by the Scientists' Institute for Public Information (SIPI).

The SIPI task force, on which I served, estimated the availability of federal onshore land for oil and gas leasing, drilling and production in 1981 to have been:

	Closed	Rarely leased	Varying leasing policy	Open with varying mitigation conditions
Alaska	35%	28%	3%	34%
Lower 48	7%	11%	12%	70%
Total Onshore	16%	16%	9%	58%

The task force also estimated the percentages of federal undiscovered recoverable oil and gas resources affected, which is of course more relevant than the percentages of land affected. We found that most of the closed or rarely leased land in onshore Alaska is thought to have very little oil and gas potential. Over ninety percent of the undiscovered recoverable resources in federal land in onshore Alaska is thought to be in the National Petroleum Reserve, which is being leased, and the coastal plain of the Arctic National Wildlife Refuge, which will be available for geophysical exploration in 1983. A congressional decision on possible development is due in 1988. In the lower

forty-eight states, most of the federal land with good oil and gas potential has been leased (120 to 130 million acres). This includes almost all of the federal land in the western Overthrust Belt below Montana. About eighty to ninety-five percent of the RARE II and BLM wilderness study areas with significant oil and gas potential have been made available for leasing and actual activity. The data indicate that, at least with respect to oil and gas, there has been no lockup of the resources in federal land.

Of course, the picture for the hardrock minerals is much less clear. But it bears repeating that the significant question is not the aggregate availability of federal land or resources, but the reasonableness of individual withdrawal actions. Given the role of the federal lands as a treasure house of nationally and internationally significant surface resources, and the inability to protect those resources adequately on any tract of land that is open to activities under the Mining Law, withdrawal may often be the only reasonable option.

The situation looks like that which occurred during the first two decades of this century. At that time increasing amounts of land being withdrawn from mineral entry forced a reappraisal of the federal mining laws that eventually resulted in the adoption of a leasing system for the fuel and fertilizer minerals. Withdrawals were made then due to concerns about competition, mineral conservation and a fair return to the government. Today's concerns are protection of and compensation for the nonmineral resources affected by mining on federal land. As before, it is unlikely that the "withdrawal problem" will be resolved until the underlying concerns are resolved by major modifications or replacement of the Mining Law itself. (OTA pp. 79-99, 215-220.)