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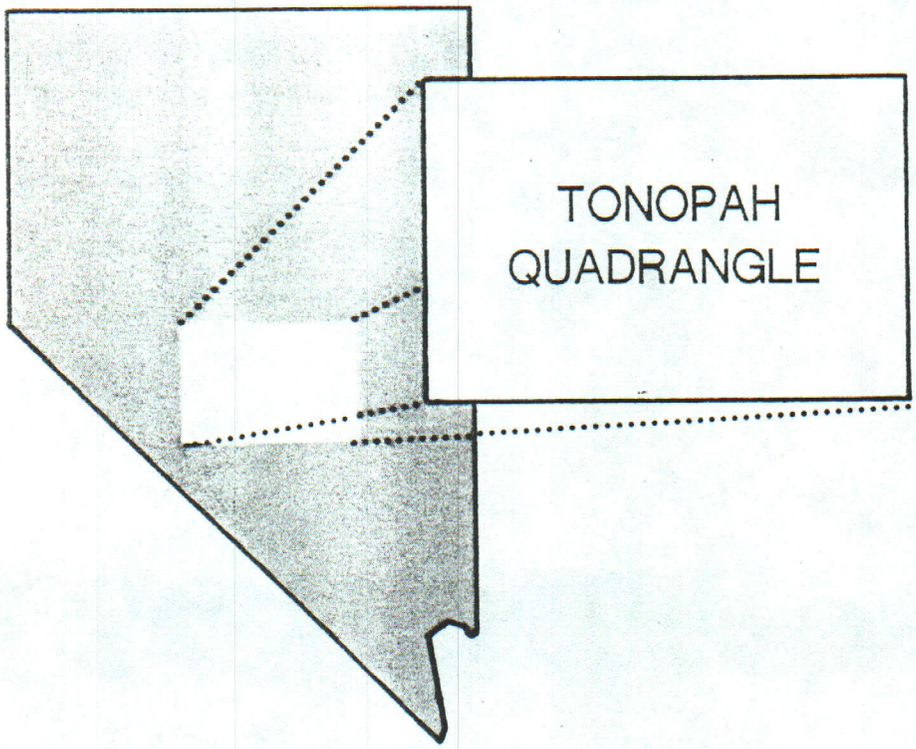
An Economic Evaluation of Selected Undiscovered Precious-Metal Deposits in the Tonopah Quadrangle, Nevada



UNITED STATES DEPARTMENT OF THE INTERIOR

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EXECUTIVE SUMMARY

This is a study of the potential for the production of gold and silver from undiscovered resources in five types of mineral deposits-polymetallic vein, epithermal, polymetallic replacement, carbonate hosted and hot spring- in the Tonopah Quadrangle, Nevada. It was completed as part of a continuing effort by the Bureau of Mines (BOM) and the U.S. Geological Survey (USGS) to develop and present mineral resource and potential supply information in a form that is more useful to decisionmakers and analysts dealing with mineral-related policy and economic issues. An important part of this effort has been the development and application of techniques to provide quantitative (quantities and values) rather than qualitative (high, low) estimates of the undeveloped and undiscovered portions of the mineral endowment of an area. The study merges existing geologic knowledge of the region with the economics of mining and milling using current technologies. Finally, this work was completed as a pilot effort for a joint BOM/USGS analysis of a much broader range of mineral terranes and deposit types across the entire State of Idaho.

Results

Estimated undiscovered precious metal endowment,[1] for the five deposit types studied in the Tonopah Quadrangle, average 6.3 million troy ounces of gold and 203 million ounces of silver. Table 1 shows that at prices of $400/oz for gold and $8/oz for silver, potential production from these resources is estimated to average 1.8 million ounces of gold and 125 million ounces of silver. It is estimated (not shown in Table 1) that 40 percent of the potential gold and silver production at these prices will come from epithermal deposits. Prices of gold and silver as high as $1000 and $20 per ounce, respectively, could result in production of 3.6 million ounces of gold and 146 million ounces of silver from the resources remaining to be discovered. During the past decade, the price of gold (in 1987 constant dollars) has ranged from around $300 to $900 per ounce.

This report discusses the importance of considering the less likely, but yet, very real possibility that some very large and/or very rich deposits remain to be discovered in an area. This is especially important when policy decisions are being considered which could limit access to these mineral resources for many years into the future.

1/ Resource endowment is defined as the total physical quantity of each metal contained in undiscovered deposits of the five types, subject to limits on minimum grade and minimum tonnage. Potential production refers to the portion of the endowment that may be recoverable under specified economic and technical conditions, assuming the area was fully explored.

In evaluating this broader range of possibilities (not shown in Table 1), the study finds there is 1 chance in 10 that the gold remaining to be discovered in the Tonopah Quadrangle is more than thirteen and one-half million troy ounces. At prices of $400 per ounce, there is a 10% chance that almost four and one-half million ounces of this remaining gold can be economically recovered, and, at $800 per ounce, this figure increases to seven and one-half million ounces. That amount of gold is almost twice the estimated[2] total gold production in the area from 1900 to 1984.

Table 1.-Cumulative Potential Average Production of Undiscovered Gold and Silver by Price Level, From Five Types of Deposits In the Tonopah Quadrangle of Nevada

Prices ($/tr. oz.)		Cumulative Potential Production (million troy ounces)	
Gold	Silver	Gold	Silver
200	4	0.7	85.6
400	8	1.8	124.5
600	12	2.8	138.8
800	16	3.3	143.7
1000	20	3.6	146.3

2/ See "Historical Production" section of this report.