Douglas County - general

Item 15

0040 0011

Mineral Resources Inventory and Analysis

of the

Pine Nut Planning Unit

Carson City District
Nevada and California

By

R. E. Bennett

1973

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INTRODUCTION

The following narrative and accompanying plastic overlays constitute the Pine Nut Mineral Resource Inventory and Analysis.

Inasmuch as only a limited amount of time was available for field work, this inventory and analysis should in no way be considered comprehensive. As a result, the documentation, analysis, and evaluation presented herein is (1) largely based upon cursory field reconnaissance (during which not even all known mineralized areas were visited), and (2) limited library research.

The Pine Nut Planning Unit encompasses about 598,000 acres, or approximately 936 sections of land. The format for this report is based upon procedures outlined in the Bureau of Land Management Manual, as supplemented by amendments and instruction memos. The manual instructions infer that this inventory and analysis shall be based primarily upon mineral resource inventories prepared over the years by geologists employed by the Bureau. However, the inventory for Nevada lands is relatively old (1965) and has not been properly maintained.

Reference is made to the published literature insofar as possible. It goes without saying, however, that this study could not have been accomplished--and in fact would have very little value--without the considerable quantity of information published over the years by numerous individuals and organizations. These contributions are hereby gratefully acknowledged.

The narrative portion is composed of two parts, the Present Situation and Minerals Management Opportunities. Additionally, two sets of maps were prepared on plastic overlays in order to present some of this information graphically. They are referenced to both the existing Mineral Resource Inventory and to this narrative.

1. <u>Mineral Status</u> - depicts status of the mineral estate (ownership) of the units, regardless of surface ownership.

2. <u>Mineral Resources</u> - depicts "indicated mineral areas", "mineral resource areas", and "mineral development areas".

   "Indicated mineral areas" are large areas, that based on geology, may contain mineral deposits, but the exact location of the deposits may not be known. Known areas of mining claims, without regard to geology, are also included. "Mineral resource areas" are located within indicated mineral areas and have a greater potential in terms of discovery of significant mineral deposits. "Mineral development areas" contain known mineral deposits that are in production, are being developed, or are capable of being developed under existing technology. Also included in this catagory are adjacent lands necessary for dump sites, mill or plant sites, and other activities associated with the necessary development of an ore deposit.

Any attempt to assess the mineral potential of an area is a difficult task at best. When time does not permit a thorough analysis, the problems involved become impressive. Therefore this report does not presume to fully evaluate the potential of an area. Whether or not significant ore deposits will be discovered can only be determined by detailed geologic mapping and exploration. These factors must be kept in mind by anyone using this document and its related exhibits for contrary to popular impression, mineral resources are not finite in quantity, but change over time.

I. PRESENT SITUATION - MINERALS (URA-3)

The Pine Nut Planning Unit encompasses southern Storey County, a portion of western Lyon County, eastern Carson City County, and nearly all of northern and central Douglas County, Nevada, four counties located in the western portion of the state.

V. E. Scheid, in Bonham and Papke, relates the basic mining history of Storey County as follows:

> "In 1859, when vein gold was discovered on the eastern slope of Mount Davidson, in what is now Storey County, the territory that has since become Nevada was a virtually uninhabited wilderness tenously administered as a part of the Utah Territory. The rush of thousands of prospectors to the Comstock Lode during the next few years caused the federal government to establish a separate Nevada Territory in 1861. Storey and Washoe counties were among the nine original counties created the same year by the first Territorial legislature. It was the silver and gold of the Comstock, that, by causing the rapid increase in the Territory's population, justified the admission of Nevada to statehood in 1964 by President Linclon's wartime administration. It may, therefore, truly be said that Nevada was born of its mineral wealth.
>
> "The small camp at the head of Sixmile Canyon rapidly grew into the wilderness metropolis of Virginia City, the prototype of scores of other bonanza type mining camps that, during succeeding decades, were to bloom not only in Nevada but throughout the West. Unlike most of these, however, the Comstock quickly matured into a stable, productive mining center, that would contribute to the nation a total mineral production of almost $400 million during the sixty-odd years of its existence as a viable mining community. Here in this mining area were first developed the square-set timbering methods of stope support, as well as many other mining and engineering advances that would be applied in future years wherever men were forced to endure the extreme pressures and temperatures of the Earth's depths in search of mineral treasure.
>
> "The population and the economic importance of Storey County declined in direct proportion to the decline of mining on the Comstock, and it has not enjoyed growth comparable to neighboring Washoe County in recent years. Both counties, however, have received increasing attention as favorable sites for mineral exploration in recent years, and this activity can be expected to continue, and to increase, as more is learned of the geologic structure and the rock sequence of this area."

Bonham, in Bonham and Papke, in addition, states:

"Storey County...has a total production of about $400 million in metals, of which $393 million represents silver and gold production from the famed Comstock Lode. Some mercury, copper, and lead have also been produced in Storey County. Antimony, zinc, and selenium are known to occur in the county, principally in the ores of the Comstock Lode, but no production of these metals has been recorded to date...

He concludes with:

"The occurrence of relatively little explored areas of extensive mineralization with attendant strong hydrothermal alteration in...Storey County, suggests that significant metallic ore deposits are yet to be found in the area."

Concerning the basic history of Lyon, Douglas, and Carson City counties, Moore states that:

"The history of mining in Nevada began in May of 1850, when placer gold was first discovered near the present site of Dayton in northwestern Lyon County. This placer gold was worked for several years, and eventually led to the discovery of its source in 1859 at the Comstock Lode. The major part of the Lode is north of the county line in Storey County, but the Silver City district is in Lyon County and constitutes the southern end of the Comstock fault system. The history of the Silver City district is intimately tied to the general history of the Comstock Lode. Up until 1905, most of the mining of the tricounty area was done in the Silver City region. However, during the early excitement of the Comstock in the 1860's and 1870's, the surrounding countryside was heavily prospected and several small mining districts were formed. These include the Como district in Lyon County; the Genoa and Red Canyon districts in Douglas County; and the Voltaire and Carson districts in Carson City County. Also during this period, some low-grade coal deposits were developed in the Eldorado district for use in the Comstock region.

"The Como district production came mainly in two periods, 1919-1920 and 1935-1936, and by 1940 more than half a million dollars in gold and silver had been produced. During World War II, a premium on tungsten stimulated many small properties to a limited production. Most of these properties are in the Tungsten Hills or Gardnerville district.

"In the early 1920's, and again from 1940 to 1943, considerable gold production came from large-scale dredging operations on the gravels in Gold Canyon near Dayton. From 1941 to 1943, the Dayton Dredging Co. reported dredging a 3,603,276 cubic yards with a recovery of $1,115,752. The company used a 1.5-million pound dragline with a 180-foot boom and a 14-cubic yard bucket, reportedly the largest ever used in gold placer work."

He emphasizes that:

"Despite its relatively small size, the tricounty area, especially Lyon County, has contributed substantially to the mineral production of the State of Nevada. Through 1965, the three counties produced $316,086,230 in mineral commodities. In 1958, the counties produced 23 percent of the State total; in 1960, 27 percent; and in 1965, 31 percent."

The following list summarizes the value of mineral production through 1965 in Lyon, Douglas, and Carson City counties[1].

Period	Lyon	Douglas	Carson City
Pre-1941	$ 32,005,359	$ 292,388	-----
1941-1950	2,160,688	3,968	$ 10,988
1951-1960	138,099,567	8,278,300	394,815
1961-1965	125,999,171	8,469,633	371,354
Total	$298,264,785	$17,044,289	$777,156

Prior to the establishment of the county system of government, a number of "mining districts" were established in the planning unit to facilitate record keeping. The nomenclature "mining district" is presently archaic, but because early mining history and data is referenced to individual "districts", they will be referred to upon occasion in the following text. It should be clearly understood, however, the term "mining district", and its ofttimes vaguely described parameters, have no significance whatsoever in defining the presence or type of mineral resources or in their evaluation: The fact is that all persons concerned should avoid using the term insofar as practicable.

1 Inasmuch as the planning unit does not include the counties in their entirety, the figures for the area of this report would be lower - especially for Lyon County where the bulk of production has come from Anaconda's copper pit at Yerington.

A number of areas exhibiting manifestations of the probable presence of valuable mineralization were noted by the early miners in the region. It was in these areas that prospecting was concentrated. Later on these became organized and known as mining districts. Those that were named are summarized below:

Name	Year Developed	Period of Greatest Activity	Commodities Extracted	Recorded Production	References
Carson	1860's	sporadic to 1930's	gold, silver, copper, lead, tungsten	small	Overton
Castle Peak	1927	1929-35	mercury	2,600 flasks	Bonham
Como	1860's	early 1900's 1930-40	gold, silver	$511,000	Moore
Comstock Lode (including Flowery and Occidental Lode)	1850's	1850's-1950	gold, silver	393 million	Bonham
Delaware	1870's	1900-45	iron, gold, silver, copper, tungsten	small	Moore
Gardnerville	1860	early 1900 1930's	gold, silver, copper, tungsten, antimony	$54,000	Moore
Genoa	1860's	Prior to 1865 1920's	copper, gold, silver	small	Overton
Mount Siegel	1891	1896 1914-30	placer gold	$3,500	Moore
Ramsey	1915	1915 1933-40	gold, silver	$373,000	Moore
Red Canyon	1863	1880's early 1900 1930's	tungsten, iron	small	Moore
Silver City	1850	1871-1923 1930-1943	gold, silver	14 million	Moore
Voltaire	1860's	early 1900 1920-30	graphite, gold arsenic, zinc	small	Overton

Nonmetallic minerals occur widely across the planning unit. Many types of these commodities are being extracted today and some have been worked for years. The more significant such deposits are summarized below:

Name	Year Developed	Period of Greatest Activity	Commodities Extracted	Recorded Production	References
Chalk Hills	1910's	1910's to 1930's	diatomite	small	Bonham
Eldorado	early 1860's	1860's	coal, limestone	small	Moore
Flowery Foothills	1960	to present	pumice	moderate	Bonham
Mound House	1914	to present	gypsum, gypsite	large	Moore
Prison Quarry	1862	late 1800's	dimension stone	large	Moore
Washoe Mountains	1955	to present	volcanic cinders	moderate	Moore

The value of mineral commodities extracted from the Pine Nut Planning Unit to date is approximately $409,000,000 in metallic minerals. Statistics on nonmetallic minerals are not readily available because many companies request that the data be kept confidential. However, production in 1970 alone was about $1,000,000, mostly in sand and gravel.

It is estimated that approximately 90 percent of the Pine Nut Planning Unit area has a potential for the occurrence of either metallic or nonmetallic deposits of either current economic value, or of economic value in the reasonably forseeable future.

The metallic mineral of economic interest occur mainly in veins, replacement deposits, or as particles disseminated throughout pre-existing rock. Generally such deposits occur in volcanic rocks, metamorphic rocks, or sedimentary rocks (including sand and gravel). That is just about all of the rock types occuring in the planning unit with the exception of massive granite.

Nonmetallic rocks and minerals of economic value occur mainly in Tertiary volcanic and sedimentary rocks. However, many of the so-called nonmetallic or industrial minerals closely resemble common, valueless rocks, and this situation creates real problems in their identification. Furthermore, the ubiquitous overburden commonly conceals more than is revealed and hence poses considerable problems in the discovery and evaluation of these type of deposits.

Several mines were active in the area early in 1973. Pumice was being extracted from two small open pits southwest of McClellan Peak, and the Naturalite Corporation was mining pumiceous rhyolite from their property northeast of Sixmile Canyon.

Gypsum and gypsite are currently being mined in the vicinity of Mound House for use in the manufacture of cement and as a soil conditioner respectively. Standard Resources, Inc., was completing installation of a plant to produce silica from their Veta Grande Mine south of Minden.

Several prospects were found to be active in the area. A Denver, Colorado company has recently completed a staking program in the foothills east of Gardnerville in the vicinity of Pine Nut Creek. Exploratory activities are anticipated in this area in the near future. Intermountain Exploration Company was conducting exploratory drilling on their claims near Virginia City.

Interest has been expressed in several other properties in the planning unit--especially with the continued increases in the price of gold. These properties include the gold placers at Slaters mine and west of Dayton.

The Bureau operates four mineral commodity "community pits" in the planning unit. Three are active on a year-long basis and serve numerous private individuals and contractors in western Nevada and eastern California. One pit is located immediately south of Carson City, another south of Dresslerville, and a third southeast of Dayton. Decomposed granite ("DG"), "top-soil", and sand and gravel are available for these sources. The fourth pit, presently inactive, is located northeast of the Gardnerville dump. Sand and gravel is available from this source.

It may be anticipated that the level of metallic mineral exploration in the planning unit will increase moderately with time, that nonmetallic mineral activities will increase greatly with time, and exploration for geothermal energy sources will be on a high level for at least a period of a few years over the near term. Rising gold prices will cause a considerable influx of "weekend" prospectors into the planning unit.

There is no significant potential for the occurrence of "leasing act" minerals in the planning unit, and little or no exploration for such minerals is anticipated.

There is little or no potential for the existence of petroleum products in the planning unit although some of the larger valleys--such as Carson and Eagle Valleys--conceivably might contain limited quantities. However, the sedimentary environments in these basins is such that the accumulation of petroleum is highly unlikely.

The potential for geothermal energy resources is somewhat greater than that for petroleum. The areas delineated on the base-map overlays as being prospectively valuable for geothermal steam are after U. S. Geological Survey data. Basically, areas containing volcanic rocks are favorable; areas within volcanic terrain exhibiting evidence of hydrothermal alteration are more so; and, areas containing hot springs have, of course, an even greater potential. Less obvious are areas containing concealed intrusive rocks wherein probably the greatest potential of all exists for the development of significant sources of geothermal energy. Such areas would not exhibit any indications whatsoever at the surface which a non-earth scientist would associate with geothermal energy.

General Geology

Moore writes that:

> "The entire...area is within the borders of the Cretaceous Sierra Nevada batholish and pre-Cretaceous rocks are present only as roof pendants in the batholith. The pre-Cretaceous rocks are Triassic and Jurassic in age and are predominantly metamorphosed volcanic rocks (chiefly andesite) and volcanogenic sedimentary rocks. Limestone and gypsum are interbedded with the clastic and volcanic rocks.
>
> "Overlying the granitic and included metamorphic rocks is an extensive sequence of Cenozoic volcanic and interbedded sedimentary rocks. In general, this sequence begins with widespread rhyolite tuffs, up to several thousand feet thick, which are considered to be Miocene in age. Overlying the tuff is a thick sequence of andesitic and dacitic rocks, largely breccias, with thick sequences of intercalated lacustrine and fluviatile sediments of Miocene and Pliocene age. The latest general period of volcanism extruded basaltic flows which cap parts of some of the ranges and are mainly Pliocene or Pleistocene in age."

Bonham states that:

> "The structural geology of the area is complex and still little understood....The data presently available indicates that there have been two main deformational episodes, one of late Mesozoic age, and the other of Cenozoic age.
>
> "The Mesozoic deformation began in the Jurassic with the folding, faulting, and low-grade regional metamorphism of the Triassic and Jurassic volcanic and sedimentary rocks. Numerous granitic plutons were subsequently intruded into these rocks, principally in the Cretaceous, during the waning stages of the orogenic episode.
>
> "The Cenozoic deformation began in the Miocene and has continued into the Recent. Structural elements associated with this deformation include normal faulting and associated tilting, warping, wrench faulting, and related folding and volcanism."

The basement complex of the Pine Nut planning unit is basically identical to that of the northern Sierra Nevada--Mesozoic metamorphosed sedimentary and volcanic rocks and somewhat younger intrusive rocks of granitic composition occur in complex inter-relationships to each other. These older rock types have considerable significance in terms of occurrence of metallic mineral deposits. Other metallic ore deposits, such as the Comstock Lode, occur in much younger (Tertiary) volcanic units. In contrast, the nonmetallic deposits are mainly restricted to the younger (Tertiary) volcanic units--which include intercalated sedimentary rocks--and the much younger (Quaternary) sands and gravels.

The geology of the planning unit is further complicated by the existence of the Sierra Nevada range frontal fault systems, which generally trend northerly. The end result of these major faults is manifested in large-scale dislocations of pre-existing rock units, and the creation of zones with which metallic ore deposits may be associated. As to the significance of faulting to ore deposits, the Virginia City ores, as well as practically all of the other presently known metallic mineralization in the planning unit is intimately and directly associated with fault zones.

see individual district files
for write-ups

BLM COMMUNITY PITS
(Sand, gravel, topsoil)

GENERAL BACKGROUND

Four community pits are located in the Pine Nut Planning Unit. These sites, their location, and specific commodities are summarized below:

NAME	LOCATION	MATERIAL
Clear Creek Community Pit	T. 15 N., R. 20 E., sec. 31	Decomposed granite, topsoil
Dayton Community Pit	T. 16 N., R. 21 E., sec. 24	Sand and gravel, fill
Dresslerville Community Pit	T. 12 N., R. 20 E., sec. 27	Decomposed granite, topsoil
Gardnerville Community Pit	T. 12 N., R. 21 E., sec. 18	Sand and gravel, fill

GEOLOGICAL AND TECHNICAL DATA

Sand and gravel are common products of erosion that typically have been deposited by water. Common sources include alluvial fans and river and stream channels.

Decomposed granite is a coarse "sand", formed in situ, by the weathering of the parent granitic rock.

Topsoil is nothing more than pre-existing soil that has been enriched in organic matter and other nutrients derived from the decomposition of plants. Where an abundance of vegetative cover exists, there is likely to be good topsoil.

POTENTIAL FOR DEVELOPMENT

There is every indication that continued urbanization in the resource area will require additional sources of construction material in the future. These materials are of value only if they are located reasonably close to population centers. Because of high transportation costs, their value diminishes rapidly with increased distances from consumption points. Therefore, the community pits will receive increased use in the future, and as present ones are exhausted new pits should be established to provide for orderly growth of the community.

II. MINERALS MANAGEMENT OPPORTUNITIES (URA-4)

INTRODUCTION

The following narrative, including the section on commodities, attempts to depict the future mineral potential of the Pine Nut Planning Unit. It should be noted, however, that when attempts are made to evaluate future mineral needs, prediction accuracy rapidly diminishes as the time increment over which present trends must be extrapolated increases. Although this analysis has been based upon the best information available, suffice it to say that there are a multitude of factors which could appreciably alter the future minerals picture.

The mineral resource areas delineated in this report have been established from data compiled from several sources. These sources include the Nevada Mineral Resource Inventory, geologic literature including AEC records, county legal records, background knowledge, and field reconnaissance in the area. Undoubtedly there are areas containing mineral resources that are not indicated in this report, but because limited field time did not permit a comprehensive inventory these areas have not been identified. Furthermore, it is assumed that there are undiscovered mineral deposits in the resource area whose location is presently concealed beneath alluvium and/or younger rocks and are thus unknown.

Sites of identified potential future mineral extraction in the Pine Nut Planning Unit have been depicted graphically on a plastic overlay as "Mineral Development Areas". These areas contain known mineral deposits that are in production, are being developed, or are capable of being developed under existing technology. Also included in the Mineral Development Areas are adjacent lands necessary for dump sites, mill or plant sites, and other activities associated with the necessary development of an ore deposit. This overlay should in no way be construed to limit the potential of an area to within fixed, rigid boundaries inasmuch as the limits of an ore deposit may be extended by additional exploration, new technology, changes in economic conditions, or an entirely new deposit may be discovered therein.

OUTLOOK FOR THE FUTURE

The following section contains brief summaries for individual mineral commodities present or anticipated to be discovered at some later date in the Pine Nut Planning Unit. The main objective of this coverage is an attempt to survey current uses, prices, and to analyze present and future supply and demand relationships for each commodity. It should be noted, however, that the outlook for each mineral commodity represents only a brief digest compiled from various published sources[1] and by no means is construed to be comprehensive.

1 Mineral Facts and Problems, U.S. Bureau of Mines Bulletin 650, 1970.

Mining Engineering, vol. 24, No. 1, 1972.

Engineering and Mining Journal, monthly.

Market quotations for the various commodities have been compiled from several sources. Engineering and Mining Journal, a monthly publication devoted to the mining industry, is an excellent source of current market (price) information. Prices--especially price increases --must be interpreted with caution inasmuch as most increases simply reflect inflationary gains of several percentage points per year. Price decreases may simply represent minor short-term fluctuations and not a major trend. Individuals wishing further background material or latest market quotations should consult Mineral Facts and Problems, U. S. Bureau of Mines Bulletin 650, or any current periodical devoted to news and developments in the mining industry such as E & M J (above).

Included with each commodity is a section listing areas containing or having a potential for the specified resource. This list should in no way be interpreted to limit the potential of other areas not designated to contain said commodity.

The "future addition and comments" section in the following summaries contain space for future notations concerning each commodity.

OUTLOOK FOR THE FUTURE

ANTIMONY

Antimony is used in the manufacture of batteries, fire-retardent chemicals, rubber and plastic products, and in various alloys. Antimony is produced from its primary ore, stibnite, and as a byproduct of the refining of silver and base-metal ores. Approximately 85 percent of the United States antimony output is derived from foreign ores. Over one-half of our domestic production comes from recycling. Scrap battery plates constitute the single most important secondary source of antimony.

Consumption of antimony will generally continue to increase, especially in the fields of battery and flame retardant/repellant manufacturing. However, because of the important military applications of antimony, wide demand fluctuations have occurred in the past as the result of the difference between wartime requirements and those of peacetime. The winding down of hostilities in Southeast Asia will probably result in a temporarily depressed antimony market.

PRICES

Prices are in cents per pound for antimony metal and in dollars per long ton for ore.

	Jan. 1971	Nov. 1972	Apr. 1973
Foreign metal	90.0¢	55.0¢	70.0¢
Domestic metal	96.0-97.0¢	57.0-68.0¢	66.0-80.0¢
Foreign ore (60% Sb)	$13.50-16.50	$8.00-9.00	$9.20-10.20

DISTRICTS MOST LIKELY TO BE AFFECTED

Gardnerville District NW-40-3

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

ARSENIC

The chief use of arsenic is in the manufacture of pesticides, herbicides, and defoliants. Environmental considerations have created increasing consumer resistance to the use of arsenical insecticides, and competition from organic pesticides has further decelerated market growth. The only other major end-use of arsenic is in the glass industry where it is used as a decolorizer and to make opal glass.

World supply of arsenic generally exceeds world demand. Domestic arsenic consumption is met almost entirely by foreign import. What little arsenic is recovered in the United States is produced as a byproduct of base-metal ores.

It is expected that the United States will continue to import most of its arsenic requirements in the future. Increased government regulations and public concern over the use of arsenic could appreciably lower future domestic demands, however.

PRICES

Prices are in cents per pound.

	1968
Arsenic oxide	6.0-6.25¢
Arsenic metal	47.4¢

DISTRICTS MOST LIKELY TO BE AFFECTED

Voltaire District NW-31-1

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

BARITE

Barite is used intensively in the petroleum industry as a weighting agent in drilling muds. Approximately 75 percent of domestic barite consumption is in the end-use. This high dependence on a single end-use makes barite very sensitive to increases or decreases in oil drilling activities. The standard requirements for barite used in drilling muds are that: it have a specific gravity of 4.2, contain 92 percent $BaSO_4$, be free of soluble salts, and 90-95 percent must pass a 325 mesh screen.

The glass, paint, rubber, and chemical industries consume most of the remaining 25 percent of barite consumption in the United States.

As the energy shortages grow, an increase in oil and geothermal exploration should create a greater demand for barite. However, because of the low-cost, high-volume nature of the material most of Nevada's barite will be marketed in the western states, with California being the most important potential purchaser.

Diversification of the barite industry into new markets created by improved or new technology could appreciably increase the future demand for barite. However, overall consumption could be lowered should domestic petroleum exploration slack off because of increased reliance of other energy sources such as geothermal steam or nuclear power.

PRICES

Prices are in dollars per ton and depend upon the specifications mentioned above and other physical and chemical attributes.

June 1971	April 1972	April 1973
$15-78	$15-78	$14-78

DISTRICTS MOST LIKELY TO BE AFFECTED

Carson District	NW-31-1
Delaware District	NW-31-1

FUTURE ADDITIONS AND COMMENTS

Bennett, June 1973

OUTLOOK FOR THE FUTURE

COPPER

The primary use of copper is in electrical equipment and related supplies. Electrical uses accounted for almost 50 percent of the 1968 copper demand in the United States. Other important uses and their respective consumption percentages in 1968 are tabulated below:

Roofing, tubing, plumbing, etc.	16%
Transportation	12%
Copper alloys	10%
Munitions	6%
Miscellaneous uses (chemical, coins, jewelry, etc.)	7%

Total copper demand for the United States in 1968 amounted to 1.54 million short tons. Projected total demand in the year 2000 could range from 4.90 million to 7.86 million short tons. These figures represent a cumulative demand for 96.4 million to 128.2 million short tons of copper during 1968-2000. Known total domestic reserves are available to meet the bulk of the lower cumulative demand at prices close to present levels. However, increased importation or exploitation of marginal domestic properties at higher prices will be required to satisfy the higher cumulative demand figure.

The increasing demand for copper will certainly spur the discovery and development of new domestic reserves, especially considering the volitile position of foreign copper properties still owned by United States companies. Additionally, future development of new benefaction techniques or substantial price increases will result in renewed exploration for, and re-evaluation of, presently submarginal resources.

Although copper is the metal of choice in many applications, alternate metals are sometimes available. This substitution factor will of course be influenced by future price levels and supply of copper.

Bennett, July 1973

PRICES

Prices are in cents per pound.

	Feb. 1970	Jan. 1971	Nov. 1972	Apr. 1973
Domestic	56¢	51.525¢	50.61¢	59.548¢
Imported	69¢	45.427¢	45.645¢	69.964¢

DISTRICTS MOST LIKELY TO BE AFFECTED

Delaware District	NW-31-1
Carson District	NW-31-1
Voltaire District	NW-31-1
Red Mountain District	NW-31-1
Mineral Peak Area	NW-31-7
Genoa District	NW-31-8
Gardnerville District	NW-40-3

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

CLAY

As a group, clays are used primarily in ceramic products, cement, and lightweight aggregate. These uses account for about 90 percent of the clay consumption in the United States. The other 10 percent, consisting of high-quality clays suitable for use as fillers, catalysts, and chemicals, accounts for more than 75 percent of the total clay value.

Most clays are a low-price commodity and cannot stand high transportation costs. Only high quality clays can be shipped any great distance. Because of this transportation factor, clays are typically mined close to marketing areas.

Mixtures of clays have fundamentally different characteristics and because of this factor, many deposits are suitable only to limited end-uses. Therefore, local shortages may occur due to the lack of material suitable for specific end-uses.

The clay market is expected to increase in the future and major technological advances (such as the production of aluminum from common clay) could materially increase the demand for clay.

PRICES

Prices are in dollars per short ton for raw material. Prices in 1968 ranged from one dollar per ton for common clays and exceeded ten dollars per ton for some of the high quality clays.

DISTRICTS MOST LIKELY TO BE AFFECTED

Ramsey District	NW-30-15
Dry Lake Clay Deposit	NW-32-6

Any area that has been argillized has a potential for clay.

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

DIATOMITE

Diatomite is composed of the silicious skeletons of microscopic one-celled organisms (plants) called diatoms. These skeletons accumulate at the bottom of lakes as the plants die and sink. The inert character of the skeletons, porosity, and large surface area of the diatom accumulations make an ideal filtration medium. Diatomite is also used as a mild abrasive, filler, and insulation material. The following list gives the 1968 consumption percentages for various uses of diatomite:

Filtration	50%
Fillers	20%
Insulation	4%
Miscellaneous (Abrasives, aggregate, catalyst carriers)	26%

The United States is self-sufficient in diatomite and in 1968 about 25 percent of our domestic production was exported. Projected domestic reserves are sufficient to meet the estimated consumption through the year 2000.

Present usage of diatomite requires selective mining of horizons that have the proper characteristics for each application. Exploration for and evaluation of diatomite is difficult as no suitable method is available to determine the product grade that can be produced without testing finished products from each individual deposit. Additionally, there are many alternate materials that may be substituted for diatomite. However, it is anticipated that advanced utilization and marketing techniques will offset losses due to substitute materials. Nevada's diatomite deposits should be of increased interest in the future. Because diatomite is relatively a low price, high bulk product, transportation costs will limit the exploitation of deposits not in close proximity to shipping facilities.

PRICES

Prices are in dollars per short ton.

Use	1968 average	1969 average	1970 average
filtration	$ 67.74	$ 70.14	$ 61.67
abrasives	$128.70	$134.19	$119.19
miscellaneous	$ 35.34	$ 33.16	$ 33.58

Bennett, July 1973

DISTRICTS MOST LIKELY TO BE AFFECTED

Chalk Hills area NW-19-3

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

GOLD

The traditional use of gold as jewelry is declining and only 50 percent of the commercial gold production is used for this purpose. Industrial uses of gold are increasing and in 1970 about 40 percent of the total gold demand was consumed by industry. Electronic components accounted for the large increase in industrial gold needs. Dental gold requirements represent the final 10 percent of commercial gold use.

The inescapable conclusion is that the commercial requirements for gold are increasing in a market where demand has historically exceeded supply. As a result, increased gold prices will be the rule rather than the exception.

The U. S. Bureau of Mines cites Nevada as having the third highest gold reserves in the nations. Most of these reserves are not economically recoverable at the old ceiling of $35.00 per ounce. Since the ceiling has now been lifted it is anticipated that there will be increased exploration for new gold deposits and re-evaluation of properties considered uneconomic in the past.

PRICES

Prices are in dollars per troy ounce on the open market.

Feb. 1970	Jan. 1971	Nov. 1972	Mar. 1972	July 1973
$35.39	$37.87	$62.91	$82.50	$125.81

DISTRICTS MOST LIKELY TO BE AFFECTED

Ramsey District	NW-30-15
Delaware District	NW-31-1
Carson District	NW-31-1
Voltaire District	NW-31-1
Silver City District	NW-31-1
Red Mountain District	NW-31-1
Comstock Lode District	NW-31-1
Mineral Peak Area	NW-31-7

Bennett, July 1973

Genoa District	NW-31-8
Como District	NW-31-15
Red Canyon District	NW-40-1
Mt. Siegel District	NW-40-1
Monarch Mine Area	NW-40-2
Gardnerville District	NW-40-3

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

GEOTHERMAL RESOURCES

Because of impending shortages of fossil fuels, and essentially complete development of hydrological sources, geothermal resources will become increasingly important for power generation in the future. The industry is still in a very early stage of development, but it is expected that exploration and development of geothermal resources will increase dramatically in the future.

Two types of geothermal systems are considered to have present commercial application:

(1) Vapor-dominated systems (dry steam) are believed to contain both saturated steam and water in the reservoir. When a well is drilled, the decrease in pressure superheats and dries the steam. The steam may be used to drive a turbine directly.

(2) Hot water systems are believed to result from a thermally driven convection system which moves the heated water upward. When a well is drilled, a portion of the water flashes into steam and both water and steam come to the surface. The steam is separated from the water and used to drive a turbine. To date, only hot water geothermal systems are known in Nevada. Many of Nevada's known geothermal resources contain abundant, and often total impurities. Exploitation of these thermal areas will have to await the development of a closed-power generating system whereby toxic impurities are reinjected into the ground. Several pilot plants utilizing a closed system are in various stages of testing and development at the present time, but it is not known when they will become functional on a large scale.

In summation, Nevada's potential geothermal resources constitute a very important energy source of the future. Geothermal exploration and development can be expected to increase greatly in the next decade.

PRICES

Private leases for geothermal exploration currently range from 50 cents to 15 dollars per acre, depending upon how favorable the locality is for geothermal resources, and other factors. Federal Government non-competitive leases cost 1 dollar per acre.

DISTRICTS MOST LIKELY TO BE AFFECTED

Genoa district NW-31-8

The northwestern quarter of the Pin Nut Planning Unit and a small portion of the east-central part of the unit has been declared prospectively valuable for geothermal resources by the USGS (areas designated by dashed orange line on overlay).

Other areas of potential geothermal resources include areas of hydrothermal alteration and areas of young volcanics.

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

GRAPHITE

Graphite is the mineral form of the element carbon. Diamond is but another form of carbon and is not considered here. The bulk of domestic graphite needs are met by foreign imports.

The largest use of graphite (about 40 percent in 1968) is for foundry facings where it prevents metals from sticking to the molds. Other important uses are in the manufacture of high-carbon steel, refractories, lubricants, and brake linings.

Major problems facing the graphite industry are limited markets for the raw material, alternate material substitutes, and the increased production of synthetic graphite. It is anticipated that domestic demand will increase only moderately through the year 2000. Competition from established, low-cost foreign producers make it unlikely that any new domestic deposits will be exploited in the near future.

Should graphite imports be curtailed by foreign political instability or war, domestic deposits would be exploited. Government stockpiles would be drawn upon until domestic ore development could be achieved.

PRICES

Prices are in dollars per metric ton and are based on grade and other quality specifications.

June 1971	April 1972	April 1973
$24-942	$24-942	$24-1,024

DISTRICTS MOST LIKELY TO BE AFFECTED

Voltaire District NW-31-1

FUTURE ADDITIONS AND COMMENTS

Bennett, June 1973

OUTLOOK FOR THE FUTURE

GYPSUM

Included under this heading is hydrous calcium sulfate--gypsum--and anhydrate, the anhydrous calcium sulfate mineral. Gypsite, a mixture of gypsum and soil, clay, or other earthy materials is also considered.

Virtually 70 percent of the gypsum produced is channeled into the construction market where it is used in plasters, wallboard, and other related materials. The Portland cement industry uses about 22 percent of the gypsum produced. With such close ties to the construction industry, production and prices for gypsum will closely follow expansion and contraction in this field.

Gypsum and gypsite are also used in agriculture as soil conditioners. Gypsum requires prior crushing whereas gypsite is suitable for direct application to the soil.

It is not anticipated that any new gypsum deposits will be discovered in the Pine Nut Resource area. Production will continue from properties presently operating in the Mound House area.

PRICES

Prices are in dollars per ton and vary depending upon preparation of the material.

	1970	1973
Gypsum (plaster)	$37-47	----
gypsite	----	$10 (delivered and spread)

DISTRICTS MOST LIKELY TO BE AFFECTED

Carson District	NW-31-1
Mound House District	NW-31-1

FUTURE ADDITIONS AND COMMENTS

Bennett, June 1973

OUTLOOK FOR THE FUTURE

IRON

The United States consumes approximately 25 percent of the world's iron supply, but only produces about 13 percent of that supply.

Iron is used chiefly in the production of steel. The transportation and construction industries are major users of steel and account for about 50 percent of the total domestic consumption. Machinery and equipment for industrial uses account for another 17 percent of the total steel demand. Other important steel users are container, petroleum, and home appliance manufacturers.

The world demand for iron will steadily increase in the future. Iron and steel consumption in the United States essentially parallels economic growth. United States iron consumption will also expand, but problems associated with domestic production will moderate these increases. The most pressing problems in the domestic market are the decline of steel production during automobile strikes and "hedge" buying of steel against a possible steel strike. These two factors create a "roller-coaster" production pattern of ups and downs in raw steel output.

Shipping costs and the high expense of mining small deposits has, in the past, effectively provented Nevada's iron ore from competing in domestic markets. However, prior shortages of iron ore in Japan has allowed the State's deposits to compete in that market. Future production will depend upon premium overseas or favorable long-term domestic contracts.

Especially encouraging to Nevada's iron deposits is the possibility of the expansion of iron and steel making facilities to the Pacific Coast. Should this occur, it will be a tremendous boost to Nevada's iron ore production.

PRICES

Prices are in dollars per long ton for domestic iron ore.

1968 (average)	Jan. 1971	Nov. 1972	April 1973
$10.21	$10.80-11.57	$11.17-11.52	$11.91-12.31

DISTRICTS MOST LIKELY TO BE AFFECTED

Delaware District	NW-31-1
Red Mountain District	NW-31-1
Mineral Peak area	NW-31-7

Bennett, May 1973

OUTLOOK FOR THE FUTURE

LEAD

Lead-acid storage battery manufacturing accounts for about 35 percent of the total United States lead use. The second largest use of lead (about 18 percent in 1968) is for gasoline additatives. Miscellaneous uses, such as in munitions, solders, corrosion-resistant paints, and electronics, account for most of the remainder of domestic lead production.

It is estimated that the domestic lead demand, through the year 2000, can be met by domestic production with little or no increase in price. In fact, supply presently exceeds demand and some major producers have curtailed production. Additionally, with the anticipated phasing out of leaded gasoline due to environmental considerations, a considerable surplus will be created unless present markets are expanded. A further depressant on the market is the existence of a considerable lead surplus in government stockpiles. Producers hope that increased battery production and the use of lead shielding in the expanding nuclear power industry and as a sound depresant in structures will offset losses in the tetraethyl lead market.

Indications are that a status quo situation will continue to exist in the lead industry; prices will remain low and demand will be met by domestic production.

PRICES

Prices are in cents per pound.

1968 (average)	Feb. 1970	Jan. 1971	Nov. 1972	April 1973
13.0¢	16.5¢	13.3-13.5¢	14.5¢	16.0¢

DISTRICTS MOST LIKELY TO BE AFFECTED

Delaware District	NW-31-1
Carson District	NW-31-1
Red Canyon District	NW-40-1

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

LEASABLE MINERALS

Leasable minerals, other than oil and gas (and geothermal resources), include coal, potassium, sodium, phosphate, sulfer, and asphalt. These minerals and their various end-products are widely used in the commercial and industrial segments of our economy, and it is anticipated that the demand for leasable minerals will increase in the future.

Of the leasable minerals only coal, sodium, and potassium have a potential, albeit slight, for future development in the Pine Nut and Markleeville Planning Units. Abundant resercces of these minerals in other areas of the United States makes it unlikely that serious exploration programs will be initiated in the future.

Coal is of course used primarily as a source of hear and power. Sodium and potassium are used chiefly in the manufacture of fertilizerx, water-softeners, soaps, and chemicals.

PRICES

Prices for coal vary according to type, grade, etc., and are quoted in dollars per short ton.

1968 (average)
\$1.42-9.03

Prices for potassium (potash) are in cents per short ton unit (1 percent, or 20 pounds K_2O per ton). Prices vary according to grade and degree of processing.

	Jan. 1971	Nov. 1972	April 1973
Domestic potassium (potash)	43.0-47.0¢	43.0-47.0¢	33.75-47.0¢

Prices for sodium are in dollars per short ton.

	1968 (average)
Sodium metal	\$360-\$480
Sodium compounds	\$18.57

Bennett, July 1973

DISTRICTS MOST LIKELY TO BE AFFECTED

Eldorado District (coal)	NW-31-6
Red Mountain District (sodium, potassium)	NW-30-1

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

LIMESTONE

Limestone uses are varied, but the two main use categories are for cement and lime and calcium. Cement production accounts for about 45 percent of domestic consumption. The second most important use is as a refractory and flux in the steel and iron industry. Agriculture applications account for another 18 percent of the total demand.

The United States is self-sufficient in limestone production. Estimated reserves are more than adequate to meet cumulative demands through the year 2000.

Of the major applications, the only important use of Nevada's limestone in the reasonably foreseeable future will be in the manufacture of cement. The demand for limestone is expected to increase. Because of close ties to the construction industry, production and prices will follow expansion and contraction in this field. Improved construction techniques requiring less cement and therefore less limestone, could moderate any overall demand increase.

As limestone is a low-cost, high volume commodity, transportation costs are critical. Because of this factor, exploitation is limited to areas in close proximity to markets or railheads. Another problem the industry faces is environmentalists' objections to dust, noise, and unsightly scars created by quarry operations.

PRICES

The average price of limestone per ton in 1968 was $3.75.

DISTRICTS MOST LIKELY TO BE AFFECTED

Red Mountain District	NW-31-1
Eldorado District	NW-31-6

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

MANGANESE

The principal use of manganese ore in the United States is in the production of ferroalloys that are in turn used in the manufacture of cast iron and steel. Approximately 91 percent of domestic manganese consumption is for metallurgical uses, the remainder being used in the manufacture of chemicals, batteries, glass, and other miscellaneous products.

Inasmuch as domestic ores cannot compete effectively with abundant and easily obtainable foreign ore, less than 10 percent of the United States manganese requirements are met by domestic production. Known world reserves of manganese ore, comparable to grades being mined today, are more than double the estimated world demand through the year 2000. It is anticipated that manganese prices will remain at about 1968 levels until the end of the century.

Barring any disruption of present trade relations, the United States will continue to be dependent upon foreign sources for its manganese supply. Should manganese imports be curtailed by foreign political instability or war, domestic low-grade ores would be exploited. Government stockpiles would be drawn upon until domestic ore development could be achieved.

PRICES

Prices are in cents per pound for manganese metal and in cents per long-ton unit (22.4 pounds) of contained manganese for ore.

	Jan. 1971	Nov. 1972	April 1973
Metal	33.25¢	33.25¢	33.25¢
Ore (46%-48% manganese)	56.0-62.0¢	61.0-68.0¢	61.0-68.0¢

DISTRICTS MOST LIKELY TO BE AFFECTED

Delaware district NW-31-1

FUTURE ADDITIONS AND COMMENTS

Bennett, June 1973

OUTLOOK FOR THE FUTURE

MERCURY

Mercury is used primarily in the manufacture of chemicals, catalysts, and in certain electronic applications. Because of erratic demands, mercury prices tend to fluctuate widely. Furthermore, the market is very sensitive to over production and the influence of foreign imports.

In the past few years environmental considerations have materially contributed to "across the board" declines in mercury consumption. Prices have fallen and domestic mines, plagued by high mining costs, have drastically curtailed production or have closed. Additionally, low-priced and the readily available supply of mercury from high-grade deposits in Spain and Italy hinder domestic production.

The demand for mercury will increase in certain applications where the metal's unique properties--liquid at room temperature, high specific gravity, and electrical conductivity--have no substitute. This increased consumption will probably be met by foreign imports. Inasmuch as domestic mercury production correlates directly with periods of high prices, there is little likelihood of any mercury being mined in Nevada at today's prices. However, should prices increase to the 1968-1969 highs, or a national emergency occur, mining of low-grade deposits in Nevada is a possibility.

PRICES

Prices are in dollars per flask (76 pounds of mercury).

1968 (average)	Feb. 1970	Jan. 1971	Nov. 1972	April 1973
$535.56	$475-$480	$349.50	$256.995	$291-300

DISTRICTS MOST LIKELY TO BE AFFECTED

Delaware District	NW-31-1
Carson District	NW-31-1
Castle Peak District	NW-31-2

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

OIL AND GAS

There is little or no potential for the discovery of oil or gas in the Pine Nut Planning Unit. Nevertheless, there is a possibility, albeit slight, that limited quantities of petroleum might exist in Carson and Eagle Valleys. It is not anticipated that these two areas will be of interest to petroleum companies in the near future, however.

PRICES

Prices for crude oil and natural gas liquids are in dollars per barrel.

	1968 (average)	Jan. 1973
Crude oil	$2.94	$3.25-3.50
Natural gas liquid	$2.04	----

DISTRICTS MOST LIKELY TO BE AFFECTED

Eagle Valley, Carson Valley

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

PUMICE

Pumice is the general name for a lightweight, porous rock of igneous origin. Included in the general pumice catagory are volcanic cinders, scoria, and pumiceous rhyolite. Pumice is used extensively in the construction industry as a lightweight aggregate. The only other major use of pumice is as an abrasive.

Pumice is a low-cost, high-volume product that is very sensitive to transportation costs. Substitutes are available for essentially all uses of pumice, and the degree of substitution is determined with respect to location, mining costs, and transportation distances associated with a particular deposit. Haul distances exceeding even a few tens of miles may be enough to make a deposit uneconomical.

Domestic reserves are expected to meet United States pumice demands through the year 2000. The market will be confined to the western United States inasmuch as these states contain all of the reserves and costs of transportation to eastern markets is prohibitive.

Pumice consumption will increase in the future as the economy expands. Highgrade deposits, in close proximity to marketing areas or shipping facilities, will be exploited first. As these deposits are depleted, and assuming the substitution factor is not substantial, attention will be focused on other deposits with increased haul distances.

Pozzolan, a fine-grained silicious material that imparts advantageous properties to cement (superior strength, acid resistance) is included here also.

PRICES

Prices are in cents per pound.

	June 1968	Feb. 1970
powdered	3.5-6.0¢	3.5-6.0¢
lump	6.0-8.0¢	6.0-8.0¢

DISTRICTS MOST LIKELY TO BE AFFECTED

Cinder Mountain area	NW-19-3
Carson District	NW-31-1

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

SAND, GRAVEL, TOPSOIL AND DIMENSION STONE

Sand, gravel, and stone are important materials used in the construction industry. Topsoil is used as an additative to pre-existing soil to increase its organic content and ability to support plant life. Generally these materials are of value only if they are located reasonably close to population centers. Because of high transportation costs, their value diminishes rapidly with increased distances from consumption points.

An exception, however, is stone used for ornamental purposes in construction. This type of stone has one or more physical characteristics that enhance its value and thus the material is able to withstand additional transportation costs and still be marketable.

As the economy grows and the construction industry expands, it is anticipated that the demand for these products will increase. As deposits in close proximity to population centers are exhausted, producers will be required to relocate operations at further distances from market areas.

PRICES

Prices for sand and gravel are in dollars per short ton.

	1968 (average)
Sand	$0.60-7.87
Gravel	$0.75-1.35

Prices for dimension stone are in dollars per short ton.

	1968 (average)
Building stone	$2.42-105.50
Monumental stone	$219.00
Flagging and curbing stone	$31.90-34.00
Crushed and broken stone	$1.09-1.88

Bennett, July 1973

Prices for mineral material sales from Bureau of Land Management community pits in the resource area as of July 1973 are listed below.

Topsoil	16.0-21.0¢ per cubic yard
Native Borrow	13.0-18.0¢ per cubic yard
"DG"	16.0-21.0¢ per cubic yard
Sand and gravel	18.0-23.0¢ per cubic yard
Building stone	50.0¢ and up per ton depending upon several factors.

DISTRICTS MOST LIKELY TO BE AFFECTED

Table Mountain Quarry	NW-31-3
Carson Quarry	NW-31-1
Mound House District	NW-31-1
Red Mountain District	NW-31-1
Eldorado District	NW-31-6

BLM Community Pits:

Clear Creek (Decomposed granite, topsoil)
Dayton (Sand and gravel, fill)
Dresslerville (Decomposed granite, topsoil)
Gardnerville (Sand and gravel, fill)

Other areas propectively valuable for sand, gravel, topsoil, and dimension stone:

Alluvial fans, river and stream channels (sand and gravel)

All areas of bedrock outcrop (stone)

Areas with well-developed vegetative cover (topsoil)

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

SILICA

Silica is used primarily as a commercial source of the element silicon and in the manufacture of glass. Silicon, when alloyed with other metals, is used extensively in the iron and steel industries. Elemental silicon is used primarily in the production of aluminum castings.

Because silicon is the second most abundant element in the earth's crust, the supply is essentially dependent on the demand. The United States has abundant silica reserces and it is not expected that foreign imports will have any future impact on the market.

Since the principal use of silicon is in the iron and steel industry, future demands are expected to parallel growth in that industry. The use of silicon in the aluminum industry is expected to increase and by the year 2000 consumption should exceed that of the iron and steel industry. The future potential for silicon is therefore very good.

PRICES

Prices for silica are variable and depend primarily on grade and degree of preparation of the final product. Representative prices listed below are in dollars per short ton.

	Jan. 1971	Nov. 1972	April 1973
90-99% silica, nominal crushing	$26-27	$26-27	$26-27
96-99.5% silica, finely crushed	$30.50-45	$30.50-45	$30.50-45
99% silica, extremely well crushed	$72-92	$72-92	$72-92

DISTRICTS MOST LIKELY TO BE AFFECTED

Gardnerville District NW-40-3

All igneous intrusives with a high silica content.

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

SILVER

The photographic industry is the major user of silver in the United States. Other important consumers are the electronics and jewelry industries.

At the present time, silver consumption exceeds new production and the deficiency is being met primarily by the release of government stockpiles, private silver hoards, and recycling. With the exception of recycling, these sources are likely to be soon exhausted, and it is anticipated that prices will move upward in response to increased demands over available supply. Speculative interests will probably cause minor price fluctuations for short periods of time, but the overall trend will be for increasing prices. Unless major users fall by the wayside, these factors should ultimately spur the exploration for new deposits and the exploitation of presently submarginal ones. Exploration in Nevada will definitely be on the increase: This is the Silver State!

Approximately two-thirds of the United States domestic silver production is recovered as a byproduct of the beneficiation of copper and lead-zinc ores. Therefore, future silver production will be related to the price of these metals as well as the price of silver. Recycling of silver scrap has played only a minor role in the recovery of silver. This potential source of silver will probably receive more attention in the future.

PRICES

Prices for silver are in cents per Troy ounce.

Jan. 1971	Nov. 1972	Mar. 1973	April 1973	June 1974
163.995¢	183.242¢	230.5¢	269.0¢	508.0¢

DISTRICTS MOST LIKELY TO BE AFFECTED

Ramsey District	NW-30-15
Delaware District	NW-31-1
Carson District	NW-31-1
Voltaire District	NW-31-1
Silver City District	NW-31-1
Comstock Lode District	NW-31-1
Mineral Peak Area	NW-31-7

Genoa District	NW-31-8
Como District	NW-31-15
Red Canyon District	NW-40-1
Monarch Mine Area	NW-40-2
Gardnerville District	NW-40-3

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

TUNGSTEN

Tungsten is used extensively in metallurgical applications, imparting hardness and high heat-resistant characteristics to the metal it is alloyed with. Perhaps its most important use is in the manufacture of high-speed cutting tools. Other applications are in the electric industry; the most important of which is its use as filaments in light bulbs.

Domestic tungsten, primarily recovered as a byproduct of molybdenum mining, equals about 75 percent of the United States demand. Unless government price incentatives are established--as they have been in the past--the future rate of domestic production will remain relatively constant while the demand increases markedly. Hence, the United States will probably become increasingly dependent on foreign ore imports.

The tungsten market closely follows trends in the steel industry. Any factor adversely effecting steel production will tend to depress the tungsten market. However, in the long run, world consumption of tungsten will out-grow world production and the future for the metal is bright indeed.

PRICES

Prices are in dollars per pound for tungsten metal and in dollars per short ton unit (20 pounds of WO_3) for ore.

	Jan. 1971	Nov. 1972	April 1973
Tungsten metal (98.8% W)	$4.50	$4.50	$4.50
Tungsten ore	$55.00	$55.00	$55.00

DISTRICTS MOST LIKELY TO BE AFFECTED

Delaware District	NW-31-1
Carson District	NW-31-1
Red Mountain District	NW-31-1
Mineral Peak Area	NW-31-7
Gardnerville District	NW-40-3

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

URANIUM

The principal current use for commercial uranium is for the generation of electrical power. With the growing shortages in fossil fuels, uranium usage is expected to increase dramatically in the coming years. This trend should continue until perhaps the late 1990's, when breeder reactors become a major factor in providing nuclear fuel requirements. After establishment of breeder reactors, the future of uranium is uncertain, but the market will probably decline.

At the current time the domestic uranium industry is more than capable of meeting current demand. In fact, many plants are now operating at under-capacity. However, present known domestic reserves are wholly inadequate to meet estimated consumption in the 1980's. Therefore, within the next decade or so, major exploration programs will probably be initiated in search of new uranium deposits.

The only problem confronting the uranium industry at the present time is the opposition of environmentalists to the establishment of nuclear power generating plants at various sites in the United States.

PRICES

Prices are in dollars per pound of uranium oxide.

1953 (high)	1968 (average)
$19.96	$8.00

DISTRICTS MOST LIKELY TO BE AFFECTED

Delaware District	NW-31-1
Carson District	NW-31-1
Mound House District	NW-31-1
Red Mountain District	NW-31-1
Mineral Peak Area	NW-31-7
Pine Nut Creek Area	NW-31-9

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

OUTLOOK FOR THE FUTURE

ZINC

Zinc is used primarily as a protective coating for steel, in metallurgical applications (as in zinc alloys for diecasting), and as a chemical additive in paints and rubber.

The supply of zinc presently exceeds demands and for the next several decades domestic production could easily satisfy domestic demand. However, the overall picture is not bright as cheap and readily available imports will make substantial inroads on domestic production. These imports have already resulted in lower zinc prices, and marginal domestic mines and smelters will eventually be closed if prices remain at or below today's levels.

The government has recently declared over 500,000 tons of zinc surplus in the United States stockpile. This, coupled with increasing substitution of other materials for zinc will further depress the market. The ultimate effect will be the increasing dependence of the United States on foreign sources of zinc.

It is apparent that until the uncertainties of United States stockpile disposal and importation policies are resolved, the domestic zinc market will remain on a downhill slide, and there is little likelihood that any new mining ventures will be initiated in the near future.

PRICES

Prices are in cents per pound for zinc metal and in dollars per long ton for ore.

	Feb. 1970	June 1972	Nov. 1972	April 1973
Zinc metal	15.5-16¢	18.0¢	18.0¢	20.3¢
Zinc ore	$100.00	-----	-----	-----

DISTRICTS MOST LIKELY TO BE AFFECTED

Voltaire District NW-31-1

FUTURE ADDITIONS AND COMMENTS

Bennett, July 1973

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APPENDIX

ABBREVIATED GEOLOGIC TIME TABLE

ERA	PERIOD	TIME FROM BEGINNING OF PERIOD TO PRESENT IN MILLIONS OF YEARS	TIME SPAN IN MILLIONS OF YEARS
Cenozoic	Quaternary	2.5	2.5
	Tertiary	65	62.5
Mesozoic	Cretaceous	136	71
	Jurrasic	190	54
	Triassic	225	35
Paleozoic	Permian	280	55
	Pennsylvanian	320	40
	Mississippian	345	25
	Devonian	395	50
	Silurian	435	40
	Ordovician	500	65
	Cambrian	570	70
Precambrian	Z	800	230
	Y	1700	900
	X	2600	900
	W	4500 plus	1900 plus

Source: Glossary of Geology, 1972.

GLOSSARY

Because it is often impossible to discuss problems of a geologic nature efficiently without using the language of the profession, some words or phrases of a scientific nature have been used in sections of this report which may be read by individuals without a geologic background. (Exclusion of technical terminology solely on the basis that it may not be understood by layman was not deemed advisable from the point of view of completeness, clarity, and professionalism.) Therefore, this glossary has but a single purpose--an attempt to define certain language appearing in the "Potential for Development" portion of this report, in particular, in terms that the non-earth scientist can understand.

ALTERED ROCK: Rock that has undergone changes in physical, chemical, or mineral composition by the action of hot or cold water, gases, or nearby igneous rocks. Ex. bleaching, argillization, etc.

ANOMALY: A deviation from uniformity.

ARGILLIZATION: Alteration process whereby certain minerals in rock are changed to clay minerals.

BASEMENT: Metamorphic or igneous rocks, usually underlying younger sedimentary or volcanic rocks, but which may locally be exposed on the surface.

BLEACHING: A type of rock alteration commonly resulting from the weathering of disseminated pyrite.

BLIND ORE BODY: An ore deposit that is not exposed at the surface.

HAND COBBED: Sorted by hand.

HARD ROCK: Loosely used to distinguish igneous and metamorphic rocks from sedimentary rocks.

HYDROTHERMAL: Heated waters or gases. Fluids which produce mineralization, ore deposits, rock alteration, and hot springs.

IGNEOUS: Rocks created from a molten or partially molten state.

LODE: Fissures in rock which usually contain valuable minerals and have definite boundaries; a group of veins.

METAMORPHISM: A change in the texture or composition of a rock, produced by exterior agencies, such as heat or pressure.

MINERALIZED STRUCTURE: Commonly a fault or zone of crushed rock that has been the site of mineral deposition.

ORE: Mineral commodities, usually metallic, that can be recovered at a profit.

ORE TENOR: The metal content of an ore; grade.

OVERBURDEN: Rock of any type that overlies a deposit of minerals or ore. The loose soil and rock that overlies bedrock (also referred to as mantle).

OXIDIZED ORE: Ore minerals created in the zone of oxidation (see Zone of Oxidation).

PEGMATITE: A very coarse-grained igneous rock.

SECONDARY ENRICHMENT: Nature's process of making high-grade ore out of low-grade ore. A process whereby the tenor of a vein or ore deposit is increased.

SECTION: A series or group of rocks occuring at a given place.

VEIN: An individual fissure in rock, usually containing a valuable mineral.

ZONE OF OXIDATION: That portion of a vein or lode that has been acted upon by surface water containing oxygen and carbon dioxide. The zone in which sulfide minerals are altered to oxide or carbonate minerals, etc.

Source: Glossary of Geology, 1972, and other authorities.