



United States General Accounting Office

Report to the Honorable
Dale Bumpers,
U.S. Senate

August 1992

MINERAL RESOURCES

Value of Hardrock Minerals Extracted From and Remaining on Federal Lands



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RELEASE

**Resources, Community, and
Economic Development Division**

B-248533

August 24, 1992

The Honorable Dale Bumpers
United States Senate

Dear Senator Bumpers:

This report responds to your request that we identify the value of hardrock minerals extracted from federal lands that are subject to the Mining Law of 1872 (30 U.S.C. 22, *et seq.*). The Department of the Interior's Bureau of Mines (BOM) publishes information on mineral production. However, neither BOM nor the agencies responsible for managing most federal lands open to mining—Interior's Bureau of Land Management (BLM) and the U.S. Department of Agriculture's Forest Service—were able to provide us with information on the portion of hardrock minerals extracted from federal lands. Therefore, we sent a confidential questionnaire to mineral operators to obtain information on the estimated value of eight selected minerals produced or located on federal lands in 12 western states.

Specifically, this report presents the estimated value of production that mineral operators reported to us for eight hardrock minerals—barite, copper, gold, lead, limestone, molybdenum, silver, and zinc—extracted from public domain lands¹ in 12 western states² during calendar year 1990. These minerals account for a large percentage of the value of all hardrock minerals extracted (from federal and nonfederal lands) in this country. In addition, this report provides information on the estimated value of the eight minerals' reserves—identified mineral resources whose existence is well established (that is, their tonnage and quality have been estimated by engineering measurements) and deemed recoverable for a profit at 1990 costs and mineral prices—remaining on federal lands.

As agreed with your office, we plan to report separately on the extent to which other major mineral-producing countries and western mineral-producing states share in the proceeds from hardrock minerals extracted from their public lands.

¹Public domain lands are lands owned by the federal government that have never been privately or state-owned. In contrast, acquired lands are lands purchased by, condemned by, or donated to the federal government. Public domain lands constitute the vast majority of federal lands subject to the mining law. This report refers to public domain lands as federal lands.

²The 12 western states are Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. These states contain 99 percent of all federal lands.

Results in Brief

According to our questionnaire respondents, the total estimated value of the eight hardrock minerals extracted from federal lands in the 12 western states during 1990 was at least \$1.2 billion. Of this amount, about \$1 billion, or 83 percent, came from one state—Nevada. Also, the total estimated value of the known, economically recoverable reserves of these minerals remaining on federal lands at the end of 1990 in these states was about \$64.9 billion, based on 1990 mineral values.

Background

The Mining Law of 1872 was enacted to promote the exploration and development of domestic mineral resources. The law permits U.S. citizens and businesses to freely prospect for hardrock minerals (such as copper, gold, iron, lead, certain varieties of limestone, and silver) on federal lands not closed or withdrawn from mining. A prospector can file a claim, covering about 20 acres, which gives the claim holder the right to explore, develop, mine, and sell minerals from the claim without paying royalties or holding fees to the federal government. A claim holder can obtain a patent—fee simple title—for the land and the mineral rights after proving that an economically minable discovery exists. After the patent has been granted, the claim becomes private property.

When enacted, the law applied to all types of minerals on all federal lands. Legislation enacted over the seven decades has revised the mining law. Fuel minerals (such as coal, gas, and oil) and most common variety minerals (such as cinders, gravel, sand, and stone) are no longer covered by the mining law, leaving primarily the hardrock minerals. In addition, more than 135 million acres of the 727 million acres the federal government manages have been closed or withdrawn from mining.

The vast majority of the federal lands are concentrated in the 12 western states. About 53 percent of the land in these states is federal. In some states, the federal percentage of land is much higher. For example, about 82 percent of the land in Nevada is federal, and about 67 percent of the land in Alaska is federal.

Mining claims are also concentrated in the 12 western states. As of September 30, 1990, there were about 1.2 million hardrock mining claims of record on federal lands. Ninety-nine percent of these claims are in the 12 western states. Figure 1 illustrates the number of mining claims on federal lands in each of the 12 western states.

Figure 1: Mining Claims of Record on Federal Lands in 12 Western States, as of September 30, 1990



Source: Interior data.

The value of minerals subject to the mining law and produced in the United States in 1990 was about \$14 billion.³ On the basis of our survey results, we estimate that the value of the minerals in our review (excluding limestone) produced from federal and nonfederal lands in the 12 western states in 1990 was about \$8.6 billion.

Federal Lands as a Source of Hardrock Mineral Production and Reserves

Federal lands in the 12 western states are an important source of some hardrock minerals. For example, we found that in 1990 about a third of the gold and over a quarter of the silver produced in the 12 states were extracted from federal lands. We also found that federal lands contain large reserves of some minerals.

Production From Federal Lands

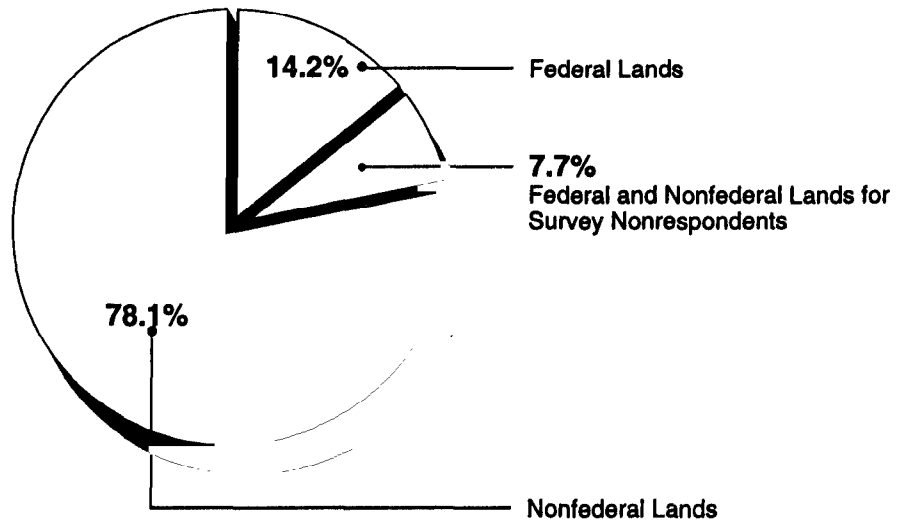
Using information obtained from our questionnaire and BOM, we estimate that at least \$1.2 billion worth of the eight selected minerals was produced from federal lands in the 12 western states in 1990. About 83 percent of the \$1.2 billion came from minerals that were produced in Nevada.

This estimate of the value of production on federal lands is conservative because it does not include data from (1) mining operators who failed to respond to our questionnaire or who said they had production on federal lands in 1990 but would not inform us of the amount and (2) small operators not included on BOM's 1990 list of mineral producers.

For the seven selected minerals (excluding limestone), we compared the amount of 1990 production from both federal and nonfederal lands reported by the 282 respondents to our questionnaire with BOM data for all production for the seven minerals in the 12 states. On the basis of our survey results, we estimate that our respondents account for 92.3 percent of the value of reported production—14.2 percent of the value of production came from federal lands and 78.1 percent came from nonfederal lands. Some producers did not respond to our questionnaire, and others gave only partial information. They account for 7.7 percent of the value of production—about \$658 million—reported to BOM and to us from federal and nonfederal lands. (See fig. 2.)

³This figure does not include limestone because the majority of limestone produced in the United States is not subject to the mining law and available data do not differentiate between which amount of limestone is subject to the mining law and which is not. Therefore, except when referring to the limestone information that we received from our survey respondents, we have excluded the presentation of limestone data throughout this report.

Figure 2: 1990 Estimated Share of Value of Hardrock Mineral Production From Federal and Nonfederal Lands in 12 Western States for Seven Selected Minerals



Source: GAO survey and BOM data.

About 53 percent of the land in these 12 states is public domain land. However, the value of minerals mined from federal lands was not in proportion to the amount of federal land—about 14.2 percent of the mineral production value was attributed to federal lands. The relatively small percentage of production from federal lands is at least partially explained by the fact that the Mining Law of 1872 gives claim holders who prove that an economically minable discovery exists on their claims the right to patent those claims, thus removing those lands from federal ownership. Over the years, many claim holders have availed themselves of this right. Through the mining law's patent provision, over 3.2 million acres of land have left federal ownership. For example, we found that 2 of the 10 largest gold producers in the United States are producing from patented lands. In addition, the president of the Arizona Mining Association told us that virtually all copper, gold, and molybdenum mined in Arizona is from patented lands that were originally federally owned.

The percentages of the minerals in our review that were reported as extracted from federal lands in the 12 western states and the percentages

of mines producing in 1990 that reported extracting these minerals totally or partially from federal lands are shown in table 1.

Table 1: Percentages of Reported Mineral Production From Federal Lands and Percentages of Operators Producing on Federal Lands in 12 Western States in 1990

Mineral ^a	Reported production from federal lands	Producing operators responding to questionnaire	
		Percent of respondents producing on federal lands	Number of respondents producing on federal lands
Gold	30	41	65
Silver	29	30	44
Copper	<1	9	4
Lead	24	29	5

^aToo few producers of barite, molybdenum, and zinc responded to our questionnaire to allow a presentation of individual data on these minerals without potentially disclosing confidential company data. Information on limestone is not included for reasons discussed in footnote 3.

Reserves on Federal Lands

Federal lands in the western states are also an important source of hardrock mineral reserves. The value of mineral reserves that was reported remaining on federal lands at the end of 1990 in the 12 western states for the eight minerals included in our review totaled about \$64.9 billion. This estimate of the value of reserves on federal lands is conservative because it does not include operators who did not respond to our questionnaire and others who were not sent questionnaires because they were not on BOM's list of operators with mineral production in 1989 or 1990.

Agency Comments and Our Evaluation

On July 10, 1992, we provided the Departments of the Interior and Agriculture with a draft of this report and requested oral comments within 15 days. On July 23, 1992, Agriculture responded, noting that although it could not confirm the estimated values in the report, given the methodology used, it accepted the values and the report. On July 24, 1992, Interior provided a written response acknowledging general agreement with our results. Interior noted, however, that we seemed to imply that it was inexpensive and easy to obtain a patent and suggested that we redraft the report to recognize that claim holders spend large sums of moneys to patent their claims. We recognize that the costs associated with the process of patenting a mining claim can vary considerably; however, the costs identified in the draft of this report were the minimum amounts

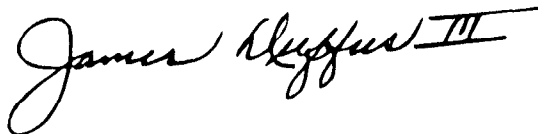
required by the Mining Law of 1872, as amended. Because these costs were provided only as background and are not directly related to the issues addressed in this report, we deleted them. Interior's comments and our evaluation are presented in appendix III.

We selected the 12 western states for our review because 99 percent of all federal lands and 99 percent of mining claims of record were located in those states, as of September 30, 1990. Officials of the federal land management agencies estimated that the minerals we selected for review account for a large percentage of the value of hardrock minerals extracted from their lands. Appendix I contains a more detailed discussion of our objectives, scope, and methodology, and appendix II presents the questionnaire we sent to mineral operators. We performed our work from March 1991 to April 1992 in accordance with generally accepted government auditing standards.

As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 10 days from the date of this letter. At that time, we will send copies to the Secretaries of Agriculture and the Interior. We will also make copies available to others upon request.

Please contact me at (202)275-7756 if you or your staff have any questions. Major contributors to this report are listed in appendix IV.

Sincerely yours,



James Duffus III
Director, Natural Resources
Management Issues

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Abbreviations

BLM	Bureau of Land Management
BOM	Bureau of Mines
GAO	General Accounting Office

Objective, Scope, and Methodology

To assist in the congressional debate on hardrock mining policy, Senator Dale Bumpers asked us to determine the value of hardrock minerals extracted from federal lands subject to the Mining Law of 1872. Because mining operators are not required to report their production from these lands and because the federal government is not required to collect such information, reliable figures have not been available.

Neither the Bureau of Land Management (BLM) nor the Forest Service have information on the exact amount of hardrock minerals extracted from lands that they manage. However, both agencies are generally familiar with the types and volume of mineral operations existing on lands that they manage through reviews of operators' plans of operation and site inspections. To estimate the value of hardrock minerals extracted from federal lands, we first asked BLM and the Forest Service to identify the hardrock minerals that made up a large percentage of hardrock minerals mined on lands they manage. We then selected copper, gold, lead, limestone, molybdenum, and silver because the federal land management agencies agreed that these minerals account for a large percentage of the value of hardrock minerals produced on federal lands. We included zinc in our review because zinc is usually found along with copper, lead, gold, and silver. We selected barite because when we developed our questionnaire, we were considering doing specific work on the resource ownership of barite for a related study.

We obtained from the Bureau of Mines (BOM) its list of mining operators in the United States that had produced these eight minerals during calendar years 1989 and 1990. BOM estimates that its list of mining operations covers from 75 percent to 100 percent of total national production, depending on the minerals.

To determine the value of hardrock minerals on federal lands, we chose 12 western states (Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming) because the vast majority of federal lands, hardrock mining claims, and hardrock mining are located in these states. We sent a questionnaire to each of the 352 hardrock mining operators identified by BOM in the 12 states. We sent follow-up questionnaires to encourage responses. We determined mineral value by multiplying the amount of mineral production reported in response to our questionnaire by the minerals' 1990 average price per unit obtained from BOM. For nonrespondents, we used mineral production data reported to BOM. Data were collected between November 1991 and April 1992.

The questionnaire asked the operators to provide their total 1990 production and mineral reserves and to allocate these amounts to federal and nonfederal lands (see app. II). Our questionnaire also included a pledge of confidentiality to operators to encourage responses. We promised operators that their responses would be summarized along with those of other operations and reported to the Congress in summary form only. We received 282 responses for a response rate of 80 percent. These respondents accounted for 92.3 percent of the value in 1990 for seven minerals in the 12 western states, excluding limestone. Nonrespondents included 13 operators that we were unable to locate through the mail.

We performed our work from March 1991 to April 1992 in accordance with generally accepted government auditing standards. We did not, however, verify actual figures obtained from individual operators regarding percent of production or percent of mineral reserves remaining on federal lands because verification would have required extensive analysis of proprietary company data.

Confidential Survey of Mineral Production on Public Domain Lands

United States General Accounting Office



Confidential Survey of Mineral Production on Public Domain Lands

The U.S. General Accounting Office (GAO) is developing information on hardrock mineral production from public domain lands. To do this, we need your help in identifying how much, if any, of your operation's 1990 production and/or reserves for each of the 8 minerals in our review came from public domain lands which were claimed under the Mining Law of 1872, and not patented.

Your responses to our questionnaire are confidential. They will be summarized along with those of other operations and reported to the Congress in summary form only.

We would appreciate your response by December 3, 1991, if at all possible. This will help us avoid costly follow-up. If you have any questions, feel free to call Jennifer Clayborne collect at 202-634-7351.

Instructions:

*Please answer on this form only for the operation identified in Question 1.

*Please report *all* quantities in the following measurement units:

Barite	Short tons of barite
Copper	Short tons of copper
Gold	Troy ounces of gold
Lead	Short tons of lead
Locatable Limestone	Short tons of limestone
Molybdenum	Pounds of molybdenum
Silver	Troy ounces of silver
Zinc	Short tons of zinc

Note: If you usually report metric tons or tonnes of copper, lead, or zinc, please convert to short tons for this survey.

*When completed, please return all forms in the enclosed postage paid envelope. If the envelope is missing or misplaced, please return completed forms to:

Ms. Jennifer Clayborne
U.S. GAO, RCED, Room 1826
441 G Street, N.W.
Washington, D.C. 20548

Definitions:

Production. Amount of mineral recovered in calendar year 1990, stated in commodity units (e.g., troy ounces of gold).

Reserves. Identified resources at the end of 1990 (after 1990 production has been subtracted) whose existence and nature are well established (i.e., tonnage and quality have been estimated by engineering measurements) and which could have been recovered at 1990 costs and prices for a profit, stated in commodity units (e.g., troy ounces of gold). Include proven and probable reserves, but *not* possible reserves, in your estimates.

1. To the best of your knowledge, did the operation named below produce or have reserves of barite, copper, gold, lead, locatable limestone, molybdenum, silver or zinc in 1990 on public domain land that is claimed under the Mining Law of 1872, and not patented? (*Check one*)

1. Yes → Continue
2. No → Stop here. Return form to GAO

Operation:

**Appendix II
Confidential Survey of Mineral Production
on Public Domain Lands**

2. Using the definitions provided on the front of this form, what was the 1990 total production and total reserves, after production, for each of the listed minerals for the operation named in Question 1 (regardless of land ownership)? (Enter number or zero, if none, in each sub-column)

Also, about what percent of these totals were from or on public domain land that is claimed under the Mining Law of 1872, and not patented? (Enter percent or zero in each sub-column)

The following abbreviations are acceptable: M = 1,000; MM = 1,000,000.

	Barite (Short tons)	Copper (Short tons)	Gold (Troy ounces)	Lead (Short tons)
Production				
1. 1990 total production, regardless of land ownership				
2. Percent of 1990 production from public domain land				
Reserves				
3. Total reserves at the end of 1990, regardless of land ownership				
4. Percent of reserves at the end of 1990 on public domain land				

	Limestone (Short tons)	Molybdenum (Pounds)	Silver (Troy ounces)	Zinc (Short tons)
Production				
1. 1990 total production, regardless of land ownership				
2. Percent of 1990 production from public domain land				
Reserves				
3. Total reserves at the end of 1990, regardless of land ownership				
4. Percent of reserves at the end of 1990 on public domain land				

Please provide below the name and phone number of the person we should call if we need further clarification of the information provided on this form.

_____ (name)

_____ (phone number)

Comments From the Department of the Interior



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240



JUL 2 1992

Mr. James Duffus, III
Director, Natural Resources
Management Issues
General Accounting Office
441 G Street, NW
Washington, D.C. 20548

Dear Mr. Duffus:

Thank you for providing us with the opportunity to review your draft report entitled, Mineral Resources: Value of Hardrock Minerals Extracted from and Remaining on Federal Lands (GAO/RCED-92-192). The Bureau of Land Management (BLM) has reviewed the findings of your report. We have no comments to offer on the analytical techniques used, since the details of how you reached your findings are not specified for reasons that include protection of confidential information. However, we are in general agreement with your results.

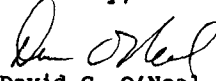
We note with considerable surprise your statements, in the first paragraph on page three, regarding the apparent ease and low costs associated with obtaining a mineral patent. We feel that this paragraph reinforces the incorrect perceptions that claims can be developed and patented for sums amounting to a "give-away" of the public lands. The paragraph should be redrafted to reflect the vastly larger sums of monies spent by mining claimants who seek mineral patents. To assist you in this, we are providing you with a document prepared by the BLM's Nevada State Office which details the minimum costs associated with the process of patenting a lode mining claim.

See comment 1.

**Appendix III
Comments From the Department of the
Interior**

Thank you for the opportunity to offer our comments. If there are any questions regarding the information in the attachment, or if we can be of further assistance to you in this matter, please contact us.

Sincerely,



David C. O'Neal
Assistant Secretary, Land and
Minerals Management

See comment 2.

Enclosures

+

The following are GAO's comments on the Department of the Interior's letter dated July 24, 1992.

GAO's Comments

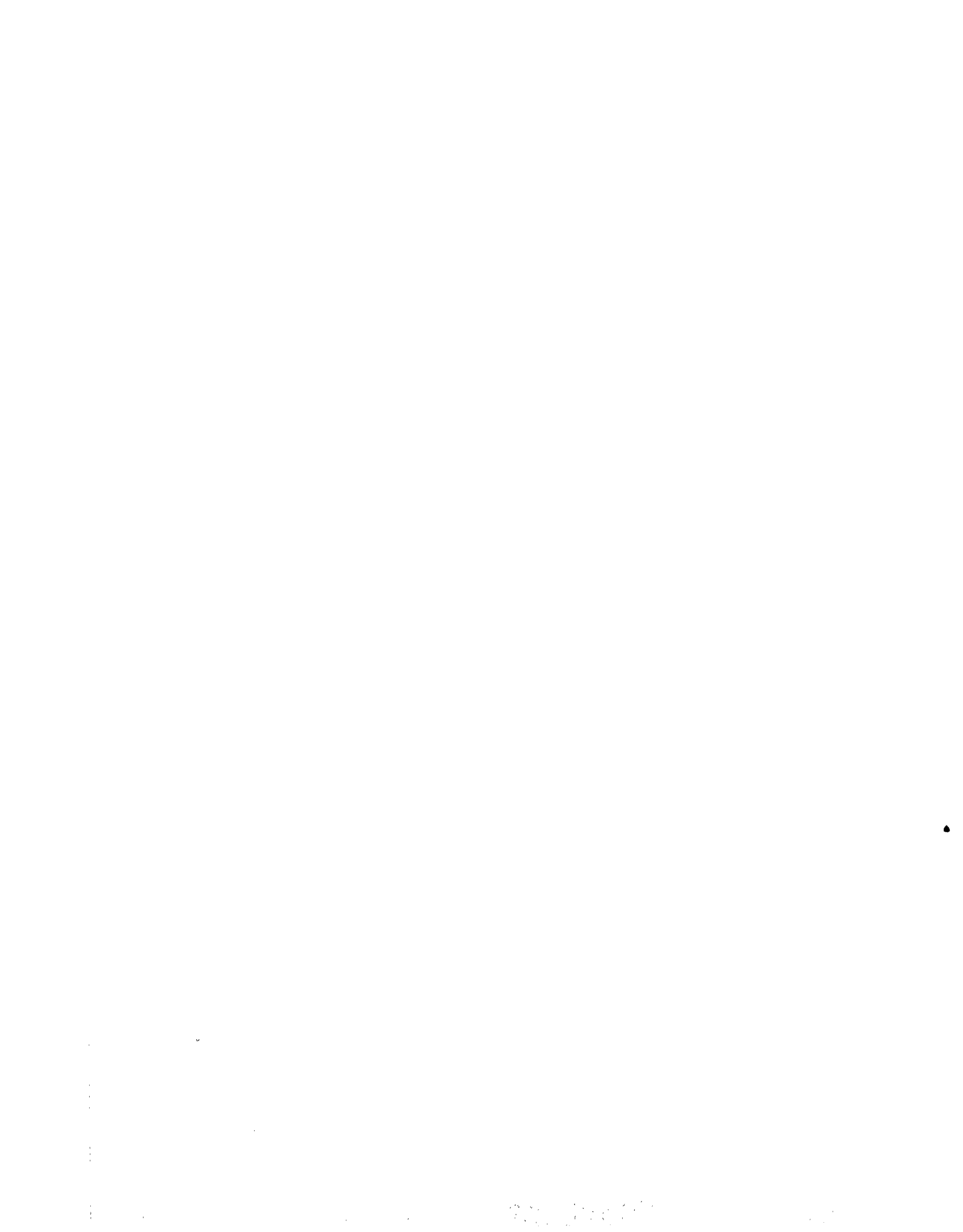
1. In our report, we had stated that a claim holder desiring to obtain fee simple title to the land and the mineral rights can, after proving that an economically minable discovery exists and that at least \$500 has been spent to develop the claim, patent the claim for \$2.50 or \$5.00 an acre, depending on the type of claim. Interior stated that the information on the costs to patent a mining claim seemed to imply that obtaining a patent is inexpensive and easy and suggested that we redraft the report to recognize that claim holders spend large sums of moneys to patent their claims. Interior provided an undated document prepared by the Bureau of Land Management's Nevada State Office stating that the costs associated with the process of patenting a mining claim can vary considerably and that, at a minimum, these costs are estimated to be \$37,900. While we did not verify the accuracy of this estimate, we agree with Interior that the costs of patenting a mining claim can vary considerably. However, the costs identified in the draft of this report were the minimum amounts required by the Mining Law of 1872, as amended. Because the minimum costs required by law to patent a mining claim were provided only as background and are not directly related to the issues addressed in this report, we deleted them.

2. The two enclosures to Interior's July 24, 1992, comments have not been included. One was an undated document summarizing the process and estimated costs of patenting a claim. This issue is not directly related to those addressed in this report, and we have deleted the narrative that gave rise to Interior's comment. The second enclosure questioned two estimates included in the draft of the report. Subsequently, Interior agreed with our estimates.

Major Contributors to This Report

Resources,
Community, and
Economic
Development Division,
Washington, D.C.

Robert W. Wilson, Assistant Director
Robert E. Cronin, Assignment Manager
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