

# **Nevada Bureau of Mines and Geology**

## **Special Publication MI-2002**

# **The Nevada Mineral Industry 2002**

This report, twenty-fourth of an annual series, describes mineral, oil and gas, and geothermal activities and accomplishments in Nevada in 2002: production statistics, exploration and development including drilling for petroleum and geothermal resources, discoveries of orebodies, new mines opened, and expansion and other activities of existing mines. Statistics of known gold and silver deposits, and directories of mines and mills are included.

**Metals**

**Industrial  
Minerals**

**Oil and Gas**

**Geothermal**

**Exploration**

**Development**

**Mining**

**Processing**

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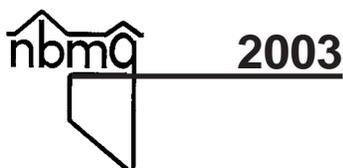
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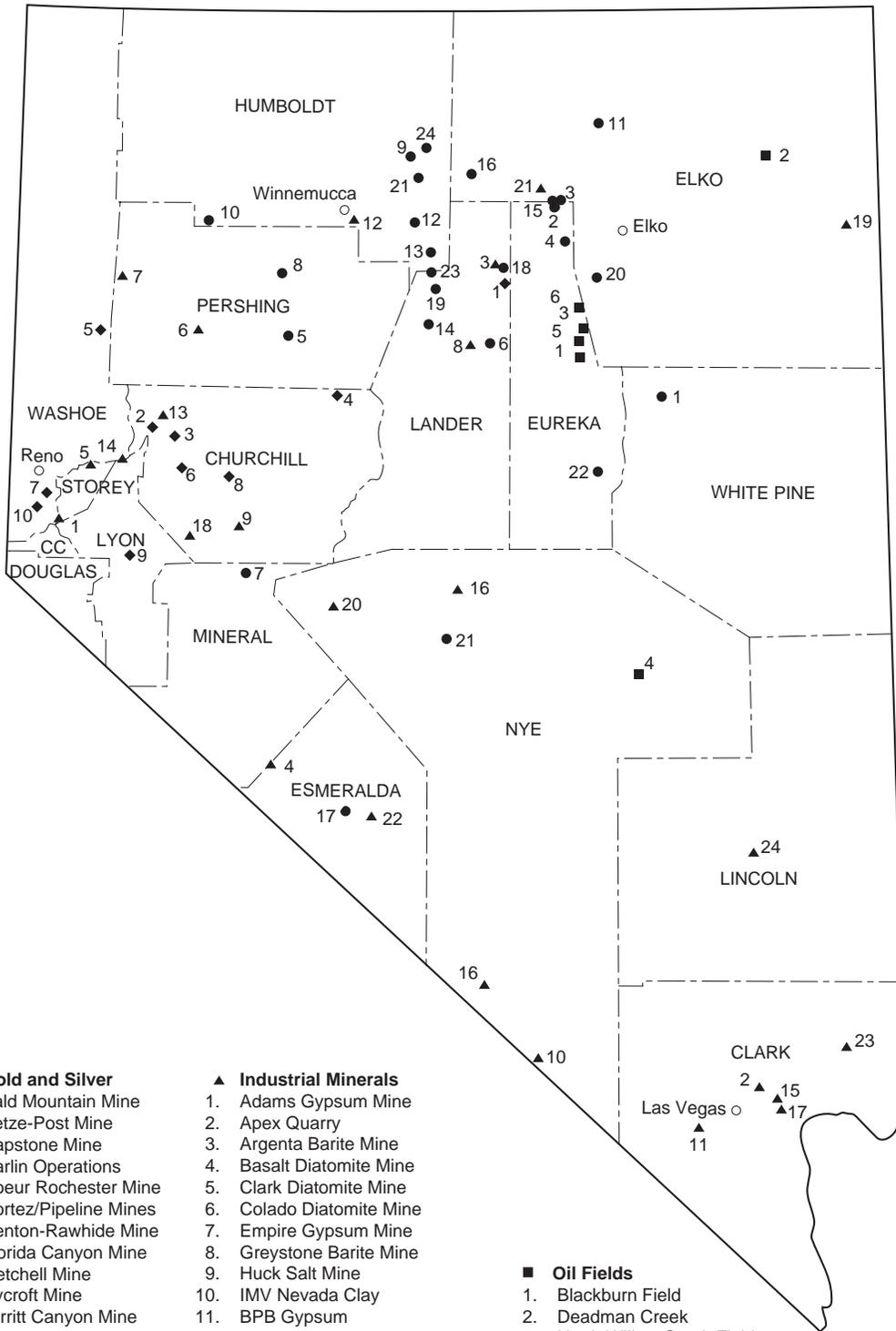
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2002**

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**Major mines, oil fields, and geothermal plants, 2002.**

# Overview

by Jonathan G. Price and Richard O. Meeuwig

This report highlights activities through 2002 in metals, industrial minerals, geothermal energy, and petroleum. Numerous graphs and charts are incorporated for rapid inspection of trends in production and price. Overall mineral and energy production in Nevada in 2002, valued at \$2.9 billion, rose slightly from the previous year, primarily as a result of the increase in the price of gold. Gold production decreased from 8.1 million ounces in 2001 to 7.7 million ounces in 2002, but the output in 2002 was nonetheless the sixth highest level in history. Nevada led the nation in the production of gold, silver, and barite and was the only state that produced magnesite, lithium, and the specialty clays, sepiolite and saponite. Other commodities produced in Nevada in 2002 included construction aggregate (sand, gravel, and crushed stone), geothermal energy, lime, diatomite, gypsum, cement, clays, silica (industrial sand), dimension stone, semiprecious gemstones, perlite, salt, kalinite (potassium alum), zeolite, mercury as a by-product of gold and silver processing, and petroleum.

Nevada ranked second in the United States in terms of value of overall nonfuel (excluding oil, gas, coal, and geothermal) mineral production in 2002 (according to the U.S. Geological Survey, Mineral Commodity Summaries 2003, <http://minerals.usgs.gov/minerals/pubs/mcs/>). California, with its large population and commensurate demands for construction raw materials, was first. Texas, also a populous state and major producer of construction raw materials, was third. Florida, the leader in phosphate production was fourth, and Arizona, the nation's leading copper producer, was fifth.

Nevada's production of gold, valued at nearly \$2.4 billion, was 81% of the U.S. total and helped make the U.S. the second leading gold producer in the world in 2002. Nevada alone accounted for 10% of world production of gold. Only the countries of South Africa and Australia produced more gold than the State of Nevada in 2002. Second to gold in terms of Nevada's mineral value in 2002 was construction aggregate, \$159 million. Electrical power from geothermal energy production in Nevada in 2002 was valued at \$64 million. Silver, chiefly a by-product or co-product of gold production, ranked as the fourth leading mineral commodity in 2002, with a value of \$62 million.

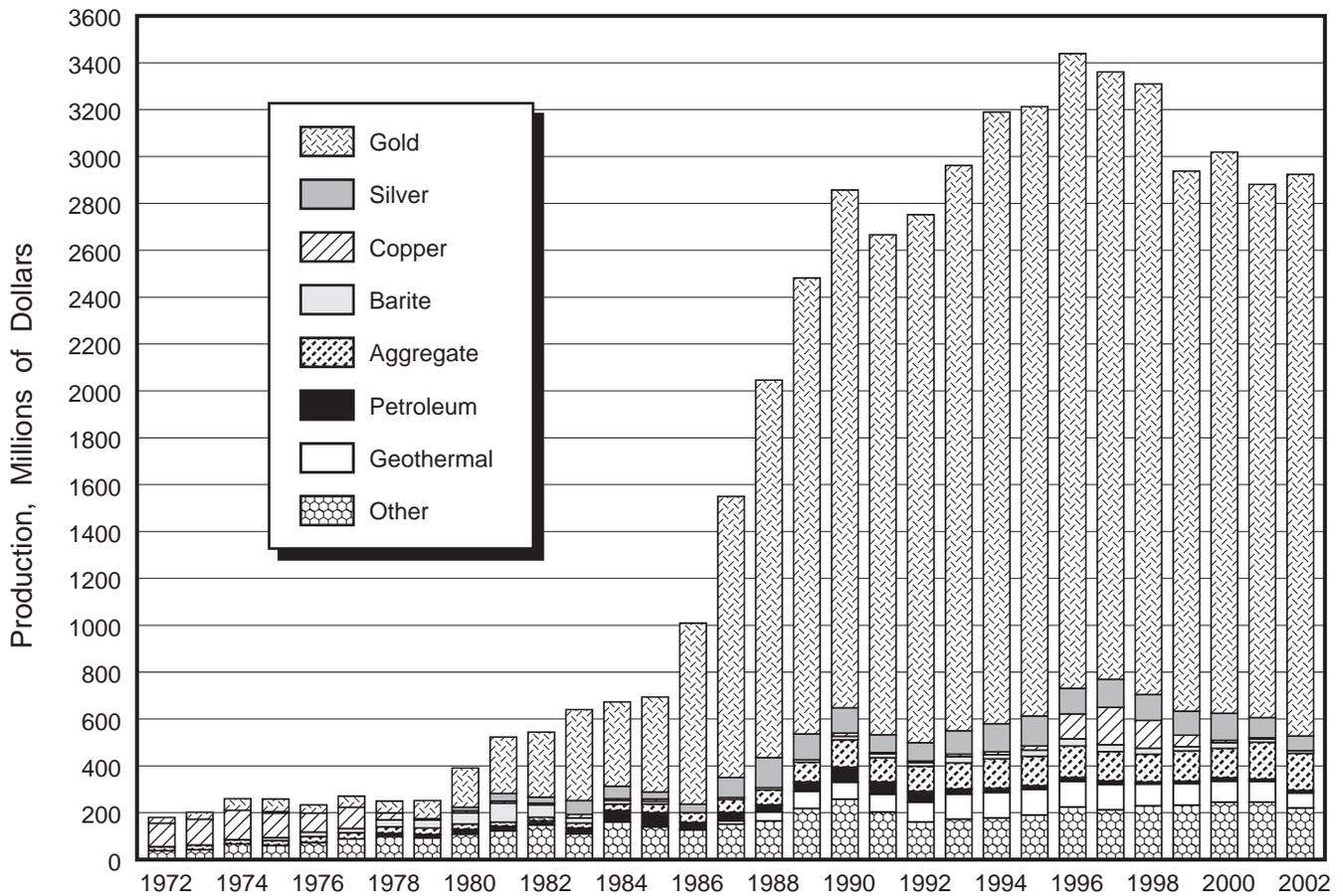
The contributions that mining makes to the economies of Nevada and the U.S. are significant in terms of jobs, commerce, taxes, improvements to the infrastructure, and lowering of the U.S. trade deficit. Because of Nevada's production, the U.S. is a net exporter of gold, most of which is sold on the international market for jewelry and arts and some of which is sold for its superior qualities in computers and other electronics. The U.S. is a net exporter of few mined commodities and a net importer of many. Among the major mined products in Nevada, the U.S. relies upon imports for barite (76% of total U.S. consumption from imports in 2002, according to the U.S. Geological Survey, used primarily to prevent blowouts in oil and gas drilling), silver (61%, used in photographic and other applications), copper (37%, used primarily to conduct electricity), and gypsum (25%, used in wallboard). Our exports of gold help offset the staggering U.S. trade deficit (difference between imports and exports of goods and services), which amounted to

## MINERAL, GEOTHERMAL POWER, AND PETROLEUM PRODUCTION IN NEVADA<sup>1</sup>

Minerals	2001		2002		% change from 2001 to 2002	
	Quantity	Value (millions)	Quantity	Value (millions)	Quantity	Value
<b>Gold</b> (thousand troy ounces)	8,125	\$2,275.0	7,732	\$2,397.0	-4.2	+5.4
<b>Silver</b> (thousand troy ounces)	17,452	85.6	13,564	61.9	-22.3	-27.7
<b>Copper</b> (thousand pounds)	7,131	5.4	0	—	—	—
<b>Aggregate</b> (thousand short tons)	35,000	157.5	35,300	158.9	+0.8	+0.9
<b>Gypsum</b> (thousand short tons)	2,220	35.5	1,850	29.6	-16.7	-16.6
<b>Barite</b> (thousand short tons)	478	13.9	377			
<b>Geothermal energy</b> (thousand megawatt-hours)	1,247	87.2	1,251	64.0	+1.0	-26.6
<b>Petroleum</b> (thousand 42-gallon barrels)	571	9.8	553	9.9	-3.2	+1.3
<b>Other minerals<sup>2</sup></b>	—	210.0	—	220.7	—	+5.1
<b>Total</b>	—	\$2,879.9	—	\$2951.9		+2.5

<sup>1</sup> Production as measured by mine shipments, sales, or marketable production (including consumption by producers); compiled by the Nevada Division of Minerals and the Nevada Bureau of Mines and Geology. Products milled or processed in Nevada but mined from deposits in California are excluded. Specifically, colemanite from a mill in Amargosa Valley in Nye County and zeolite from the Ash Meadows plant in Nye County are not included in these totals.

<sup>2</sup> Building stone, cement, clay, diatomite, lime, lithium carbonate, magnesite, mercury, perlite, salt, and silica sand.



**Nevada mineral, geothermal power, and petroleum production, 1972–2002.**

an annual record of \$418 billion in 2002 (according to the Department of Commerce, Bureau of Economic Analysis, [www.bea.gov](http://www.bea.gov)).

The local economy also benefits from mining. Construction of new homes, casinos, other businesses, schools, and roads continues the strong demand for local sources of sand, gravel, crushed stone, gypsum, and raw materials for cement, all of which are abundant in Nevada. The mining industry directly employed approximately 9,000 people in 2002, and the industry is responsible for another 44,000 jobs related to providing the goods and services needed by the industry and its employees (Driesner and Coyner, 2002).

Nevada and the U.S. make significant contributions to the world's production of several mineral commodities. Thanks in part to Nevada's production, the U.S. is the world's leading producer, as well as consumer, of gypsum (with the U.S. accounting for 16% of world production in 2002) and industrial sand (29% of world production). In addition to gold, the U.S. is a leading silver producer (8% of world production; only Mexico, Peru, Australia, and China outpaced the U.S. in 2002). The U.S. is essentially self sufficient, as are most countries, in construction aggregate, largely because of the high expense of transportation. Total U.S. production of construction sand,

gravel, and crushed stone in 2002 was approximately 2.72 billion metric tons, according to the U.S. Geological Survey. Net imports of aggregate account for less than 1% of consumption. The U.S. is also self sufficient in the other major mined material, coal. According to the U.S. Energy Information Administration ([www.eia.doe.gov/](http://www.eia.doe.gov/)), the U.S. produced and consumed approximately 1.0 billion metric tons of coal in 2002. Although no coal is produced in Nevada, coal is the primary source of energy for generation of electricity in Nevada.

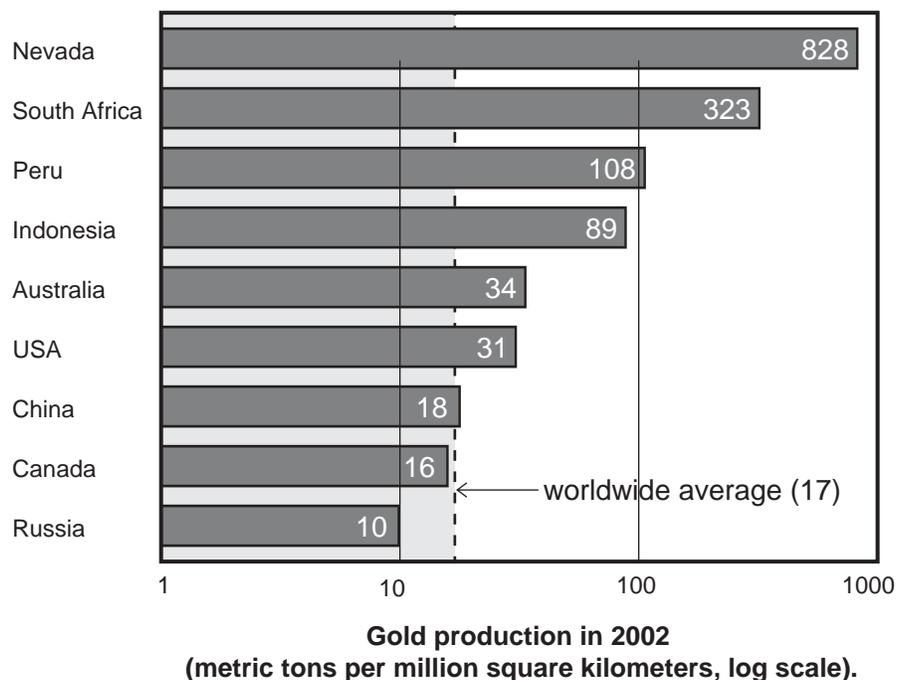
As a result of its favorable geology, Nevada has tremendous potential for the discovery of additional mineral deposits. Areas where prospective rocks are beneath a cover of young, valley-filling sediments and volcanic rocks have only been explored to a limited extent, and ore deposits continue to be discovered in and near Nevada's 526 historical mining districts. Like the Transvaal, the most productive region of South Africa, Nevada is a world leader in terms of gold production per unit area.

Through a survey conducted early in 2003, the Nevada Division of Minerals collected data for Nevada Bureau of Mines and Geology Special Publication P-14, Major Mines of Nevada 2002. This publication includes, in handbook form, location maps, names and telephone numbers of operators, numbers of employees, and

## WORLD PRODUCTION OF SELECTED MINERAL COMMODITIES (metric tons) in 2002\*

Country/State	Area (10 <sup>6</sup> km <sup>2</sup> )	Gold	Silver	Gypsum	Barite	Industrial Sand
Algeria	2.38	—	—	—	52,000	—
Australia	7.68	280	2,200	3,800,000	—	2,500,000
Austria	0.08	—	—	—	—	5,800,000
Belgium	0.03	—	—	—	—	2,400,000
Brazil	8.51	—	—	—	60,000	2,700,000
Burma	0.68	—	—	—	32,000	—
Canada	9.96	160	1,300	8,600,000	—	2,000,000
China	9.57	175	1,800	6,800,000	3,000,000	—
Egypt	1.00	—	—	1,900,000	—	—
France	0.57	—	—	4,500,000	65,000	6,600,000
Germany	0.36	—	—	—	120,000	6,800,000
India	3.28	—	—	2,300,000	900,000	1,400,000
Indonesia	1.90	170	—	—	—	—
Iran	1.65	—	—	11,000,000	190,000	—
Italy	0.30	—	—	1,300,000	—	3,000,000
Japan	0.38	—	—	5,800,000	—	2,500,000
Korea, North	0.12	—	—	—	70,000	—
Mexico	1.97	—	2,800	6,300,000	130,000	1,800,000
Morocco	0.45	—	—	—	400,000	—
Netherlands	0.04	—	—	—	—	3,000,000
Peru	1.29	140	2,300	—	—	—
Poland	0.31	—	—	1,200,000	—	—
Russia	17.07	170	—	—	60,000	—
South Africa	1.22	395	—	—	—	2,100,000
Spain	0.50	—	—	7,500,000	—	6,000,000
Thailand	0.51	—	—	6,100,000	30,000	—
Turkey	2.59	—	—	—	100,000	—
United Kingdom	2.44	—	—	1,500,000	70,000	4,000,000
United States	9.37	295	1,418	16,100,000	400,000	28,000,000
<b>Nevada</b>	<b>0.29</b>	<b>240</b>	<b>422</b>	<b>1,889,000</b>	<b>342,000</b>	<b>613,000</b>
<b>WORLD</b>	<b>149.90</b>	<b>2,525</b>	<b>18,748</b>	<b>103,000,000</b>	<b>6,000,000</b>	<b>96,000,000</b>

\* Production data for all areas except Nevada are from the U.S. Geological Survey (USGS) minerals information publications (<http://minerals.usgs.gov/minerals/>), with revisions for some data from USGS mineral commodity specialists; production data for Nevada are from Driesner and Coyner (2002); USGS statistics are adjusted to be consistent with Nevada data; data for areas are from The World Almanac and Book of Facts, 1992, Pharos Books, New York, 960 p. There are some discrepancies between the Nevada and USGS data, particularly for barite (USGS reports 400,000 metric tons total for USA), for which the USGS reports quantity sold and used rather than quantity produced in the year.



preliminary, nonproprietary production figures for most mines in Nevada. It also contains a section on economic impacts of the industry. The full contents of this 28-page publication are available for free on the World Wide Web ([www.nbmj.unr.edu/](http://www.nbmj.unr.edu/)), as are the contents of this report. The data from this survey are used, along with information from other sources, in this publication and will be used to update, revise, and check preliminary statistics collected and released by the U.S. Geological Survey.

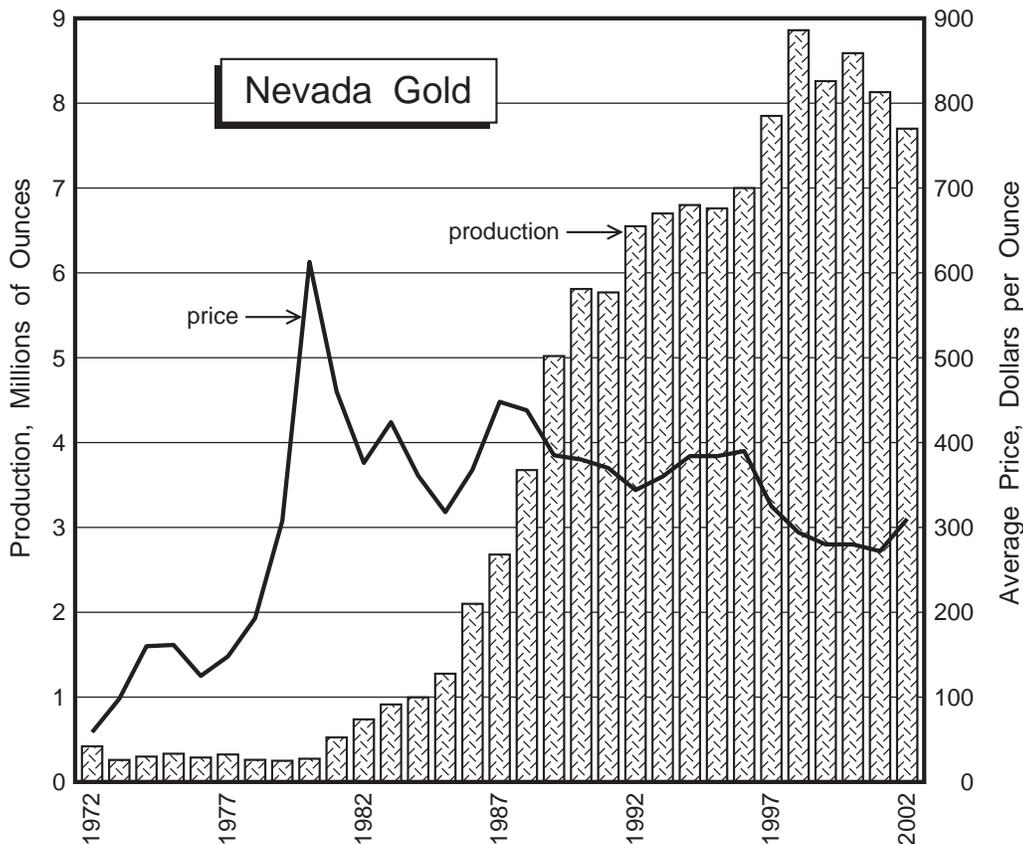
The section on **Metals** and the table of **Major Precious-Metal Deposits** provide details on new deposit discoveries, new mine openings, mine closures, additions to reserves, and mine expansions. As has been the case in recent years, gold has been the leading commodity produced in Nevada. Production of gold in 2002 came from 24 major mining operations. The Carlin trend in northeastern Nevada accounted for 44% of the total production. Eight additional mining operations, not on the Carlin trend, each produced over 100,000 ounces of gold from mostly multimillion-ounce deposits.

In April 2002, the Carlin trend produced its 50 millionth ounce of gold, making it one of the five most productive gold-mining districts in the world. The Nevada Bureau of Mines and Geology Special Publication 30 is a poster highlighting this milestone in production. A commemorative gold coin, officially designated as the 50 millionth ounce of production, was donated by the mines of the trend, operated by Newmont Mining Corporation, Barrick Goldstrike Mines, and Glamis Gold,

and is on display at the W.M. Keck Museum at the Mackay School of Mines on the University of Nevada, Reno campus. By the end of 2002, cumulative production from the Carlin trend reached 52,466,955 ounces.

Nevada and the U.S. have produced a significant portion of world gold. The U.S. Geological Survey estimates that total world gold production, since the beginning of civilization, has been 142,600 metric tons (4.6 billion troy ounces). Interestingly, about 85% of that gold is still in use (in bullion, coins, jewelry, electronics, etc.), and most gold currently being mined is recycled. Through 2002, cumulative gold production in Nevada (since mining on the Comstock lode in 1859) stands at 4,423 metric tons (142 million ounces). Remarkably, 83% of this total has been produced during the current boom (since the Carlin mine began production in 1965), and 54% of this total has been produced in the decade from 1993 to 2002. Total U.S. production, primarily since 1835, is approximately 15,216 metric tons (489 million ounces or nearly 11% of total world gold production), and total Nevada production is 3% of total world production. The Carlin trend alone accounts for one percent of all the gold ever mined in the world.

Barrick's Betze-Post Mine in Eureka County produced 1.4 million ounces, making it the largest producer in the state, and Barrick's Meikle Mine in Lander County produced nearly 640,000 ounces, making it the largest underground producer in 2002. Newmont's overall production from several mines on the Carlin trend,

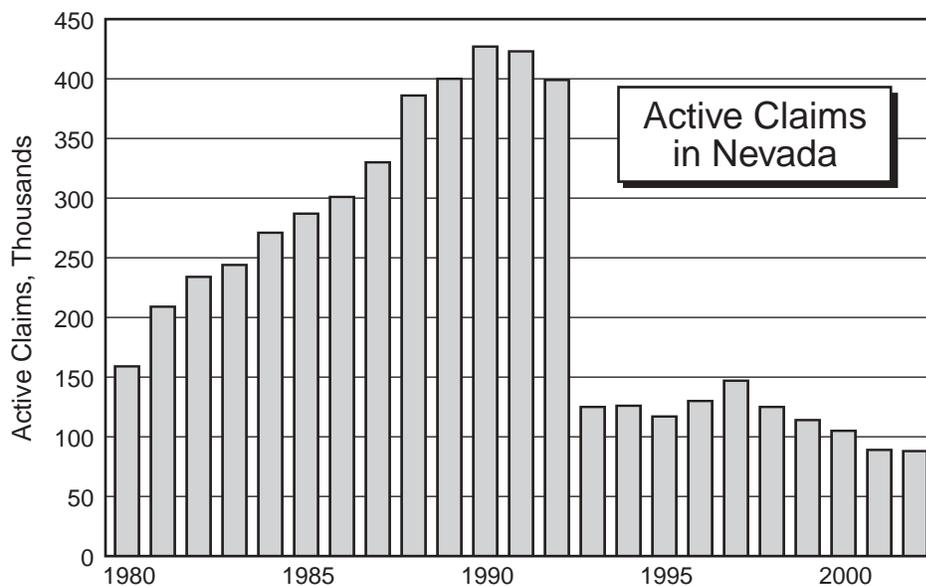


including its Carlin operations and Capstone/Bootstrap and Rain Mines, totaled 1,378,782 ounces. Placer Dome's Cortez operation (Pipeline and nearby deposits in Crescent Valley, Lander County) produced nearly 1.1 million ounces of gold in 2002.

Closures outnumbered new operations in 2002, but a recent surge in exploration may lead to several new mines in coming years. Echo Bay's McCoy/Cove operations in Lander County and Kennecott's Rawhide Mine in Churchill County ceased mining in 2002, although production continued from previously mined ores. Placer Dome resumed production at its Getchell operations in Humboldt County, and Barrick shut down its Ruby Hill Mine in Eureka County in 2002. Exploration in 2002 focused on a combination of high-grade (mostly vein) targets, which tend to be popular during times of depressed prices for gold, and low-grade, large tonnage deposits, which generally become more profitable when gold prices are higher. Success in looking for high-grade targets was reported in 2002 at the Midway project in the Rye Patch district of Nye County, at the Ren property on the Carlin trend in Elko County, south of the Deep Post deposit on the Carlin trend in Eureka County, in the Ivanhoe district in Elko County, and at the Sterling Mine and in the Manhattan district in Nye County. The large tonnage successes included expansions of reserves at Newmont's Gold Quarry mine on the Carlin trend in Eureka County, Glamis's Marigold property in the Battle Mountain district in Eureka County and new discoveries near the Florida Canyon and at the Nevada Packard deposit in Pershing County. Exploration, including grass-roots activity, work in known mining districts, and development of extensions to known deposits, added to the Nevada resource base in 2002. New mineable deposits continue to be discovered. Exploration activities are summarized in the section on Metals.

Most exploration efforts focused on gold and silver. As measured by the numbers of active claims on public lands, grass-roots exploration activity was about the same as in the previous year, but other reports indicate increased activity. According to a survey of exploration activities by the Nevada Division of Minerals (D. Driesner, 2003, Nevada Exploration Survey 2002, available at <http://minerals.state.nv.us/>), exploration activity in Nevada had been steadily declining since 1997, but 2002 saw an increase of 26% over 2001. The 33 companies responding to the survey reported spending \$64.6 million on exploration in Nevada in 2002, up from \$51.2 million in 2001, but well below the level of \$138.8 million in 1995. They project spending \$69.4 million in Nevada in 2003. Another measure of exploration activity is the number of exploration geologists employed by these companies: 129 in 2002 compared with 107 in 2001 and 309 in 1997. These companies project employing 141 exploration geologists in 2003. The decline in exploration was largely the result of low metal prices, and the increases in 2002 and 2003 are probably the result of relatively higher prices. Because of its favorable geology and regulatory climate, Nevada continues to attract a large portion of the worldwide exploration expenditures of the companies actively exploring in Nevada.

We continue to be in the midst of the biggest gold boom in U.S. history, as the graph of historical U.S. gold production illustrates. The recent surge in production in the U.S. is largely the result of discoveries of Carlin-type gold deposits and other deposits in which fine-grained gold is widely disseminated in the ore. These deposits are primarily in Nevada. The U.S. production so far in the current boom, the period from 1980 to 2000, has been nearly 171 million ounces. This is significantly greater than the total production during the era of the California gold rush (1849 to 1859, with 29 million ounces), the



**Number of active claims in Nevada as of October 1, 1980 through 2002. Data from the Nevada State Office of the U.S. Bureau of Land Management.**

Comstock (Nevada) era from 1860 to 1875 (with 34 million ounces), and the period from 1897 to 1920, when Goldfield (Nevada), the Black Hills (South Dakota), Cripple Creek (Colorado), and by-product production from copper mines in Arizona and Utah contributed to cumulative production of 95 million ounces. U.S. production in the decade from 1993 to 2002 alone was 108 million ounces.

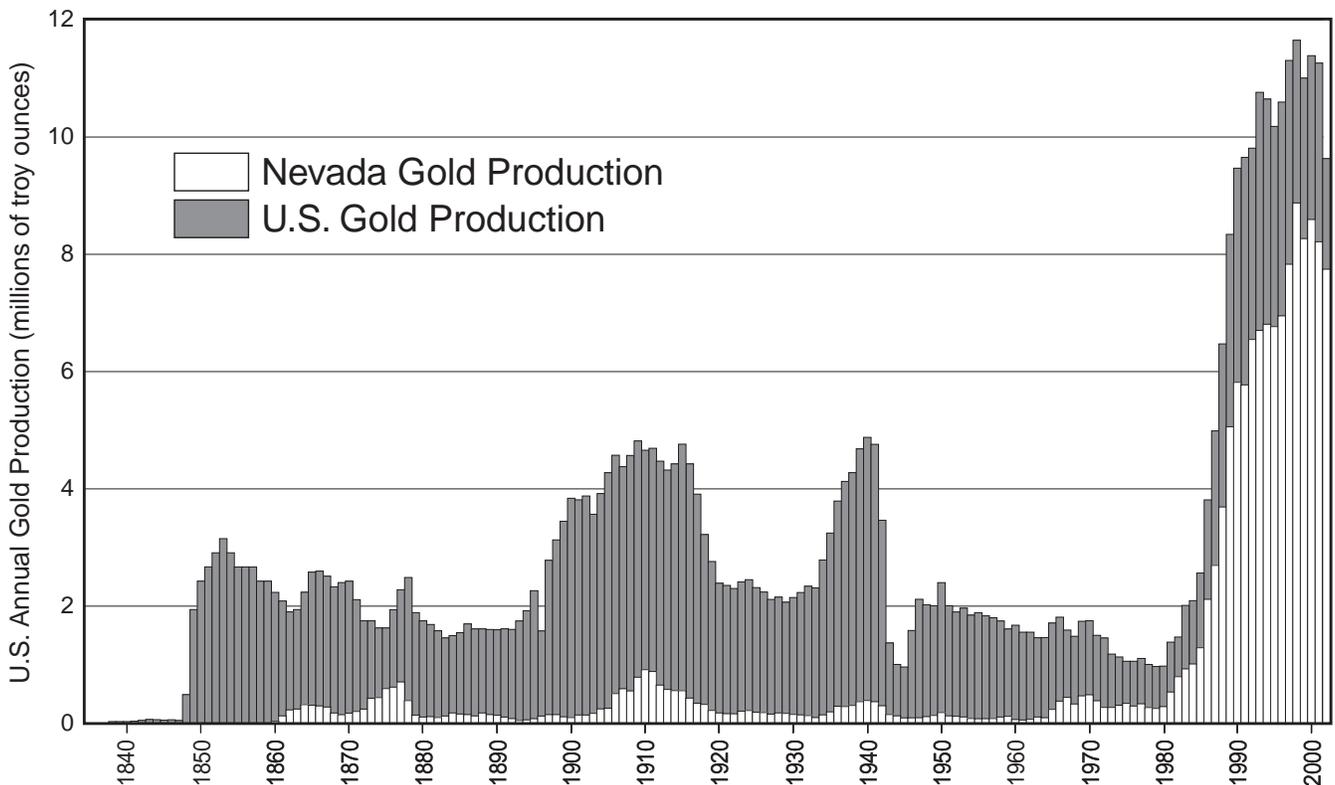
The announced gold resources in Nevada, including mineable reserves and perhaps some subeconomic resources (as reported in announcements by companies and compiled by the Nevada Bureau of Mines and Geology, with deductions for production), are enough to sustain gold production at substantial levels for 15 to 20 years, assuming stable prices. The term “reserve” has special meaning with regard to U.S. securities laws. To be called a reserve, the deposit must be able to be mined profitably. With relatively low gold prices, some of the reserves of previous years have been downgraded to subeconomic resources. When prices rise or when new technologies allow mining and gold processing costs to be lower, subeconomic resources can become reserves.

Productivity of Nevada mining operations is exceptionally high. Measured simply by the value of the commodities produced divided by the number of employees, productivity of Nevada miners is outstanding. On the average, each person in the nonfuel mineral industry in Nevada produced approximately \$320,000 in mined products in 2002, an all-time high figure.

Challenges that face the precious metal mines in Nevada include:

- economic, safety, and environmental concerns, particularly uncertainty in metal prices;
- obtaining financial assurances (bonds) for reclamation and closure;
- hazards of underground mining;
- regulatory changes and length of time that it typically takes to obtain permits;
- treating refractory (iron sulfide and/or carbon-bearing) ores, including innovative ways to oxidize these ores and to recover gold-bearing pyrite by flotation;
- dewatering mines;
- predicting the ultimate chemical compositions of pit lakes;
- procedures for closure of heaps used for leaching gold and silver from ore; and
- treatment and disposal of large volumes of water, some of which may contain potentially toxic elements that need to be removed or may be too warm to introduce directly into streams.

Through research on new technologies and engineering approaches, industry is responding well to these challenges.

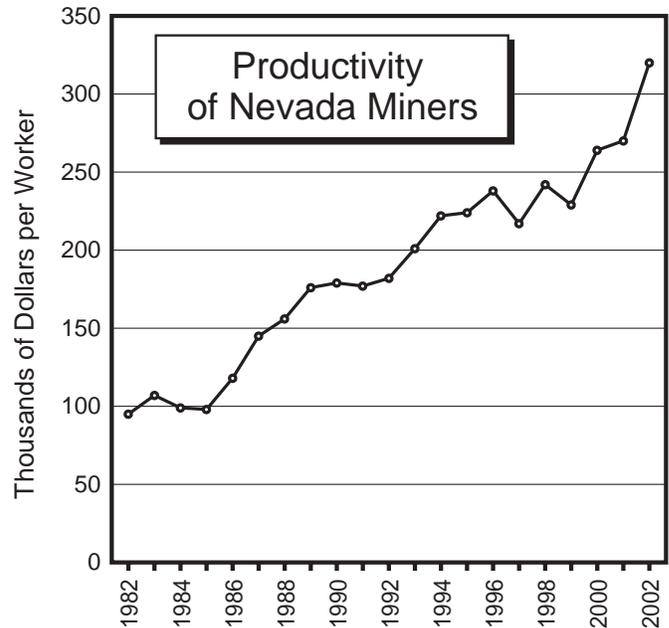


**U.S. and Nevada gold production from 1835 through 2002. Data from The U.S. Gold Industry 1998 (NBMG Special Publication 25) by J.L. Dobra and from the U.S. Geological Survey.**

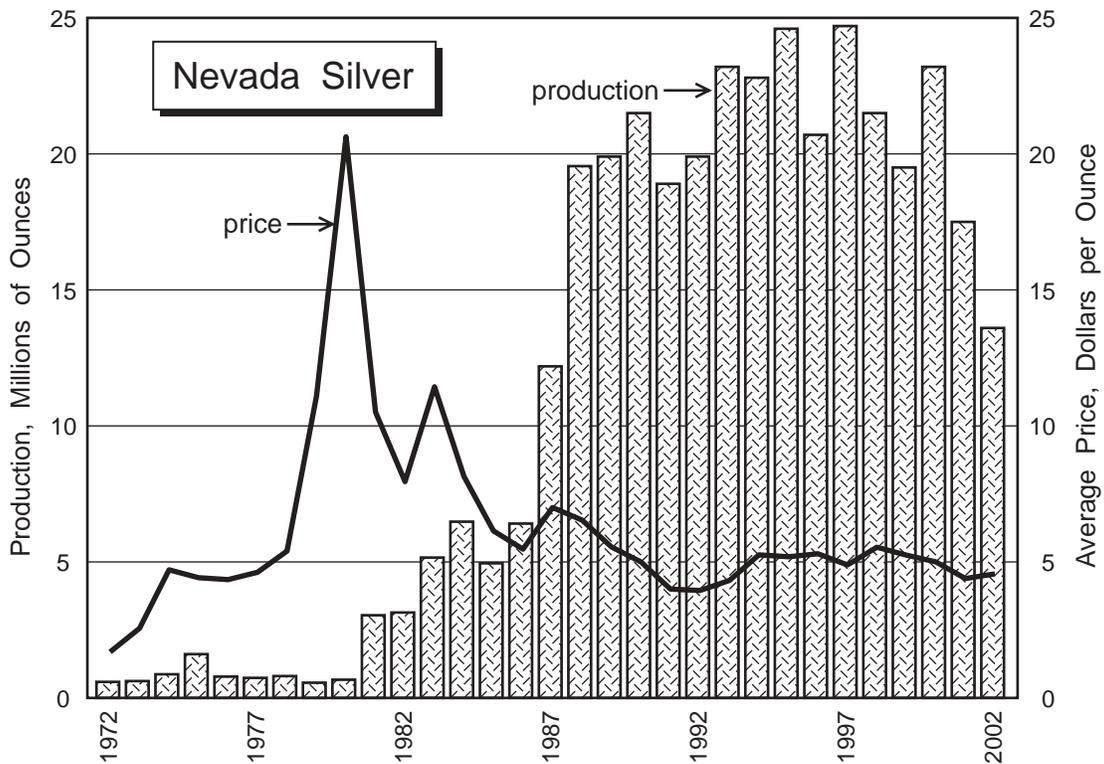
Much of Nevada's silver production in 2002, which totaled nearly 14 million ounces, was a co-product or by-product of gold mining. With a ratio of value (average price of gold to average price of silver) of 68:1 in 2002, only those deposits with more than 68 times as much silver as gold can be considered primary silver deposits. Only one such deposit operated in Nevada in 2002- the Coeur Rochester Mine in Pershing County (with a silver to gold production ratio of 89:1 and total silver production of nearly 6.4 million ounces). The McCoy/Cove operation in Lander County (with a silver to gold production ratio of 60:1 and total silver production of nearly 2 million ounces) produced more value in gold than in silver in 2002. These largest two silver operations produced 62% of Nevada's silver in 2002. Nevada's production in 2002 accounted for 30% of the U.S. total and 2% of the world total. Depending on price, Nevada is likely to retain the present-day distinction of its nickname, the "Silver State."

The section on **Industrial Minerals** covers developments during 2002 and gives details on important commodities produced from or processed in Nevada, such as aggregate, barite, cement, clays, diatomite, dimension stone, dolomite, gypsum, lime, limestone, lithium, magnesite and brucite, perlite, salt, semiprecious gemstones (opal and turquoise), silica, and zeolites (clinoptilolite and mordenite). In 2002 Nevada ranked first in the nation in barite production, second in diatomite (behind California) and third in gypsum (behind Oklahoma and Iowa). The Silver Peak lithium operation in Clayton

Valley, Esmeralda County, where subsurface brines are evaporated on the floor of the playa, is the only domestic lithium producer, and the Gabbs Mine in Nye County is currently the nation's only producer of magnesite.



Total value of mined product per mine worker in Nevada (excluding petroleum and geothermal energy)



Aggregate production reached an all-time high in 2002 as a result of Nevada's expanding population and needs for construction materials for homes, schools, streets, highways, airports, resort hotels, and other businesses. Demand for construction raw materials is likely to remain strong owing to Nevada's booming population.

An interesting trend that is occurring nationwide as well as in the Las Vegas area is the combination of aggregate quarries with landfill operations. Planning for the eventual uses of quarries is vital in areas where urban expansion encroaches on the mineral resources that must be mined locally to reduce transportation costs and related concerns regarding highway safety. Gypsum mines near the urban growth areas of Las Vegas are now being considered as sites for housing developments.

Developments in the geothermal industry are covered in the section on **Geothermal Energy**. Electric power production in 2002 was slightly higher than in the previous year, but the unit value of the production fell. Plants operating at ten sites sold \$64 million in electricity, far surpassing the value of petroleum production. Additionally, geothermal energy is used at numerous places in Nevada for space heating, warm water, recreation, and dehydrating vegetables, particularly onions and garlic. New programs in the U.S. Department of Energy, energy bills passed by the Nevada and California legislatures, and activities of the Great Basin Center for Geothermal Energy at the University of Nevada, Reno are stimulating geothermal development in Nevada. Nevada Bureau of Mines and Geology Map 141, Nevada Geothermal Resources, shows the locations of geothermal plants, direct-use locations, hot and warm springs and wells; it demonstrates the fact that Nevada has considerable potential for geothermal development.

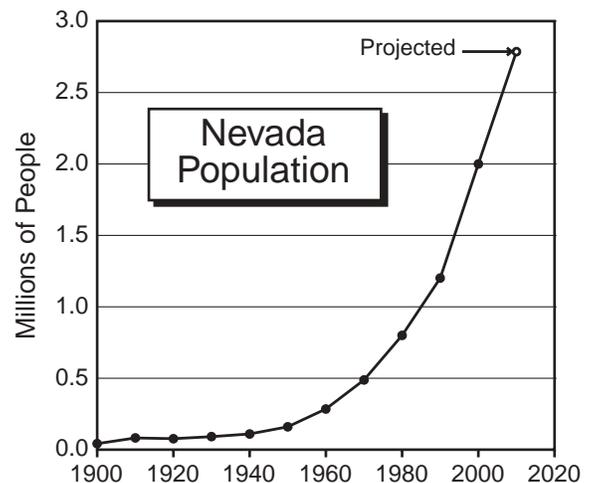
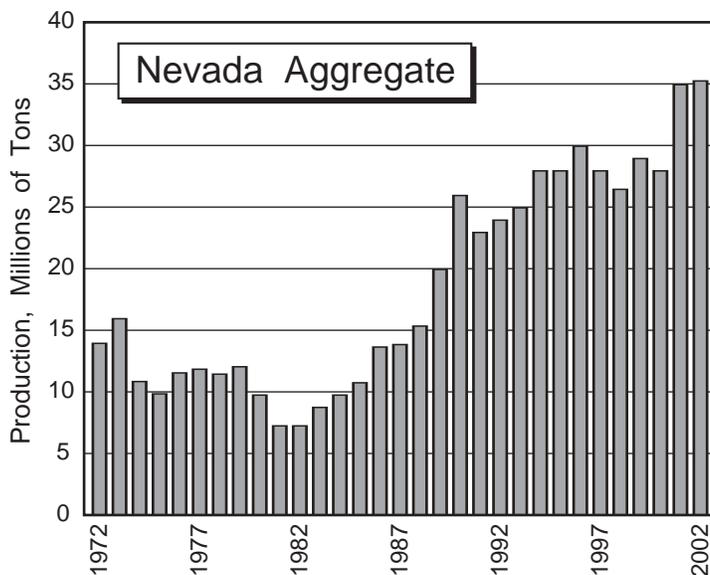
Nevada has great potential for renewable energy (particularly geothermal, wind, and solar energy for

electricity). Approximately 92% of Nevada's electricity currently is generated by power plants that burn fossil fuels, with 64% from coal and 27% from natural gas (Statistics from the Energy Information Agency for 2000, exclusive of geothermal energy).

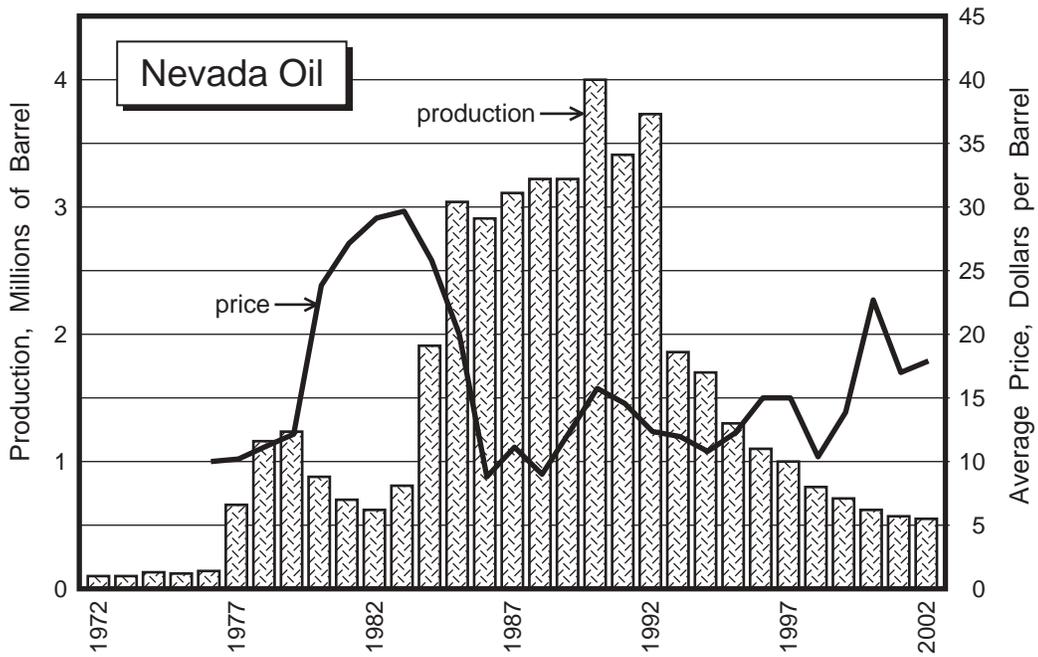
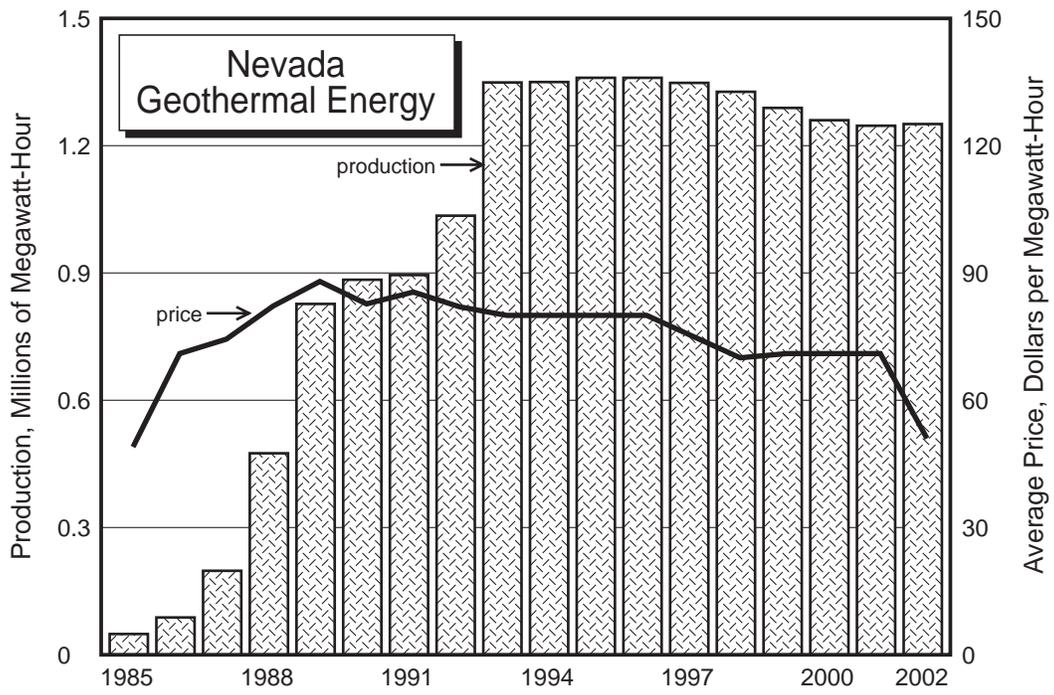
Developments in the Nevada petroleum industry are covered in the section on **Oil and Gas**. Oil is produced primarily in two areas—Railroad Valley in Nye County and Pine Valley in Eureka County. Total annual oil production from Nevada (valued at \$9.9 million in 2002) is a minor part of U.S. production. The amount of oil production declined for the tenth consecutive year, and no new fields were discovered in 2002. Small amounts of natural gas are used to fuel equipment needed for oil production.

Exploration for oil in Nevada is encouraged by the cumulative production from the two premier fields in Railroad Valley, Grant Canyon and Trap Spring (21 million and 13 million barrels, respectively). Historically, few exploration wells have been drilled in the state (less than 1,000 wells, or fewer than one well per 111 square miles or 286 square kilometers). With so much area unexplored, even discounting areas underlain by high-grade metamorphic and granitic rocks, the potential for finding more multimillion-barrel fields remains high.

Additional information about the Nevada mineral industry and the U.S. gold industry, including the contents of selected publications, is readily available on line through the World Wide Web from the Nevada Bureau of Mines and Geology ([www.nbmgs.unr.edu/](http://www.nbmgs.unr.edu/)) and the Nevada Division of Minerals (<http://minerals.state.nv.us/>). Useful national and international data on nonfuel minerals can be obtained from the U.S. Geological Survey (<http://minerals.usgs.gov/minerals/>), and the U.S. Energy Information Administration ([www.eia.doe.gov/](http://www.eia.doe.gov/)) provides data on oil and gas, geothermal, and other energy sources.



**Nevada population. Data from the U.S. Census Bureau <[www.census.gov](http://www.census.gov)>. Projection to 2010 by Nevada State Demographer.**



# Metals

*by Joseph V. Tingley*

Nevada produced 7.73 million oz (troy ounces) of gold in 2002, falling below year 2001 production by 394,000 oz. Silver production was 13.6 million oz, about 3.8 million oz lower than 2001. Even with the production decreases, Nevada maintained its place as the leading gold and silver producing state in the United States with 25 mines reporting gold production and 24 mines reporting silver production during 2002.

Newmont Mining Corp.'s Nevada operations (the Carlin trend mines, Twin Creeks, Lone Tree, Mule Canyon, Trenton Canyon, the Phoenix property at Battle Mountain, and the Midas Mine in the Gold Circle district) reported a total production of 2,691,543 oz of gold in 2002. With this production, Newmont maintained its place as the Nevada's largest gold producer. Barrick Gold Corp. remained in second place with production of 2,563,516 oz of gold. Barrick's production total includes its Goldstrike property in the Carlin trend as well as Homestake's former properties (Ruby Hill and a 50% share of Round Mountain's output).

For the third consecutive year, Barrick Gold's Betze-Post Mine was Nevada's most productive gold mine, producing 1,409,984 oz in 2002. Newmont's Carlin trend mines produced 1,335,302 oz, and Placer Dome's Cortez operation (Pipeline Mine) produced 1,081,677 oz in 2002. Barrick's Meikle Mine, the largest underground mine in the state, reported 2002 production of 640,337 oz of gold.

The Rochester Mine, operated by Coeur D'Alene Mines Corp., remained first in silver production in Nevada, producing 6,417,792 oz in 2002. Newmont's Midas Mine moved into second place with 2,870,164 oz, displacing Echo Bay's McCoy/Cove Mine which dropped into third place with 1,987,421 oz.

Two major operations closed during 2002; Echo Bay's McCoy/Cove Mine ceased production in March, and Barrick's (formerly Homestake's) Ruby Hill Mine ended mining in October. Placer Dome, however, resumed underground mining on a small scale at the Getchell Mine in Humboldt County in September. Placer Dome suspended operations at Getchell in 1999.

Marking the end of an era in Nevada mining history, on December 4, 2002, the Goldfield Corp. concluded sale of all of its mining operations. This company was started almost a century ago with the consolidation of bonanza mining properties in the historical Goldfield mining district in Esmeralda County. It sold its last Nevada mining property-the Getchell Mine-in the 1970s, but maintained some involvement in mining in other areas. With this final divestiture, Goldfield closed the door on its mining past to concentrate on the electrical construction business in the southern United States, and on the development of waterfront condominium projects in Florida.

## EXPLORATION

Metallic mineral exploration in Nevada in 2002 showed definite signs of new life-more property acquisition news, more claim staking, talk of increased exploration budgets, and even more drilling. With the exception of some work on a gallium property in northern Humboldt County, continued study of a potential zinc-silver deposit in White Pine County, and some claims possibly staked for platinum around the old Boss Mine in Clark County, metallic exploration activity in Nevada in 2002 was devoted entirely to gold and silver. Newmont and Barrick continued to pursue their interests within the major districts along the Carlin trend while Newmont, Glamis Gold, Cordex, and others were busy in the Battle Mountain and Iron Point districts of Lander and Humboldt Counties. Placer Dome was involved with its Pediment and Crossroads projects as well as a new prospect near Horse Canyon, all in the Cortez district along the Lander-Eureka county line.

A lot of excitement was generated in 2002 by Midway Gold's high-grade vein discovery in the Rye Patch district of Nye County. This property, now being explored by Newmont, created a ripple of exploration activity and brought new life into several long-abandoned mining districts in adjacent parts of Nye and Esmeralda Counties.

Over 13,500 mining claims were staked in Nevada in 2002, three times the number recorded in 2001. Claim staking activity was fairly well scattered across the state, but two districts, Rye Patch (with 1,605 claims) and South Buckhorn (with 1,498 claims), ranked far ahead of all others in total claims staked. Newmont staked over 1,800 claims in the state, over 1,100 of these in the vicinity of its Midway property in the Rye Patch district, Nye County. Pacific Intermountain Gold Co. staked over 1,200 claims, mostly in the Rye Patch and surrounding districts in Nye and Esmeralda Counties. Anglo Gold and Cordex staked claim blocks in the Iron Point district, Humboldt County, and Idaho Resources Corp, Nevada North Resources, and Placer Dome each staked claims in the South Buckhorn area of Eureka County. Barrick Gold staked ground in the Divide district of Elko County and in the Goldbanks and Kennedy districts of Pershing County. Independent prospector Carl Pescio vied with the large gold companies and picked up over 700 new claims in several districts in Elko and Eureka Counties.

Figure 1 shows the location of Nevada mining districts and areas in which exploration activity was reported during 2002. Figure 2 shows the distribution of claim staking activity, by district and area, in Nevada in 2002.

Specific 2002 exploration and development projects are summarized by county and mining district in the following sections.

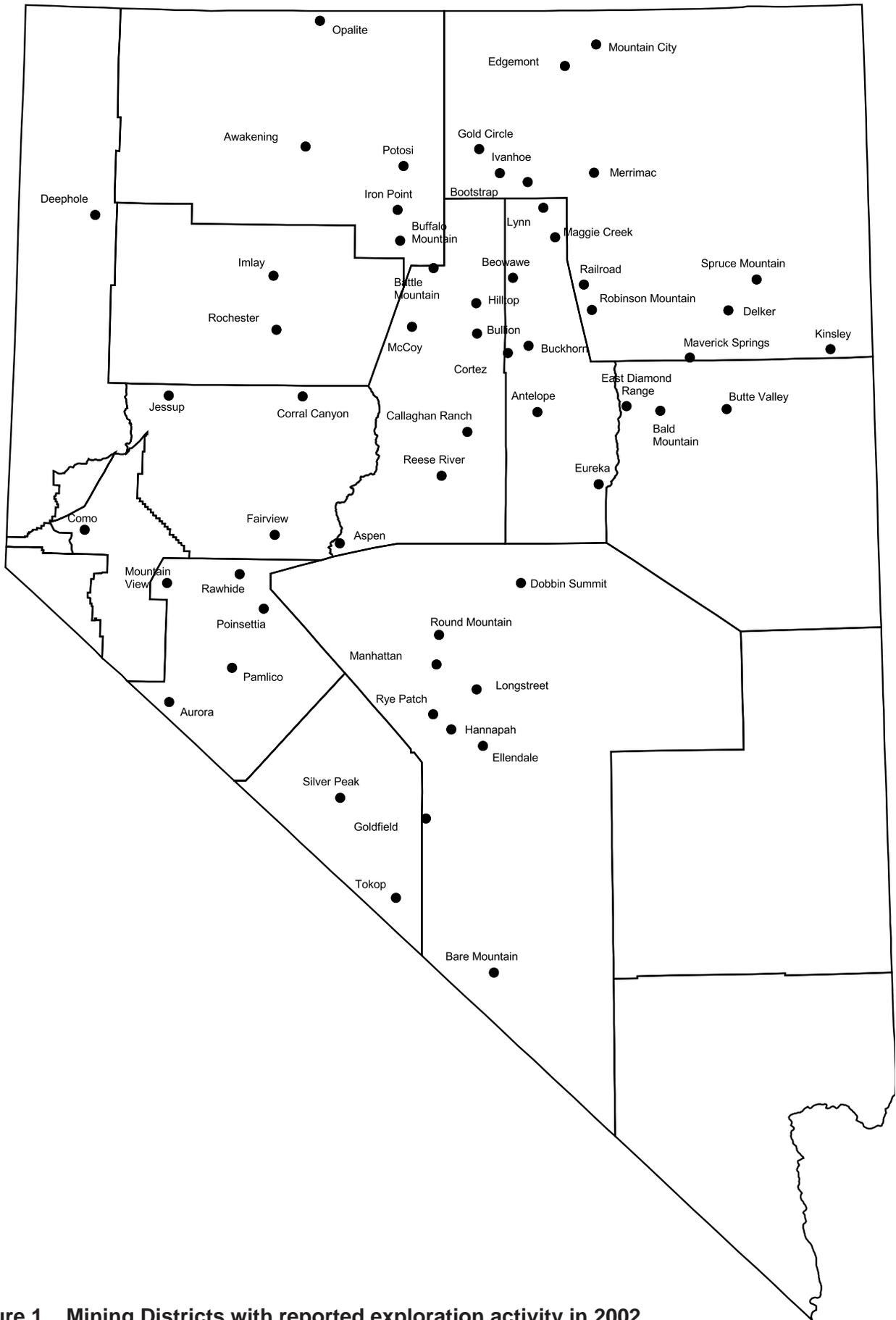


Figure 1. Mining Districts with reported exploration activity in 2002.

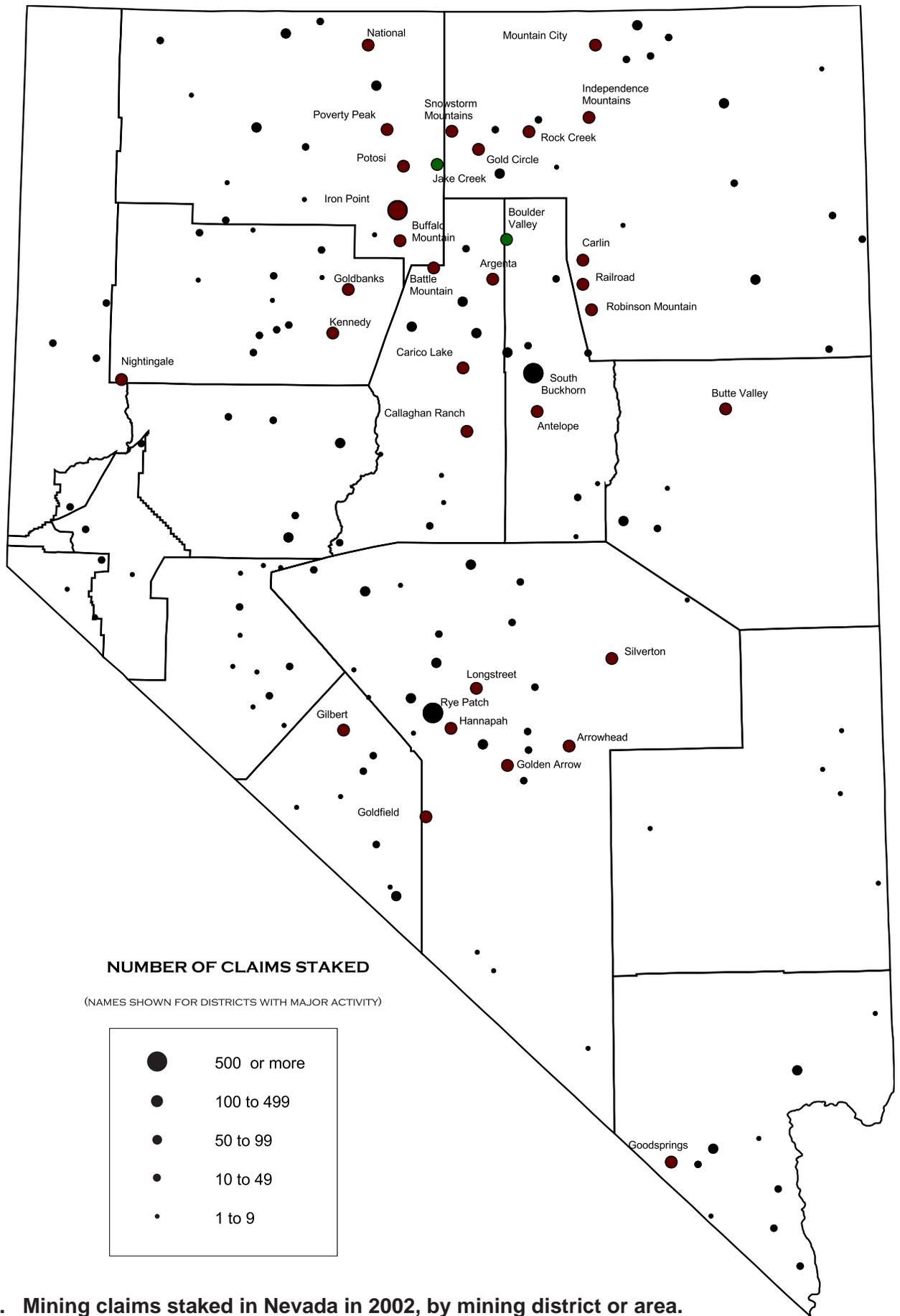


Figure 2. Mining claims staked in Nevada in 2002, by mining district or area.

## CHURCHILL COUNTY

### Corral Canyon District

**Corral Canyon property.** Western Goldfields, Inc. acquired the Corral Canyon gold and base metal property from Calumet Mining Co. Exploration and production have occurred intermittently throughout the area from the 1880s to the present and major companies that have held land positions in the district include Duval Copper Anaconda, Utah International, Asarco, Santa Fe, Newmont, and Cordex. Reverse-circulation drilling by Cordex in the mid-1980s intersected anomalous gold in many holes, and the best intercept contained 25 feet of 0.045 opt (troy ounces per short ton) Au. Gold values collected from an exposed quartz vein on the claim block assayed from 0.055 to 0.360 opt Au and specimens of coarse, visible gold have been encountered in underground workings. (Western Goldfields Inc., press release, 8/14/02)

### Fairview District

**CC property.** NDT Ventures Ltd. optioned the CC claims to explore a northeast-striking, banded, epithermal quartz vein system. Vein outcrops are found over a 1,000-foot strike length and can be traced by float for an additional 2,300 feet. A sample taken by NDT over an exposed 7-foot vein width, assayed 1.6 opt Au, and sampling by others on the vein has yielded gold and silver values along strike as high as 0.7 opt Au and 13 opt Ag. Very little exploration and no drilling have been conducted on the CC claims. (The Mining Record, 9/4/02)

### Jessup District

**Hannah property.** NDT Ventures Ltd. plans to explore the Hannah property in the Jessup district. Previous workers on the property obtained numerous gold values exceeding 0.03 opt Au over a large area of bleached and tourmalinized sedimentary rocks that can be traced over a strike length of almost 2,000 feet. The best gold assays (up to 0.5 opt Au) have been reported in iron-oxide-stained, silicified rocks. No drilling has been conducted on the property. (NDT Ventures Ltd., press release, 8/21/02)

## ELKO COUNTY

### Bootstrap District

**REN project.** Cameco Gold Inc. reported the discovery of high-grade gold mineralization at its REN project located 1.5 miles north of the Meikle and Rodeo Mines. Fourteen holes drilled over a three-year period have returned high-grade intercepts, including assayed grades ranging from 0.23 opt Au over 95 feet to 1.6 opt Au over 80 feet. Exploration results obtained in the last six months from five of these holes now confirm that the mineralization

extends at least 650 feet in length. Mineralization occurs 2,300 to 2,950 feet below surface and further drilling will be required to define the extent of mineralization, which remains open in three directions. Cameco plans to accelerate exploration efforts to further delineate the discovery. (Cameco Gold Inc., press release, 11/25/02)

### Delker District

**Doll-Peg prospect.** Nevada Pacific Gold Ltd. completed drilling on its 440-acre (22 unpatented lode-mining claims) Doll-Peg gold prospect. Six reverse-circulation drill holes have been completed on the property. No significant gold values were reported, but Nevada Pacific's geological team continues to investigate the property's potential for silver and base metals due to the extensive alteration and sulfide mineralization encountered in the drilling. (Nevada Pacific Gold Ltd., press releases, 6/3/02; 7/16/02)

### Edgemont District

**Black Jack Silver project.** A proposal has been presented to the U.S. Forest Service to rehabilitate old workings and to repair approximately 8,000 feet of existing road at the site of the former Burns Mine located in the NE1/4 Section 29, T44N, R52E, 14 miles northwest of Mountain City. (U.S. Forest Service Plan of Operations #825451-02, 10/3/02)

### Gold Circle District

**Ruby Ridge property.** Royal Standard Minerals Inc. plans to drill its Ruby Ridge gold property located 8 miles northeast of Newmont's Midas Mine. The property includes 70 unpatented lode mining claims that cover a window of mineralized Paleozoic rocks exposed through altered volcanic rocks. This property was previously controlled by Western States Minerals Corp., which drilled 11 drill holes before drilling was stopped in 1998 due to the general exploration cutback. The drilling will test a mineralized fault zone at the 500-foot to the 1,000-foot level. This fault zone contains 20 feet of 0.024 opt Au at the surface; at 275 feet in depth, drilling intersected 80 feet of 0.024 opt Au within a mineralized zone that is about 170 feet thick. (Royal Standard Minerals Inc., press release, 5/22/02)

### Ivanhoe District

**Golden Cloud property.** Atna Resources Ltd. optioned the 100-claim (2,000-acre) Golden Cloud property located on the south boundary of Great Basin Gold's Ivanhoe deposit. Multiple mineralized structures outcrop on the property containing banded and vuggy chalcedonic and opaline quartz with reported anomalous gold and mercury values. A geophysical and geochemical program will be carried out the property to define quartz feeders and structures within the strongest centers of mineralization and these targets will then be drilled. (Atna Resources Ltd., press release, 11/22/02)

**Ivanhoe property.** Hecla Mining Co. has entered into a joint venture with Great Basin Gold Ltd. to explore Great Basin's Ivanhoe property. Hecla will fund the exploration and development stages of the underground gold project that Great Basin Gold has been exploring since 1998.

Within a portion of the Ivanhoe property known as the Hollister Development Block, one million high-grade gold equivalent ounces have already been outlined by Great Basin in the Clementine, Gwenivere, and South Gwenivere gold-silver vein systems. This deposit is contained within an inferred mineral resource of 719,000 tons grading 1.29 opt Au and 7.0 opt Ag. Mineralization has been delineated at the relatively shallow depth of 500 to 1,500 feet from surface and is open at depth.

Plans call for a two-stage exploration and development program that would lead to a very low impact, small footprint, underground gold-silver mine. The ore is high-grade, and current plans are to haul the ore away from the mine for processing at one of the available mills in the area owned by Newmont or Barrick Goldstrike Mines Inc., eliminating the need to build and operate a mill on site.

Hecla estimates that it could be producing ore from Ivanhoe in 30 months, depending upon the permitting time. Commercial production would be roughly 180,000 oz of gold and 920,000 oz of silver annually. There are two old open pits at the site, and plans call for starting underground from near the bottom of one of the pits and running a decline about 1,200 feet into the vein zone, circling around and putting in another portal for loads of ore to leave the mine. (Adella Harding, Elko Daily Free Press, 6/10/02)

## **Kinsley District**

**Kinsley Mountain property.** Results of a study of property IP data in early November 2002 by Lateegra Resources Corp. indicate that the oxide gold ore zones of the Kinsley Mountain Mine are directly underlain by zones of sulfide mineralization associated with epithermal alteration and gold emplacement. Encouraged by these results, Lateegra plans to continue its exploration by testing these newly identified targets with a 10,000-foot reverse-circulation drill program.

The Kinsley Mountain property consists of 69 unpatented claims, covering about 2 square miles. Discovered in 1984, the property was put into production by Alta Gold in 1994 and produced a total of 138,151 oz Au through 1999 when it closed at the time Alta was forced into bankruptcy. (Lateegra Resources Corp., press release, 11/28/02)

## **Maverick Springs area**

**Maverick Springs Prospect.** Silver Standard Resources Inc. will acquire all of the silver resources within Vista Gold's Maverick Springs prospect located in the Maverick Springs Range southeast of Elko. Vista Gold will retain

gold resources within the property, and will be operator. In December, Vista Gold completed a 7,020-foot drill program on the property consisting of seven vertical reverse-circulation holes, 500 feet to 2,200 feet from previously identified mineralization. All seven holes encountered flat-lying mineralization, predominantly oxidized to depths of up to 900 feet, and the program was successful in outlining continuous mineralization in a 2,200-foot by 1,200-foot area immediately adjacent to known gold-silver resources. (Vista Gold Corp., press releases, 11/5/02, 12/16/02; Silver Standard Resources Inc., press release, 11/7/02)

## **Merrimac District**

**Blue Basin property.** Nevada Pacific Gold Ltd. staked 46 lode mining claims (covering 920 acres) at the Blue Basin property located along the southwest edge of the Merrimac mining district. Base metal exploration in this area in the 1970s led to the discovery of precious metal mineralization associated with siliceous-gossan outcrops. The company plans an exploration program of detailed geologic mapping along with soil and outcrop sampling at Blue Basin. (Nevada Pacific Gold Ltd., press release, 6/19/02)

## **Mountain City District**

**Merritt Mountain property.** Banner Development Corp. plans to continue exploration work along the east side of Merritt Mountain. Five lines of shallow (50- to 120-foot deep) holes will be drilled. The lines will be 500 to 1,200 feet long, and the holes will be spaced either 50 or 100 feet apart. (U.S. Forest Service Plan of Operations #822454-02, 10/25/02)

## **Railroad District**

**Dixie Fork and Triple Junction claims.** Atna Resources Ltd. optioned the Dixie Fork and Triple Junction claims from RMIC Gold. The Dixie Fork and Triple Junction claims are about 7 miles south and 14 miles south of Newmont's Rain deposit cluster, respectively. Previous work on the properties consists of geological mapping, rock and soil geochemical surveys, and the drilling of a number of shallow holes to vertical depths generally less than 250 feet. Atna plans additional mapping and geophysics to further define the potential ore bearing structures prior to additional drilling. (Atna Resources Ltd., press release, 10/23/02)

**Emigrant project.** Newmont Mining Corp. continued to look at the Emigrant project on the Carlin trend, where they feel there is potential for expanding the old Emigrant Mine. The U.S. Bureau of Land Management has been working on an environmental assessment of a proposed project there for several years, and Emigrant is scheduled to be in production in 2008. (Adella Harding, Elko Daily Free Press, 10/4/02)

**South Carlin gold project.** Nevada Pacific Gold Ltd. completed a Phase I drilling program on the company's 17-square-mile South Carlin gold project in June 2002. To follow up on favorable exploration results received in the first drill program, a \$250,000 Phase II program is now planned. The program will consist of road building, drill pad construction, and the drilling of about 6,000 feet of reverse-circulation and core drilling in two holes. (Nevada Pacific Gold Ltd., press release, 10/16/02)

### Robinson Mountain District

**Piñon gold project.** Royal Standard Minerals Inc. increased its property position at its Piñon-Rain project by staking 70 unpatented claims and acquiring an additional 608 unpatented and 19 patented claims. The company also has acquired interests in more than 4,000 acres of fee land in this area. RSM has also agreed to buyout Crown Resources Corp.'s 30% interest, giving RSM a 100% interest in the project. RSM's current property position in this area is more than 16,000 acres extending over a 10-mile strike length. The estimated mineral resource at Piñon is 3.67 million tons, measured, 14.43 million tons of indicated resources, plus 12.54 million tons, inferred, at a grade of 0.026 opt Au, at a cutoff grade of 0.01 opt Au. This estimate is based upon approximately 314 drill holes drilled on 30-foot to 150-foot centers. The current evaluation will determine the overall potential to develop an open-pit mine within the current near surface deposits. (Royal Standard Minerals Inc., press releases, 9/11/02, 12/10/02)

**RC property.** J-Pacific Gold Inc. leased the 20 unpatented claims of the RC property from KM Exploration LLC of Elko. The property includes 41 additional unpatented mining claims staked by the company adjacent to the original 20. The agreement grants all mineral and mining rights to the property for a ten-year term, which is renewable for additional ten-year terms. Reconnaissance mapping and sampling on the property has identified alteration and geochemistry characteristic for high-grade, structurally controlled and replacement gold deposits. J-Pacific plans limited additional mapping and sampling to more fully define the targets, which will then be drilled. (J-Pacific Gold Inc., press release, 6/7/02)

### Spruce Mountain District

**Clover Valley gold property.** Nevada Pacific Gold Ltd. located 54 mining claims (1,080 acres) along the western edge of the Spruce Mountain mining district. Both Gold Fields Mining Corp. and Santa Fe Gold conducted reconnaissance gold exploration in the district during the mid 1980s. Several drill holes were reported to have intersected gold mineralization: 80 feet grading 0.076 opt and an adjacent hole intersecting 40 feet of 0.037 opt. Nevada Pacific Gold now controls the area of the known gold occurrence and intends to target the mineralized zones encountered in the previous drilling. Adjacent areas

that host alteration and anomalous gold mineralization at the surface will also be tested. (Nevada Pacific Gold Ltd., press release, 5/30/02)

## ESMERALDA COUNTY

### Goldfield District

**Gemfield property.** Metallic Ventures Inc. acquired the Gemfield property from Newmont Capital Limited on August 29, 2002, initiated a 28-hole, 10,660-foot drilling program in November 2002, and completed the program in December 2002. The drill program confirmed the continuity of the existing 500,000-ounce gold resource at Gemfield and enhanced the overall grade. Additional drilling is planned for early 2003 designed to increase the ounces and grade of the resource as well as advance Gemfield towards feasibility and development. Gemfield is one component of the Goldfield project that also includes McMahan Ridge and the main Goldfield area. Metallic currently owns or controls over 18,000 acres of patented and unpatented mining claims in the Goldfield mining district. (Metallic Ventures Inc., press release, 12/23/02)

### Silver Peak District

**Mineral Ridge Mine.** Golden Phoenix Minerals, Inc. received encouraging test results on the crushed rock product from the previously processed Mineral Ridge gold ores. This study suggests that possible future recovery of the industrial minerals, quartz, feldspar, mica, and calcite will produce a saleable co-product to the gold production. The recovery of possible industrial mineral products will enhance cash flow, reduce operating costs during gold production, and reduce reclamation costs. The separated industrial mineral components can be sold to numerous markets in the United States for glass making, fillers and chemicals. (Golden Phoenix Minerals, Inc., press release, 9/10/02)



**Drill rig at work on the Goldfield Project of Metallic Ventures Inc., Goldfield district, Esmeralda County. Photo by J. Tingley, 2002.**

## Tokop District

**Gold Mountain claims.** NorStar Group, Inc. commissioned engineering studies on the company's 17 lode claims (340 acres located in Sections 11, 14, 15, and 16, T8S, R41E). (NorStar Group, Inc., press release, 12/30/02)

## EUREKA COUNTY

### Antelope District

Gold Bar property. American Nevada Gold Corp. optioned the Gold Bar property from American Bonanza Gold Mining Corp. The property is centered on the main Gold Bar open-pit mine, which operated from 1987 to 1994. The property covers more than 2 square miles, and current resources stand at 3.6 million tons grading 0.100 opt Au in the Gold Bar main pit and 2.5 million tons grading 0.056 opt in the Gold Canyon area. American Bonanza acquired the property in late 1999 and has been examining existing data to develop drill targets. (American Bonanza Gold Mining Corp., press release, 10/29/02)

**Gold Pick claims.** White Knight Resources Ltd. Staked 19 lode mining claims covering two drill-defined gold deposits, Gold Pick and Gold Ridge North. The Gold Pick claims are centered on the former Gold Pick open-pit mine from which Atlas Precious Metals produced about 48,000 oz of gold between 1991 and 1994. After the close of mining, pit optimization studies conducted by Mine Development Associates, Inc., defined a remaining mineable reserve estimated at 1,794,700 tons grading 0.077 opt Au. These reserves are contained within a larger resource estimated to exceed 4,997,800 tons at a grade of 0.057 opt Au measured mineral resources. Mineralization remains partially open along strike to both the east and west of the deposit.

The Gold Pick claim group also covers the Gold Ridge North deposit, along the north end of the former Gold Ridge open-pit mine. The deposit is estimated to contain a resource of 584,164 tons grading 0.046 opt Au of which 286,006 tons grading 0.056 opt Au had been categorized as mineable reserve at \$321/oz of gold. (White Knight Resources Ltd., press release, 9/16/02)

**Tonkin Springs property.** U.S. Gold Corp. contracted with HW Process Technologies Inc., Denver, to carry out mill refurbishment and start-up the Tonkin Springs property. Knight Piesold and Co., Denver, will assist with the environmental permit amendments. U.S. Gold hopes to produce 50,000 oz of gold in the first year of operation from milling oxide ore, and 90,000 oz per year in the second year and beyond from milling sulfide ore. The sulfide ore will be treated using Newmont Mining Corp.'s N2TEC proprietary flotation technology that U.S. Gold has licensed. U.S. Gold's initial production plan is a 5-year program using only approximately 400,000 oz of

gold from the 1.4 million ounce gold resource at the mine. There is an existing 3,000-ton-per-day mill and complete infrastructure in place at the site. (U.S. Gold Corp., press release, 10/25/02)

### Beowawe District

**Beowawe property.** Atna Resources Ltd. Has optioned the 100-claim (2,000 acres) Beowawe gold property from prospector Carl Pescio. The Beowawe property is located about 4 miles east of Newmont's Mule Canyon Mine. Previous shallow drilling on the property, in the pediment adjacent to a range front fault, intersected multiple quartz rich structures with anomalous gold and mercury values, and anomalous gold values are reported from a geothermal well drilled adjacent to the property. A geophysical and geochemical program is planned to define quartz feeders and structures within the strongest centers of mineralization and these targets will then be drill tested. (Atna Resources Ltd., press release, 11/22/02)

### Buckhorn District

**HC property.** J-Pacific Gold Inc. leased the HC property, located approximately 3 miles southeast of the Buckhorn Mine, from KM Exploration LLC of Elko. The target at HC is the Devonian Devils Gate Formation-Mississippian Web Formation contact that is thought to lie at shallow depth beneath the property. At least 12,000 feet of strike length have been staked to cover the core of the relatively shallow target. The company plans to carry out limited geologic mapping and sampling to refine the target location, which will then be drilled. (J-Pacific Gold Inc., press release, 6/11/02)

### Cortez District

**Golden Trend project.** J-Pacific Gold Inc. has acquired the Golden Trend property from Rubicon Resources Inc. of Reno. Plans are being made for a limited exploration-drilling program to intersect the Roberts Mountains thrust, and test for associated gold mineralization and alteration. Golden Trend is about 3 miles south of Placer Dome's new Pediment Deposit. (J-Pacific Gold Inc., press release, 7/16/02)

**Horse Canyon Mine.** Cortez Gold Mines is exploring in the Horse Canyon area near the old Horse Canyon Mine. The site is roughly 12 miles southeast of the Pipeline Mine and 5 miles southeast of the new Pediment deposit. In late November 2002, five drill rigs were mobilized in the area. (Adella Harding, Elko Daily Free Press, 11/23/02)

### Eureka District

**Ruby Hill Mine.** Barrick Gold Corp.'s Ruby Hill Mine began layoffs in February, and mining ended in October, 2002, although gold production from the heap-leach pad will continue through 2003. Homestake Mining Co. began

producing gold at Ruby Hill in 1997 and Barrick acquired the mine in December 2001 when it acquired Homestake. (Adella Harding, The Elko Daily Free Press, 2/28/02)

**Ruby Hill Mine (FAD shaft).** Eureka County hopes to develop a historical mining center for visitors at the old FAD shaft site as the newer Ruby Hill Mine closes down. Barrick Gold Corp., which owns both the old and new sites, and Eureka County commissioners are in early negotiations for Barrick to turn the historical mine site over to the county for development as a mining park. The old site includes the old FAD shaft, a building housing old locomotive engines used to generate power in the past, the hoist building, with chairs still in place for the operators, the fire station-shower building, old houses and other old buildings. The county is looking at roughly 130 acres for the historical attraction that would show mining from the early days to modern day. Eureka County would need a guarantee that no one would mine at the historic site in the foreseeable future, because the county would get the patented surface claims but not the mineral rights. (Adella Harding, The Elko Daily Free Press, 8/8/02)

## Lynn District

**Carlin mines.** Underground development drilling approximately 330 feet south of Newmont's Deep Post deposit encountered encouraging gold mineralization of similar grade and refractory metallurgical character as the Deep Post reserves. Step-out drilling is progressing to determine the magnitude of this new high-grade zone. (Newmont Mining Corp., press release, 5/15/02)

**Goldstrike property.** The Goldstrike property (consisting of the Meikle and Betze-Post Mines) was Barrick's largest producer again in 2002, completing its eighth straight year of production in excess of 2 million ounces. During 2002, 80% of production was replaced through reserve expansion. The property is expected to continue to produce at the 2-million-ounce level for at least the next 4 years. (Barrick Gold Corp. 2002 Annual Report)

**Leeville Mine.** Site preparation started at Newmont Mining Corp.'s planned Leeville gold mine, and shaft work was scheduled to start in January 2003. Newmont expects to produce ore from Leeville toward the end of 2005, and the underground mine will produce 450,000 to 500,000 oz of gold per year for at least 7 years. Production will come from three deposits, West Leeville, Four Corners, and Turf, and the ore will be trucked to Newmont's roaster for processing. (Adella Harding, Elko Daily Free Press, 8/6/02, 10/21/02)

## Maggie Creek District

**Chukar Footwall Mine.** The Chukar Footwall Mine is in development in the southwest corner of the Gold Quarry Pit; three portals are being driven into the walls of the open-pit mine. Plans call for development production in November, and for Chukar to be in full production by April

2003, producing roughly 190,000 oz of gold per year. Average ore grade is 0.048 opt Au. Exploration could eventually increase the mine life of Chukar, which is now expected to be operating for 3.5 to 4 years. (Adella Harding, Elko Daily Free Press Mining Quarterly, Spring 2002)

**Gold Quarry Mine.** After 5 years of intensive environmental analysis, the BLM has given Newmont Mining Corp. permission to move ahead with its expansion of the Gold Quarry Mine. The Gold Quarry plan includes expanding the open pit 350 feet deeper, expanding heap-leach facilities, and relocating old tailings and waste rock facilities. Newmont expects combined ore production for the expanded pit to be about 118 million tons, roughly 57 million tons of oxide ore and 61 million tons of low-grade sulfide ores. Gold Quarry ore will feed the roaster and Mill No. 5 at the Carlin Mine, and provide ore for leaching. Also, Newmont reports that there is new potential at the Gold Quarry expansion with the Dos Equis deposit. (Adella Harding, Elko Daily Free Press, 7/29/02 10/21/02)

## HUMBOLDT COUNTY

### Awakening District

**Sleeper gold property.** New figures for a portion of the above-ground gold resource on the Sleeper gold property are pending. Eighty holes 35 feet deep have been completed by Sonic Drilling into 6.6 million tons of Sleeper tailings. The objective of the work is to better quantify some of the aboveground gold at the site as a possible offset to bonding and reclamation costs. Bonding estimates for the Sleeper gold property are also being updated. (X-Cal Resources Ltd., press release, 8/27/02)

### Battle Mountain District

**Marigold Mine.** Glamis Gold Ltd. Hopes to have a permit to expand its Millennium project at the Marigold Mine in August 2003. Plans call for four new open pits at the site and two new heap leach facilities. The four new pits will be called Target I, Target II, Basalt and Antler. Once Millennium is in full swing, Glamis expects to produce 180,000 oz of gold per year. In conjunction with the expansion program, Glamis has continued its in-fill and step-out drilling programs. (Adella Harding, Elko Daily Free Press, 8/20/02; Glamis Gold Ltd., press release, 9/29/02)

### Buffalo Mountain District

**Buffalo Mountain property.** The Cordex Syndicate has acquired 8.5 sections of ground at the Buffalo Mountain property, some three miles northwest of the Nike Converse discovery. Additional work is planned at Buffalo Mountain in the near future, but no timetable for drilling has been stated. (Franc-Or Resources Corp., press release, 9/4/02)

## Iron Point District

**Humboldt Springs property.** The Cordex Syndicate began a rotary drill program at its Humboldt Springs property some 30 miles east of Winnemucca where it has staked 270 mining claims. Cordex plans 12,000 feet of drilling on the property and has identified approximately 25 potential drill sites to test several structural targets that have been interpreted to be present beneath valley-fill cover, based on regional magnetics, gravity, and Digital Elevation Modeling (DEM), as well as ground-based Controlled Source Audio-frequency Magnetotellurics (CSAMT) and Mobile Metal Ion (MMI) soil geochemistry. Data suggest that bedrock targets may be reached within approximately 1,000 vertical feet beneath alluvial, lacustrine, and volcanic rocks. Cordex Syndicate geologists feel that both disseminated and high-grade vein or fissure-fill gold mineralization could be present at depth. (Franc-Or Resources Corp., press release, 9/4/02)

## Opalite District

**Cordero gallium project.** Gold Canyon Resources Inc. confirmed that certain rare earth elements (REEs) are present in anomalous to highly anomalous amounts at the company's Cordero gallium project. REEs and other elements occurring in spatial association with the gallium represent potential by-products or co-products if these elements can be economically recovered and marketed. The company has staked additional claims covering roughly 300 acres contiguous with its Cordero property and drilling continues to define areas of near surface, high-grade mineralization (greater than 100 g/metric ton gallium). Combined results from the 2001 and 2002 programs define two large, high-grade zones of gallium mineralization with average grades in excess of 100 ppm. These high-grade zones are contained within a much broader halo of greater than 30 ppm material. Both zones exceed 600 feet in width, and have a combined strike length of over 4,900 feet. (Gold Canyon Resources Inc., press releases, 3/7/02; 9/10/02)

## Potosi District

**Getchell Mine.** Placer Dome, which suspended gold mining at its Getchell mine in 1999, restarted operations at the Nevada property in September 2002. The startup phase includes an underground test-mining program at the Turquoise Ridge deposit and contract mining of between 500 and 1,000 tons of ore per day in another part of the mine. If the test mining is successful, operations will increase to a rate of 300,000 to 350,000 oz per year by the end of 2004. The staff anticipates an exploration budget of \$60 million in 2003 for Getchell, the highest spent on exploration there in some years. (Reuters, 11/20/02)

## LANDER COUNTY

### Aspen

**Highland property.** Rio Fortuna Exploration Corp. began an 11-hole 7,500-foot reverse-circulation drill program in November 2002 at its 69-claim Highland gold property to test three gold-silver targets related to a volcanic-hosted, low-sulfidation, epithermal vein system. Since acquisition, exploration has identified a possible extension of the northwest-trending main Highland vein system and a northeast-trending zone of quartz and quartz-carbonate veins and breccias approximately 200 feet wide. Seventeen of 45 float, dump, and outcrop samples from this area returned values greater than 0.03 opt Au (up to 0.1 opt Au), including 27 feet of nearly continuous chip/channel samples across an exposed vein set that averaged 0.069 opt Au. The property originally was developed during the 1930s, and more work was conducted from 1997 to 2001. Total historical production is estimated at 10,000 oz of gold from a shallow shaft operation. (Rio Fortuna Exploration Corp., press release, 11/19/02)

### Battle Mountain District

**Battle Mountain gold project.** Nevada Pacific Gold Ltd. Signed an agreement with Placer Dome U.S. Inc. work on Nevada Pacific's Battle Mountain Gold project (BMX). The BMX project covers approximately 24 square miles located along the east flank of Battle Mountain. Nevada Pacific will begin exploration on five gold-silver targets centered on the northeast segment of the Battle Mountain escarpment where the Elder Creek intrusive complex has altered the surrounding Paleozoic sedimentary rocks over an area exceeding 5 square miles. Mineralization consists of including quartz stockwork zones, silicification and skarn associated with strong north-south structural trends.

Earlier exploration efforts by other companies in the BMX project include copper porphyry exploration in the 1960s and 1970s and limited drilling of disseminated gold targets in 1985 and 1994. (Nevada Pacific Gold Ltd., press release, 12/2/02)

**Bluebird property.** Nevada Pacific Gold Ltd. acquired the Bluebird property located at the northern end of the Battle Mountain district. The Bluebird property consists of 10 unpatented mining claims covering an area of historical underground mining within the area of interest of the company's BMX gold project. (Nevada Pacific Gold Ltd., press release, 1/6/03)

**Lewis property.** Madison Enterprises Corp. completed a first phase of drilling on its Lewis property. Nine holes drilled in this first phase of work encountered a zone of flat-lying gold mineralization, and tested mineralization along a steeply dipping fault near the eastern boundary of the property; this latter zone may represent near-surface mineralization similar to that found at Newmont's Upper Fortitude deposit. (Madison Enterprises Corp., press release, 11/26/02)

**Phoenix project.** Newmont Mining Corp. plans to begin production at its Phoenix project in 2007. Newmont is considering developing two new open pits and expanding two existing pits to mine for gold and copper, as well as process stockpiles of gold ore and expand heap leach and waste rock facilities. (Adella Harding, Elko Daily Free Press, 1/8/03)

## **Bullion District**

**Pipeline Mine.** Approximately 224,000 feet of exploration, development, and condemnation drilling were completed in 2002 on the Pipeline/South Pipeline/South Pipeline Extension property. Exploration will continue in the Pipeline/South Pipeline area remains, but potential is limited as the margins of the deposits are becoming better defined. The exploration in 2003 will focus on continued refinement of the areas around the deposits. Attractive drill intercepts requiring follow up, as well as geologic and geophysical targets, are present to the south of the South Pipeline deposit along the projected strike of the Pipeline fault. These targets could generate additional mineralized material. (Placer Dome website, www.placerdome.com, 1/1/2003)

**Gold Acres Mine.** Cortez Gold Mines plans to reopen the old Gold Acres Mine to recover carbonaceous ore that was left unmined in the bottom of the old open pit. The ore will be mined by a contractor and transported to Barrick's Goldstrike operations for treatment. Gold Acres, one of the earliest "Carlin-type" gold deposits to be found in Nevada, was mined from 1935 to 1961 and again in the late 1980s and early 1990s. (Adella Harding, Elko Daily Free Press Mining Quarterly, Winter 2002-2003)

**Robertson South joint venture.** Coral Gold Corp. began a 9,000-foot drill program on their Robertson property, which adjoins the Pipeline Mine. The drilling will focus in two areas where previous drilling encountered anomalous gold mineralization. (Coral Gold Corp., press releases, 10/30/02, 11/20/02)

## **Callaghan Ranch District**

**Callaghan property.** J-Pacific Gold Inc. acquired the 52-claim (1,040-acre) Callaghan property under a lease/option agreement with Joseph A. Kizis of Reno. The Callaghan property, site of the 1930s-era Rast mercury mine, is located about 16 miles northeast of Austin. Anomalous values for mercury and other pathfinder elements, along with scattered anomalous gold values, have been detected in outcrops in areas of the property. These occurrences may represent leakage from high-grade gold deposits hosted by favorable rocks in the lower plate of the Roberts Mountains thrust. The most likely location for such a deposit is an area under gravel cover where the Roberts Mountains Formation dips eastward into a major structural intersection. This area will be the initial focus of the company's drilling. (J-Pacific Gold Inc. Website, www.jpgold.com, 12/01/02)

## **Cortez District**

**Pediment deposit.** Placer Dome is working with the BLM on an EIS for its planned Pediment Mine located between the old Cortez Mine and the Horse Canyon Mine in Eureka County. Plans call for a heap-leach facility, waste rock dumps, a shop, and a small office building. The ore is all oxide. This property, while in the Cortez district, is in Lander County just west of the Eureka County line. (Adella Harding, Elko Daily Free Press Mining Quarterly, Fall 2002)

## **Hilltop District**

**Slaven Canyon prospect.** White Knight Resources staked the Slaven Canyon prospect that was drilled by Alta Gold several years ago. The deposit reportedly contains a resource of 1.6 million tons with an average grade of 0.043 opt Au. Mineralization is hosted in upper plate clastic rocks and is still open in several directions. There is also a target for a buried Carlin-type gold deposit in lower plate carbonate rocks at depth. (SEG Newsletter, 4/1/02)

## **McCoy District**

**McCoy/Cove Mine.** Gold production ended at McCoy/Cove on March 31, 2002 and reclamation of the property is now underway. On June 9, 2002, subsidiaries of Echo Bay entered into an agreement with a subsidiary of Newmont providing for the sale of the McCoy/Cove complex to Newmont. As part of the agreement, a Newmont subsidiary will assume all liabilities and obligations relating to the reclamation and remediation required for the McCoy/Cove complex. Pending completion of the transaction, Echo Bay will continue to operate McCoy/Cove for its own account. (Echo Bay Mines Ltd., press release, 7/30/02)

## **Reese River District**

**Amador Canyon property.** Nevada Pacific Gold Ltd. acquired the Amador Canyon property, located 4 miles north of Austin, and is exploring the property for a bulk tonnage, disseminated/stockwork-type silver deposit. Surface outcrops containing silver mineralization occur on the property in a zone measuring 500 to 2,000 feet wide, with a strike length of 4,500 feet. Mineralized rocks in this zone are silicified and sericitized, and contain argentite along with pyrargyrite, proustite, and polybasite. Nevada Pacific plans to begin exploration at Amador Canyon that will include mapping, sampling, and compilation of existing data in preparation for a first phase drilling program. (Nevada Pacific Gold Ltd., press release, 4/4/02)

## LYON COUNTY

### Como District

**Como property.** Royal Standard Minerals Inc. acquired the Como gold-silver property consisting of 47 unpatented lode claims and five patented claims. The property has had historical underground production of about 20,000 oz of gold and 500,000 oz of silver. Since the 1960s several large companies, including St. Joe American, Amoco, Meridian Gold, Amax Gold Inc., and Anglo Gold Corp., have explored the property. Anglo released the property in 2001 after drilling eight holes and completing considerable surface geologic mapping and geochemical sampling. Anglo's drilling program discovered a "new" high-grade vein system (0.45 opt over 10 feet within a mineralized zone that is 40 to 70 feet thick). RSM plans follow up work based upon the previous exploration results. (Royal Standard Minerals Inc., press release, 4/3/02)

## MINERAL COUNTY

### Aurora District

**Esmeralda project.** In 2003, Metallic Ventures Inc. plans to continue with underground development and exploration drilling at its Esmeralda project located in the historical Aurora district approximately 100 miles southeast of Reno. At both the Prospectus and Martinez parts of the property, declines are being driven to develop underground access and drill stations, and a further exploration drilling program will follow up the successful 17-hole, 11,420-foot reverse-circulation drilling program conducted during the summer and fall of 2002. This earlier drilling program confirmed the continuity and grade of veins in the Martinez area of the property. The planned 10,000-foot underground core drilling program at Prospectus will commence in the spring and is expected to continue into the summer months and a total of 7,000 feet of underground core drilling is planned for Martinez. Surface exploration will continue with reverse-circulation drilling along the central and southwestern end of the Martinez vein and step out into previously untested areas. (Metallic Ventures Inc., press release, 1/30/03)

### Mountain View District

**Sunny Slope Mine.** The Sunny Slope Mine, a high-grade, quartz-gold vein system, was acquired by Western Goldfields by its acquisition of Calumet Mining Co. There are numerous shafts, adits, and exploration prospects in the area, along with a well-preserved historical stamp mill. At least two gold-bearing brecciated quartz veins have been identified along northwest-trending fault zones. The veins, which are poorly exposed on the surface, can be identified and mapped underground, and appear to extend many hundreds of feet along strike.

The primary objective of Western Goldfields is to develop an underground mining operation at Sunny Slope. The company also plans exploration in the surrounding area to evaluate additional targets that have been identified. (Western Goldfields, Inc., press release, 8/14/02)

### Pamlico District

**Pamlico property.** American Bonanza Gold Mining Corp. encountered favorable gold mineralization in its recently completed drilling program on the Pamlico property. The drilling program, totaling 1,608 feet in eight holes, was designed to confirm and expand mineralization encountered in previous drilling and in underground workings. Encouraging results of 1.62 opt Au over 3 feet and 2.79 opt Au over 1 foot were obtained. Four distinct mineralized structures were targeted and all four were encountered by the drilling. (American Bonanza Gold Mining Corp., 2/24/03)

### Poinsettia District

**Black Hills and Jenny properties.** NDT Ventures Ltd. optioned the Black Hills property (28 claims), and the nearby Jenny block of eight claims located in the Black Hills along the north side of Gabbs Valley. Mineralization at the Black Hills property, consisting of a gold skarn-stockwork quartz-vein system localized along a northern range-front, can be traced over about 2,000 feet via float and within a series of historical prospects. Gold values within this trend appear to consistently exceed 0.03 opt, with some values up to 0.15 opt. Additional exploration is planned on both the north and south end of the Black Hills.

The Jenny claims, located about 1 mile northeast of the Black Hills, cover a cone-shaped hill with pervasive low-sulfide quartz/adularia veining and silicified breccias in sediments with strongly anomalous gold and high mercury, arsenic and antimony. Float samples of silicified and strongly iron-stained platy sediments contain gold values in the plus 0.03 opt range. Exploration on this claim group will be directed towards further identification of sediment hosted disseminated gold mineralization. No drilling has been conducted on either the Black Hills or the Jenny properties. (NDT Ventures Ltd., press release, 8/21/02)

### Rawhide District

**Rawhide Mine.** Mining operations have ceased at the Rawhide Mine. Crushing and stacking a low-grade stockpile will continue through the end of May 2003 and then operations will largely be limited to the pumping and processing of the heap solutions. (Pacific Rim Mining Corp., press release, 12/3/02)

## NYE COUNTY

**Seabridge Gold properties.** Seabridge Gold through its 50% owned subsidiary, Pacific Intermountain Gold Corp., has staked more than 1,500 claims (approximately 30,000 acres) covering more than 20 prospective gold targets in Nevada. Most of the staking is in Nye County, where the object is to acquire potential high-grade vein targets similar to Newmont's Midway discovery. A significant number of the claims are contiguous with and southeast of the Midway property. (Seabridge Gold Inc., press release, 10/9/02)

### Bare Mountain District

**Sterling Mine.** Imperial Metals Corp. reported that all six holes drilled in a recently completed exploration program on the 144 Zone at Sterling returned significant gold intercepts. The 144 Zone was discovered in 2001 by two holes that intersected 110 feet of 0.15 opt Au and 45 feet of 0.57 opt Au respectively. The drill holes were vertical and were drilled with a combination of rotary drilling to just above the top of the target zone and diamond drilling through the zone. Using this technique, all drill holes reached the target depths and had satisfactory core recoveries. Planning is underway for an additional 12 to 16 combination rotary/diamond drill holes. Sterling was operated as an open-pit and underground mine from 1980 to 1997, producing 194,996 oz of gold from 941,341 tons of ore with an average grade of 0.217 opt Au. (The Mining Record, 8/20/02)

### Dobbin Summit District

**Juniper property.** Electrum Resources, LLC, plans to drill up to 27 holes in two phases on the Juniper property in the Monitor Range. (U.S. Forest Service Plan of Operations #03-03-001, 11/6/02)

### Ellendale District

**Monitor Flats property.** Golconda Resources staked this property in November 2002. The 27 claims (540 acres) are covered by sand and gravel except for two small hills, each about 150 feet in diameter, about 3,000 feet apart. The Tertiary volcanic rocks exposed in these hills are hydrothermally altered and contain anomalous gold, arsenic, and mercury values. The exploration target on this claim group is high-grade Carlin-type gold mineralization in the underlying Ordovician limestone, which is projected to occur at a depth of about 200 feet. (Golconda Resources Ltd., press release, 11/22/02)

**South Monitor.** Golconda Resources Ltd. purchased a 50% interest in the 108-claim (2,160-acre) South Monitor property claims. The property covers the southern extension of the Midway structure and is underlain by hydrothermally altered Tertiary tuffaceous sediments and rhyolitic domes, which cover an area of about 1 mile by 1.5 km. Disseminated gold mineralization in the plus 0.020

opt Au range occurs in two larger zones and has been encountered in drilling to a depth of 640 feet. Targets to delineate possible mineable gold deposits are zones of high-grade veining and the contact of these veins with the underlying Paleozoic limestone, which is projected to occur at a depth of about 1,800 feet. (Golconda Resources Ltd., press release, 11/22/02)

### Hannapah District

**Thunder Mountain gold property.** Castleworth Ventures Ltd. acquired a 50% interest in the Thunder Mountain gold property from Pacific Intermountain Gold Corp. The 228-claim property is located adjacent to and southeast of the Midway property recently joint ventured by Newmont Mining Corp. Since staking the Thunder Mountain property in mid 2002, Pacific Intermountain Gold has conducted detailed geologic mapping and geochemical sampling and has compiled work by past operators to define targets for drill testing. Permitting for drill testing is in progress, and drilling was anticipated to begin in the first quarter of 2003. (Seabridge Gold Inc., press release, 10/24/02, 12/23/02)

### Longstreet District

**Piñon gold project.** Rare Earth Metals Corp. plans to acquire Golden Crown Resource's option on the Piñon property held by MinQuest Inc., a Nevada-based mineral exploration and property acquisition company. The Piñon property is located about 18 miles east of Newmont's Midway gold property, and consists of the Longstreet gold deposit and several untested gold target zones. A mapping program was carried out at Piñon during the summer of 2002, and a property valuation report to verify published reserve and resource is being prepared. (Rare Earth Metals Corp., press release, 12/2/02)

### Manhattan District

**Gold Wedge project.** Assuming approval of pending mining permit applications, Royal Standard Minerals intends to commence construction on its Gold Wedge gold project in the Manhattan district in February 2003. Phase one of the development plan includes a 2,000-foot decline to the depth of 350 feet. Plans are to commence pilot underground production prior to the end of the June 2003, and to achieve an annual production of approximately 50,000 oz of gold by the end of 2003. The property is reported to contain measured gold resources of 104,706 oz at 0.494 opt, indicated resources of 47,052 oz at 0.583 opt, and 394,626 oz of inferred resources at 0.494 opt, all at a 0.15 opt cutoff grade.

The area to be developed and put into production has had approximately 40,000 feet of drilling based on 57 drill holes and more than \$7 million of exploration performed by prior owners (Freeport Exploration, Sunshine Mining, Crown Resources, and others), and the company has plans for further drilling in order to

upgrade the quality of the inferred resources. (Royal Standard Minerals Inc., press release, 12/10/02)

**Ralston Valley claims.** This property consists of 38 claims (760 acres) located in Ralston Valley south of Baxter Spring. Seven shallow holes (maximum depth, 300 feet) drilled by Golconda in the north western part of the claim block encountered intercepts (several 100 feet thick.) of quartz-calcite veining, barite, silicification and drusy dissolution breccias accompanied by highly anomalous gold values (best value, 5 feet of 0.083 opt Au). The drilling intercepted the upper, shaley part of the sequence. Deeper drilling is expected to intercept higher gold values in a lower laminated silty limestone, which is thought to be a better host rock for gold mineralization. (Golconda Resources Ltd., press release, 11/22/02)

### Round Mountain District

**Gold Hill property.** Round Mountain Gold Corp. completed a second phase exploration drill program on its Gold Hill property during the second quarter of 2002. The program focused on shallow mineralization to assess the economics of a small starter pit. (Barrick Gold Corp., press release, 7/25/02)

### Rye Patch District

**Midway gold project.** In September 2002, Midway Gold Corp. entered into a joint venture agreement with Newmont Mining Corp. to explore Midway's gold property in Ralston Valley. Under terms of the agreement, Newmont will fund future exploration on the property. At the time of acquisition by Newmont, Midway's holdings consisted of 446 mining claims covering a mineralized strike length of almost 5 miles. Prior work within the property identified four zones of low sulfidation, epithermal gold mineralization (Discovery, SP, 121, and 63-77). Mineralization is found in quartz-calcite vein stockworks within altered Tertiary rhyolite and underlying Ordovician sedimentary rocks. In high-grade intervals, the gold occurs as dendritic intergrowths with quartz-calcite crystals, and as bands within quartz-chalcedony veins and lining vugs within the siliceous rhyolite host rock.

Since assuming management of the property in September 2002, Newmont has undertaken an exploration program including EM, magnetics and radiometrics airborne geophysical surveys, IP, SP, gravity, radiometrics and CSAMT ground geophysical surveys, detailed geological mapping, and rock sampling as well as continued diamond drilling within the Discovery Zone. The geophysical survey identified nine targets under thin alluvial cover that appear to have signatures similar to the Discovery Zone mineralized area and locally are coincident with anomalous gold values identified from recent sampling. Ground follow up of these targets will commence immediately with detailed geophysics mapping and sampling. A drill program to test these targets was scheduled for early 2003.

Newmont also has staked a large number of new mining claims around the main mineralized areas on the property. The current joint venture land holdings now stand at more than 1,500 claims (30,000 acres), covering a strike length of over 14 miles along the projection of the Discovery Zone mineralization-more than 10 times the original land position acquired by Midway Gold Corp. in August 2001.

In 2002, Midway Gold completed 36,170 feet of drilling in 86 holes in the ongoing drill campaign at the Discovery Zone. Current dimensions of the Discovery Zone are approximately 700 feet by 500 feet, and the deposit remains open to the south and southeast. (Midway Gold Corp., press releases, 9/9/02, 11/6/02, 12/20/02; G. Goodall, Cordilleran Roundup, 1/29/03)

## PERSHING COUNTY

### Imlay District

**Florida Canyon Mine.** In 2002 over 62,000 feet of drilling was completed in and around existing open pit areas, focusing on in-fill drilling to convert resources to reserves. The drill program replaced almost all of the gold mined during 2002 with new proven and probable gold reserves. The company has a large undeveloped land package at Florida Canyon and intends to continue drilling into 2003 to attempt to expand this reserve base further. (Apollo Gold Corp., press release, 2/21/03)

**Standard Mine.** The Standard Mine property is located along the west side of the Humboldt Range about 3 miles south of the existing Florida Canyon Mine. Several new ore deposits collectively referred to as the Standard Mine project were discovered within this property in 2002. Purchased as part of the original Florida Canyon property, this area had no mineral reserves at the beginning of 2002. An exploration program consisting of over 89,000 feet of reverse-circulation drilling was successful in developing several orebodies and adding 318,400 oz of gold in the proven and probable mineral reserve categories. The Standard Mine project, pending all regulatory approvals, is expected to commence production late in 2004. (Apollo Gold Corp., press release, 2/21/03)

### Rochester District

**Lincoln Hill gold property.** Western Goldfields, Inc. acquired the Lincoln Hill gold property located about 2 miles west of Coeur Rochester's Rochester Mine. The project area contains a high-grade, quartz-gold-tourmaline stockwork that overprints a large, moderate-grade, disseminated precious metal system. Rock chip samples collected over an extensive area confirm high-grade gold values hosted in the quartz-tourmaline stockwork veins and hematitic clay zones, with assay values ranging from anomalous to 2.044 opt Au. Random surface grab samples collected from silicified outcrops

that were void of stockwork mineralization returned values from anomalous to 0.134 opt Au. Western Goldfields is planning a comprehensive exploration program for the property to determine if it should develop the project in-house or consider seeking a joint venture partner. (Western Goldfields, Inc., press release, 1/8/03)

**Rochester Mine.** Coeur's Rochester Mine reached a major milestone in the third week of January 2002 by pouring more than one million ounces of gold and 88 million ounces of silver since commencing production in 1986. Mining at the Nevada Packard satellite deposit, located 1.5 miles to the south of Rochester, will begin early in 2003. Road construction and development of access to the pit is currently underway. (Coeur d'Alene Mines Corp, press release, 5/14/02; The Mining Record, 8/13/02)

## WASHOE COUNTY

### Deephole District

Mountain View project. Vista Gold Corp. announced that an independent technical study of the Mountain View gold project in Nevada has been completed by Snowden Mining Industry Consultants of Vancouver, British Columbia. Vista Gold Corp. recently acquired this project from Newmont Mining Corp. (Vista Gold Corp., press release, 11/5/02)

## WHITE PINE COUNTY

### Bald Mountain District

**Bald Mountain Mine.** At the Bald Mountain Mine, Placer Dome plans to extend mining into Sage Flat and to expand the Top Pit. Sage Flats is a deposit almost adjacent to the Top Pit, and the proposed small open pit is already permitted. (Adella Harding, Elko Daily Free Press Mining Quarterly, Fall 2002)

## Butte Valley

**Limousine Butte project.** At Nevada Pacific Gold Ltd.'s Limousine Butte project, joint venture partner Newmont Mining Corp. is focusing on six new target areas of anomalous gold, arsenic, copper, bismuth, and tungsten. These new targets, located about 5 to 8 miles south of the previously identified discovery areas drilled during earlier exploration campaigns of the joint venture, were identified through exploration work conducted by Newmont, which consisted of a high-definition airborne magnetic/radiometric geophysical survey, ground-based gravity geophysics, detailed geologic mapping, and in excess of 800 rock chip/stream sediment samples.

Using all drill-hole information available, Newmont has estimated mineral inventories on five disseminated oxide gold zones identified to date at Limousine Butte. These five zones, located in the central to northern portion of the project, contain in excess of 620,000 oz of gold (estimated at a 0.006 opt Au cutoff and an average grade of drill intercepts above that cutoff). (Nevada Pacific Gold Ltd., press releases, 5/21/02; 8/8/02)

### East Diamond Range area

**Gunman property.** Cypress Development Corp. entered into a joint venture agreement with Mid-North Resources Ltd. on the Gunman property located on the east side of the Diamond Range in White Pine County. The property totals 210 claims covering 5,000 acres. Cypress has been appointed operator, and it will undertake a phase-four drill program on the property. The previous three drill programs, totaling over of 21,000 feet of drilling, resulted in the discovery of a significant zinc-silver oxide deposit by Cypress Development in 2000. The deposit has been determined to contain approximately one million tons with a weighted average grade of 9% zinc and 1.8 opt Ag over an average thickness of 82 feet, starting at surface. The zinc-silver discoveries on the Gunman property represent a previously unrecognized environment for carbonate replacement-type mineralization in this part of Nevada. An additional drill program is being planned. (Cypress Development Corp., press release, 4/4/02)

# Major Precious-Metal Deposits

by Joseph V. Tingley

The information in this compilation was obtained from the Nevada Division of Minerals and from published reports, articles in mining newsletters, and company annual reports and press releases. Locations of most of these deposits are shown on NBMG Map 120, and most active mines are shown on page 2 of this publication. opt = troy ounces per short ton.

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>CHURCHILL COUNTY</b>				
<b>Bell Mountain (Bell Mountain district)</b>	1982: 1 million tons, 0.055 opt Au, 1.4 opt Ag 1989: reserves—30,000 oz Au, 125,000 oz Ag 1997: 2.5 million tons, 0.059 opt Au equiv. oz		rhyolitic tuff	Miocene
<b>Buffalo Valley gold property (Eastgate district)</b>	1996: 96,000 oz Au		rhyolitic ash-flow tuff	Tertiary
<b>Dixie Comstock (Dixie Valley district)</b>	1991: 2.4 million tons, 0.049 opt Au 1995: 100,000 oz Au		Tertiary rhyolite	Miocene?
<b>Fondaway Canyon (Shady Run district)</b>	1988: 400,000 tons, 0.06 opt Au 1990: 400,000 tons, 0.06 opt Au	1989: 1,065 oz Au, 87 oz Ag 1990: 12,000 oz Au	Triassic slate and phyllite	Cretaceous
<b>New Pass property (New Pass district)</b>	1994: 3.4 million tons, 0.042 opt Au 1997: 3.1 million tons, 0.055 opt Au		Triassic siltstone	
<b>CLARK COUNTY</b>				
<b>Crescent property (Crescent district)</b>	1992: 390,000 tons, 0.05 opt Au; 3.3 million tons, 0.022 opt Au			
<b>Keystone (Goodsprings district)</b>	1990: <i>estimated geologic resource</i> 64 million tons, 0.05 opt Au 1992: 110,000 tons, 0.11 opt Au	1990: ~1,000 oz Au 1993: idle	lower Paleozoic carbonate rocks	Triassic
<b>ELKO COUNTY</b>				
<b>Big Springs (Independence Mountains district)</b>	1987: 3.76 million tons, 0.148 opt Au 1989: 1.55 million tons, 0.172 opt Au	1987–88: ~106,000 oz Au 1989–92: 274,000 oz Au, 48,000 oz Ag 1993: 52,752 oz Au 1994–95: 30,095 oz Au, 2,877 oz Ag	Mississippian to Permian overlap assemblage clastic and carbonate rocks	Eocene
<b>Bootstrap/Capstone/ Tara (Bootstrap district)</b>	1989: <i>geologic resource</i> —25.1 million tons, 0.039 opt Au 1996: 20.2 million tons, 0.046 opt Au proven and probable reserves; 1 million tons, 0.086 opt Au mineralized material	1988–90: included in Newmont Gold production, page 36 1996: 19,800 oz Au 1999: 147,088 oz Au, 28,395 oz Ag 2000: 131,979 oz Au, 13,402 oz Ag 2001: 92,775 oz Au, 21,093 oz Au 2002: 23,415 oz Au, 4,717 oz Ag	dacitic dikes, Paleozoic siltstone and laminated limestone/chert	Eocene
<b>Cobb Creek (Mountain City district)</b>	1988: <i>geologic resource</i> —3.2 million tons, 0.045 opt Au			
<b>Cord Ranch (Robinson Mountain district)</b>	1991: 3.5 million tons, 0.037 opt Au 1994: 350,000 oz Au in 3 deposits (see Piñon)		Webb Formation Devils Gate Formation Tomera Formation Diamond Peak Formation	
<b>Dee (Bootstrap district)</b>	1982: 2.5 million tons, 0.12 opt Au 1990: 4.5 million tons, 0.059 opt Au 1999: 1.4 million tons, 0.157 opt Au, proven and probable reserves	1985–88: 189,983 oz Au 1989–92: 172,745 oz Au, 142,000 oz Ag 1993–95: 97,860 oz Au 1996: 45,070 oz Au, 50,322 oz Ag 1997–98: 72,595 oz Au 1999: 36,329 oz Au, 68,400 oz Ag 2000: 61,171 oz Au, 110,900 oz Ag 2001: 2,351 oz Au, 6,028 oz Ag	Vinini Formation Devonian carbonates, dacitic dikes	Eocene

continued

**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>ELKO COUNTY (continued)</b>				
<b>Doby George (Aura district)</b>	1995: 3.7 million tons, 0.060 opt Au 1997: 250,000 oz Au		Schoonover Formation	
<b>Jerritt Canyon (includes Saval Canyon and Burns Basin) (Independence Mountains district)</b>	1981: 12.5 million tons 0.231 opt Au 1989: 21.6 million tons, 0.143 opt Au mill ore; 6.5 million tons, 0.043 opt Au leachable 1999: 1.5 million oz Au, proven and probable reserves; 3.8 million oz Au other 2000: 1.3 million oz Au proven and probable; 3.7 million oz Au other mineralized material 2001: 2.058 million oz Au proven and probable; 893,000 oz Au other 2002: 580,913 oz Au, proven and probable reserves; 1.296 million oz Au measured and indicated resources; 1.035 million oz Au inferred resources	1981–90: ~2.6 million oz Au 1991–94: 1,380,000 oz Au, 25,000 oz Ag 1995–98: 1,296,492 oz Au 1999: 363,000 oz Au 2000: 334,747 oz Au 2001: 295,328 oz Au, 7,752 Ag 2002: 338,660 oz Au, 8,154 oz Ag	Hanson Creek and Roberts Mountains Formations	~40 Ma
<b>Ken Snyder (Midas Mine) (Gold Circle district)</b>	1995: 13 million tons, 0.16 opt Au, 2.7 opt Ag, announced resource, proven Au reserve <500,000 oz 1996: 1.1 million tons, 1.324 opt Au, 14.95 opt Ag 1999: 3.0 million tons, 0.816 opt Au, 9.835 opt Ag proven and probable reserves 2000: 3.4 million tons, 0.63 opt Au, 7.77 opt Ag proven and probable reserves 2002: 3.4 million tons, 0.65 opt Au proven and probable reserves; 400,000 tons 0.46 opt Au measured and indicated mineralized material; 200,000 tons 0.55 opt Au inferred mineralized material	1998: 4,357 oz Au, 55,329 oz Ag 1999: 189,081 oz Au, 1,938,470 oz Ag 2000: 197,800 oz Au, 1,941,989 oz Ag 2001: 198,518 oz Au, 2,393,246 oz Ag 2002: 232,949 oz Au, 2,870,164 oz Ag	Tertiary volcanic rocks	15.3 Ma
<b>Kinsley Mountain (Kinsley district)</b>	1988: 2.1 million tons, 0.048 opt Au 1996: 3.4 million tons, 0.032 opt Au	1993: evaluation 1995–97: 127,065 oz Au, 24,452 oz Ag 1998: 9,543 oz Au 1999: 1,543 oz Au	upper Paleozoic carbonate rocks	Oligocene?
<b>Maverick Springs (Maverick Springs area)</b>	2002: 350,000 oz Au, 32.3 million oz Ag, indicated resources; 747,000 oz Au, 68.8 million oz Ag inferred resources			
<b>Meikle (Lynn district)</b>	1992: <i>geologic resource</i> —7.9 million tons, 0.613 opt Au 1999: 5.9 million tons, 0.647 opt Au proven and probable reserves; 3.3 million tons, 0.457 opt Au mineralized material 2000: 4.9 million tons, 0.540 opt Au proven and probable reserves; 2.9 million tons, 0.450 opt Au mineral resource 2001: 9 million tons, 0.439 opt Au proven and probable reserves; 13.5 million tons, 0.433 opt Au mineral resource 2002: 9.8 million tons, 0.398 opt Au proven and probable reserves; 12.9 million tons, 0.396 opt Au mineral resource	1996: 78,442 oz Au 1997–98: 1,421,621 oz Au, 426,030 oz Ag 1999: 977,356 oz Au, 263,225 oz Ag 2000: 805,718 oz Au, 205,000 oz Ag 2001: 712,688 oz Au, 213,370 oz Ag 2002: 640,337 oz Au, 203,574 oz Ag	Popovich and Roberts Mountains Formations	Eocene
<b>Piñon (South Bullion and Dark Star) (Robinson Mountain district)</b>	1996: 38.3 million tons, 0.026 opt Au geologic mineral inventory 2002: 30.6 million tons, 0.026 opt Au, measured, indicated, and inferred resources		Webb Formation siltstone Devils Gate Limestone	
<b>Pony Creek (Carlin district)</b>	1994: <i>geologic resource</i> —1.1 million tons, 0.057 opt Au			
<b>Railroad Property (POD zone) (Railroad district)</b>	1997: 1.5 million tons, 0.085 opt Au drill-indicated resource			
<b>Rain Property (Carlin district)</b>	1982: 3.4 million tons, 0.147 opt Au and 8.3 million tons, 0.083 opt Au			
<b>Gnome deposit</b>	1988: 2.7 million tons, 0.048 opt Au		Webb Formation	Eocene

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**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>ELKO COUNTY (continued)</b>				
<b>Rain Property (Carlin district) continued</b>				
<b>Rain Emigrant Springs deposits</b>	1989: 30.3 million tons, 0.021 opt Au 1996: 16 million tons, 0.028 opt Au proven and probable reserves; 10.4 million tons, 0.021 opt Au mineralized material	1994–96: 160,000 oz Au 1997–98: included in Newmont Gold production, page 40	Webb Formation	36–37 Ma
<b>Rain deposit</b>	1999: 13,467,000 tons, 0.026 opt Au proven and probable open-pit ore, 411,000 tons, 0.316 proven and probable underground ore	1999: 23,477 oz Au 2000: 25,004 oz Au, 2,539 oz Ag 2001: 43,488 oz Au, 9,887 oz Ag 2002: 20,065 oz Au, 4,042 oz Ag		
<b>SMZ deposit</b>	1989: <i>geologic resource</i> —1.6 million tons, 0.019 opt Au			
<b>Rain district</b>	2000: 13.5 million tons, 0.026 opt Au proven and probable open-pit ore; 308,000 tons, 0.267 opt Au proven and probable underground ore 2001: 13.5 million tons, 0.026 opt Au proven and probable open-pit ore; 21,000 tons, 0.024 opt Au proven and probable underground ore; 1.3 million tons, 0.048 opt Au mineralized material			
<b>Rossi Mine (Storm resource) (Bootstrap district)</b>	1998: 3.1 million tons, 0.371 opt Au resource 2000: 2.7 million tons, 0.345 opt Au resource 2002: 1.9 million tons, 0.335 opt Au measured and indicated resources; 1 million tons, 0.0335 opt Au inferred resources		Popovich Formation	Eocene
<b>Trout Creek (Contact district)</b>	1988: 1.5 million tons, 0.04 opt Au	1988: exploration	Miocene sedimentary rocks	
<b>Tuscarora (Dexter) (Tuscarora district)</b>	1987: 2 million tons, 0.039 opt Au, 1.9 opt Ag 1988: 1.8 million tons, 0.037 opt Au, 0.74 opt Ag	1896–1902: 29,940 oz Au, 28,543 oz Ag 1987–90: 34,163 oz Au, 189,865 oz Ag	Eocene rhyolitic ignimbrite and andesite	39 Ma
<b>Winters Creek (Independence Mountains district)</b>	1986: 1.4 million tons, 0.146 opt Au		lower Paleozoic carbonate rocks	Eocene
<b>Wright Window (Independence Mountains district)</b>	1986: 1.3 million tons, 0.095 opt Au	1992: 3,500 oz Au	lower Paleozoic carbonate rocks	Eocene
<b>ESMERALDA COUNTY</b>				
<b>Boss (Gilbert district)</b>	1987: 500,000 tons, 0.07 opt Au 1990: <i>reserves</i> —637,500 tons, 0.023 opt Au <i>geologic resource</i> —31,000 oz Au 1996: <i>see</i> Castle		Ordovician sedimentary rocks	Miocene?
<b>Castle (includes Boss) (Gilbert district)</b>	1996: 3.7 million tons, 0.03 opt Au 1997: 10 million tons, 0.03 opt Au resource 2000: 215,000 oz Au indicated resource and 93,000 oz Au inferred resource		Ordovician Palmetto Formation	
<b>Gemfield (Goldfield district)</b>	1996: 9.5 million tons, 0.04 opt Au 1998: 500,000 oz, 0.04 opt Au		Oligocene Sandstorm Rhyolite	21 Ma?
<b>Goldfield Project (Goldfield district)</b>	1983: 1.75 million tons, 0.087 opt Au 1994: 3.48 million tons, 0.071 opt Au	1903–45: 4.19 million oz Au, 1.45 million oz Ag 1989–97: 28,373 oz Au	andesite, rhyodacite, rhyolite	21 Ma
<b>Hasbrouck (Divide district)</b>	1982: 5 million tons 0.06 opt Au, 1.5 opt Ag 1986: 12.9 million tons, 0.0291 opt Au, 0.59 opt Ag 1998: 7.7 million tons, 0.036 opt Au, 0.7 opt Ag	1986–92: exploration	Siebert Formation tuff and volcanoclastic rocks	16 Ma
<b>Hill of Gold deposit (Divide district)</b>	1988: 500,000 tons, 0.04 opt Au, 0.40 opt Ag 1996: 1.6 million tons, 0.026 opt Au		Miocene silicic tuff	16 Ma

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**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>ESMERALDA COUNTY (continued)</b>				
<b>Mary-Drinkwater (Silver Peak district)</b>	1991: 531,300 tons, 0.124 opt Au	1991: 25,000 oz Au, 8,000 oz Ag	Wyman Formation	Mesozoic?
<b>Mineral Ridge (Silver Peak district)</b>	1995: 5.2 million tons, 0.068 opt Au proven and probable reserves (includes Mary-Drinkwater) 1998: 4 million tons, 0.06 opt Au; 241,000 oz Au 2000: 2.84 million tons, 0.074 opt Au minable reserve 2002: 2.66 million tons, 0.079 opt Au total reserves	1997: 13,793 oz Au, 7,907 oz Ag 1998: 8,582 oz Au, 4,877 oz Ag 1999: 27,145 oz Au, 19,915 oz Ag 2000: 2,200 oz Au, 1,000 oz Ag 2001: 1,399 oz Au, 424 oz Ag 2002: 397 oz Au, 396 oz Ag	Wyman Formation	Mesozoic?
<b>Tip Top (Fish Lake Valley district)</b>	1997: 109,000 tons, 0.103 opt Au, 0.88 opt Ag indicated resource 1998: 168,000 tons, 0.088 opt Au inferred geologic resource	1997: exploration 2001: exploration	Tertiary quartz latite	
<b>Three Hills (Tonopah district)</b>	1996: 3.2 million tons, 0.036 opt Au 1997: 6.3 million tons, 0.023 opt Au		Miocene Siebert Formation and Oddie Rhyolite	
<b>Weepah (Weepah district)</b>	1986: 200,000 tons, 0.1 opt Au, 0.4 opt Ag	1986–87: 58,000 oz Au	Wyman Formation	Cretaceous
<b>EUREKA COUNTY</b>				
<b>Afgan (Antelope district)</b>	1996: 80,000 oz Au drill indicated resource 1999: 2.8 million tons, 0.037 opt Au oxide resource		Webb Formation	
<b>Betze-Post (Lynn district)</b>	1988: 128.4 million tons, 0.095 opt Au 1999: 135.6 million tons, 0.153 opt Au proven and probable reserves; 23.3 million tons, 0.099 opt Au mineralized material 2000: 116.4 million tons, 0.155 opt Au proven and probable; 55.9 million tons, 0.063 opt Au mineral resource 2001: 108.9 million tons, 0.151 opt Au proven and probable; 49.9 million tons, 0.069 opt Au mineral resource 2002: 107.1 million tons, 0.150 opt Au proven and probable reserves; 47.6 million tons, 0.070 opt Au mineral resource	1974: 302,807 oz Au 1980–88: 440,000 oz Au 1989–92: 2,214,508 oz Au, 92,347 oz Ag 1993: 1,439,929 oz Au 1994–98: 8,920,871 oz Au, 372,403 oz Ag 1999: 1,130,094 oz Au, 65,804 oz Ag 2000: 1,646,640 oz Au, 52,000 oz Ag 2001: 1,549,975 oz Au, 261,261 oz Ag 2002: 1,409,984 oz Au, 135,716 oz Ag	Ordovician to Devonian chert, shale, siltstone, and impure carbonates; in part, Vinini Formation	Eocene
<b>Blue Star (Lynn district)</b>	1987: 1.95 million tons, 0.066 opt Au 1989: <i>geologic resource</i> —22.2 million tons, 0.030 opt Au	1974–84: intermittent 1988–2002: included in Newmont Gold production, page 40	lower Paleozoic sandy siltstone and carbonate rocks, granodiorite	Eocene
<b>Bobcat (Lynn district)</b>	1988: <i>geologic resource</i> —17.7 million tons, 0.029 opt Au		lower Paleozoic rocks	Eocene
<b>Buckhorn property (Buckhorn district)</b>	1984: 5 million tons, 0.044 opt Au, 0.585 opt Ag 1990: 700,000 tons, 0.05 opt Au; <i>geologic resource</i> —200,350 oz Au 1993: <i>geologic resource</i> —1.1 million tons, 0.11 opt Au	1988–93: 109,422 oz Au, 409,887 oz Ag	basaltic andesite, sinter, silicified sedimentary rocks	14.6 Ma
<b>Buckhorn South/Zeke deposit (Buckhorn district)</b>	1989: 2 million tons, 0.056 opt Au, 0.224 opt Ag 1998: 2.4 million tons, 0.046 opt Au		lower Paleozoic rocks	
<b>Bullion Monarch (Lynn district)</b>	1987: 1 million tons, 0.10 opt Au	1977–84: 17,779 oz Au	lower Paleozoic sedimentary rocks	Eocene
<b>Carlin North (Lynn district)</b>				
<b>Deep Star</b>	1996: 1.4 million tons, 0.8765 opt Au proven and probable reserves	1995: 2,800 oz Au 1996: 93,400 oz Au 1997–2002: included in Newmont Gold production, page 40	Popovich Formation	Eocene
<b>Genesis</b>	1989: <i>geologic resource</i> —35.8 million tons, 0.044 opt Au 1990: 32 million tons, 0.047 opt (includes Blue Star)	1986: production commenced 1988–2002: included in Newmont Gold production, page 40	Ordovician-Devonian limestone, argillite chert	Eocene

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**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>EUREKA COUNTY (continued)</b>				
<b>Carlin North (Lynn district) continued</b>				
<b>Genesis/North Star/Sold</b>	1996: 22.7 million tons, 0.034 opt Au proven and probable reserves; 11 million	1994–95: 684,600 oz Au 1996–2002: included in Newmont Gold production, page 40	Ordovician-Devonian limestone, argillite chert	Eocene
<b>Genesis Complex</b>	2000: 14.1 million tons, 0.026 opt Au proven and probable open-pit reserves			
<b>Post/Goldbug</b>	1996: 25.6 million tons, 0.190 opt Au proven and probable reserves; 43.6 million tons, 0.079 opt Au mineralized material	1999–2002: included in Newmont Gold production, page 40	lower Paleozoic sedimentary rocks	Eocene
<b>Deep Post</b>	2000: 3.1 million tons, 0.814 opt Au proven and probable underground reserves			
<b>Carlin Mine</b>	1965: 11 million tons, 0.32 opt Au 1965–86: 3.8 million oz Au			
<b>Carlin/Pete/Lantern</b>	1995: 14.8 million tons, 0.031 opt Au 1996: 13.7 million tons, 0.046 opt Au proven and probable reserves; 14.7 million tons, 0.046 opt Au mineralized material	1994–96: 68,700 oz Au 1997–2002: included in Newmont Gold production, page 40	Roberts Mountains	Eocene Formation
<b>Carlin North-other</b>	2000: 19.8 million tons, 0.052 opt Au, proven and probable open-pit reserves			
<b>Carlin North area</b>	2000: 8.2 million tons, 0.495 opt Au, proven and probable underground reserves			
<b>Carlin North area, open-pit</b>	2001: 32.6 million tons, 0.044 opt Au, proven and probable reserves; 13.0 million tons, 0.039 opt Au mineralized material			
<b>Carlin North area, underground (including Deep Post)</b>	2001: 10.9 million tons, 0.56 opt Au, proven and probable reserves; 2.1 million tons, 0.55 opt Au mineralized material			
<b>Carlin South (Maggie Creek district)</b>				
<b>Gold Quarry/Mac/Tusc</b>	1982: 25.1 million tons, 0.106 opt Au and 150 million tons, 0.036 opt Au 1987: 197.8 million tons, 0.042 opt Au 1990: 212.6 million tons, 0.042 opt Au, <i>geologic resource</i> —534.3 million tons, 0.037 opt Au 1996: 174.8 million tons, 0.046 opt Au proven and probable reserves; 51.9 million tons, 0.058 opt Au mineralized material	1981: 6,000 oz Au, 1982: 19,000 oz Au 1983: 74,000 oz Au, 1984: 68,200 oz Au 1985: 136,200 oz Au, 1986: 309,800 oz Au 1987: 446,600 oz Au 1988–93: included in Newmont Gold production, page 40 1994–96: 2,978,000 oz Au 1997–2002: included in Newmont Gold production, page 40	Ordovician to Devonian chert, shale, siltstone, and impure carbonates; in part, Vinini Formation	Eocene
<b>Carlin South area</b>	2000: 75.2 million tons, 0.059 opt Au proven and probable open-pit reserves			
<b>Carlin South open-pit</b>	2001: 61.3 million tons, 0.062 opt Au proven and probable reserves; 24.6 million tons, 0.028 opt Au mineralized material			
<b>Chukar Footwall underground</b>	2001: 278,000 tons, 0.49 opt Au proven and probable reserves; 115,000 tons, 0.46 opt Au mineralized material			
<b>Carlin North and South combined (includes all Carlin properties)</b>				
<b>Carlin open pit</b>	2002: 181.8 million tons, 0.042 opt Au proven and probable reserves; 9.5 million tons, 0.028 opt Au measured and indicated mineralized material; 9.3 million tons, 0.035 opt Au inferred mineralized material			
<b>Carlin underground</b>	2002: 10 million tons, 0.57 opt Au proven and probable reserves; 2.6 million tons, 0.50 opt Au measured and indicated mineralized material; 200,000 tons, 0.53 opt Au inferred mineralized material			
<b>Genesis (see Carlin North-Genesis)</b>				
<b>Genesis/North Star/Sold (see Carlin North-Genesis)</b>				
<b>Gold Bar (Antelope district)</b>	1984: 2.8 million tons, 0.09 opt Au 1990: mined out in December 1994: 240,000 oz Au 1995: 190,000 oz Au 2001: 473,000 oz Au in 6 deposits 2002: 3.6 million tons, 0.100 opt Au resource	1987–90: 238,262 oz Au 1991: 80,727 oz Au, 3,000 oz Ag 1992–94: 155,080 oz Au	Devonian Nevada Formation	Eocene?

**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>EUREKA COUNTY (continued)</b>				
<b>Gold Canyon</b> (Antelope district)	1992: <i>reserves</i> —86,500 oz Au, <i>geologic resource</i> —131,000 oz Au 1993: 770,000 tons, 0.080 opt Au 2001: see Gold Bar 2002: 2.5 million tons, 0.056 opt Au resource	(reported with Gold Bar)	Paleozoic sedimentary rocks	Eocene?
<b>Gold Pick</b> (Antelope district)	1988: 10 million tons, 0.06 opt Au 1993: 1.4 million tons, 0.079 opt Au 2001: see Gold Bar 2002: 5 million tons, 0.057 opt Au measured mineral resource	(reported with Gold Bar)	Paleozoic sedimentary rocks	Eocene?
<b>Gold Quarry/Mac/Tusc</b> (see Carlin South)				
<b>Gold Ridge</b> (Antelope district)	1988: 4 million tons, 0.06 opt Au 1993: 426,000 tons, 0.059 opt Au 2001: see Gold Bar 2002: 584,164 tons, 0.046 opt Au resource	(reported with Gold Bar)	Paleozoic sedimentary rocks	Eocene?
<b>Goldstone</b> (Antelope district)	1988: 1.7 million tons, 0.08 opt Au 1993: 130,928 tons, 0.104 opt Au 2001: see Gold Bar	(reported with Gold Bar)	Paleozoic sedimentary rocks	Eocene?
<b>Horse Canyon</b> (Cortez district)	1984: 3.94 million tons, 0.055 opt Au 1988: included in Cortez Joint Venture figures	1984: 40,000 oz Au 1988–93: included with Cortez Joint Venture	Vinini Formation, Wenban Limestone	≤35 Ma?
<b>Maggie Creek</b> (Maggie Creek district)	1977: 4.5 million tons, 0.09 opt Au 1988: <i>geologic resource</i> —303,000 tons, 0.092 opt Au	to 1986: est. 400,000 oz Au operation transferred to Gold Quarry Mine	Ordovician to Devonian siltstone, chert, sandstone, impure limestone	Eocene
<b>North Star</b> (Lynn district)	1989: <i>geologic resource</i> —6.9 million tons, 0.052 opt Au 1990: 3.9 million tons, 0.052 opt Au	1988: 4,250 oz Au 1989–2002: included in Newmont Gold production, page 40	lower Paleozoic sedimentary rocks	Eocene
<b>Post/Goldbug</b> (see Carlin North-Post)				
<b>Ratto Canyon</b> (Eureka district)	1984: ~200,000 oz Au		Dunderberg Shale, Hamburg Dolomite	Oligocene
<b>Rock Creek</b> (Eureka-Lander Co. line)	1997: 800,000 tons, 0.045 opt Au	1997: exploration	Tertiary latite tuff	
<b>Rodeo Projects</b> (Rodeo, Griffin, Goldbug, North Betze) (Lynn district)	1998: 2.9 million tons, 0.487 opt Au proven and probable reserves; 5.8 million tons, 0.302 opt Au mineralized material 1999: 5.8 million tons, 0.466 opt Au, proven and probable reserves; 13.0 million tons, 0.270 opt Au mineralized material 2000: 9.2 million tons, 0.414 opt Au proven and probable; 7.4 million tons, 0.333 opt Au mineral resource			Eocene
<b>Ruby Hill</b> (Eureka district)	1994: <i>geologic resource</i> —20 million tons, 0.08 opt Au 1995: 7.62 million tons, 0.099 opt Au 1999: 3.77 million tons, 0.110 opt Au proven and probable; 7.33 million tons, 0.072 opt Au mineralized material 2000: 2.7 million tons, 0.105 opt Au proven and probable reserves; 7.3 million tons, 0.072 opt Au mineralized material	1997–98: 133,100 oz Au, 8,686 oz Ag 1999: 123,841 oz Au, 7,688 oz Ag 2000: 125,193 oz Au, 7,984 oz Ag 2001: 134,737 oz Au, 9,315 oz Ag 2002: 135,448 oz Au, 9,750 oz Ag	Goodwin Limestone	Cretaceous? or Oligocene?
<b>Tonkin Springs</b> (Antelope district)	1983: 1.84 million tons, 0.089 opt Au, 0.204 opt Ag 1987: <i>oxide</i> —1.5 million tons, 0.05 opt Au; <i>sulfide</i> —2.5 million tons, 0.09 opt Au 1991: 9 million tons, 0.05 opt Au 1999: 30.7 million tons, 0.045 opt Au resource	1987–88: 10,265 oz Au 1989–90: 3,821 oz Au, 1,872 oz Ag	Vinini Formation, dacitic dikes	Oligocene?
<b>Turf</b> (Lynn district)	1996: 2.5 million tons, 0.367 opt Au mineralized material	included in Newmont Gold production, page 40	Roberts Mountains Formation	Eocene

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**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>EUREKA COUNTY (continued)</b>				
<b>Tusc (Maggie Creek district)</b>	1988: <i>geologic resource</i> —15.8 million tons, 0.059 opt Au 1990: 13.3 million tons, 0.062 opt Au	included in Newmont Gold production, page 40	lower Paleozoic sedimentary rocks	Eocene
<b>West Leeville (Newmont) (Lynn district)</b>	1996: 2 million tons, 0.377 opt Au proven and probable reserves; 581,000 tons 0.354 opt Au mineralized material	1995–96: 272,000 oz Au 1997–2000: included in Newmont Gold production, page 40	Roberts Mountains Formation	Eocene
<b>West Leeville (Newmont-Barrick) (Lynn district)</b>	1996: 7.1 million tons, 0.425 opt Au proven and probable reserves; 500,000 tons 0.328 opt Au mineralized material		Roberts Mountains Formation	Eocene
<b>Windfall (Eureka district)</b>	1988: 3 million tons, 0.03 opt Au 1995: mined out	1908–16: 24,000 oz Au 1975–84: 90,000 oz Au 1988: 6,380 oz Au, 59 oz Ag	Hamburg Dolomite	Eocene or Oligocene
<b>HUMBOLDT COUNTY</b>				
<b>Adelaide Crown (Gold Run district)</b>	1989: <i>south pit</i> —585,000 tons, 1.313 opt Ag, 0.043 opt Au; <i>additional area</i> : 165,000 tons, 0.015 opt Au, 1.10 opt Ag	1990–91: 4,917 oz Au, 53,474 oz Ag	Preble Formation	Tertiary
<b>Ashdown (Vicksburg district)</b>	1987: 1.16 million tons, 0.125 opt Au 1992: 1.1 million tons, 0.12 opt Au 2002: 100,000 oz Au		Mesozoic granite	Mesozoic
<b>Buckskin (National district)</b>	1997: 50,221 oz Au, 466,243 oz Ag estimated resource		Miocene rhyolite flows and flow breccias	15 Ma
<b>Chimney Creek (Potosi district)</b>	1988: <i>proven, probable</i> —26.9 million tons, 0.068 opt Au; <i>inferred in south pit</i> —2.1 million oz Au 1993: see Twin Creeks	1987–88: 300,000 oz Au 1989: 222,556 oz Au, 55,953 oz Ag 1990: 220,000 oz Au 1991–92: 476,034 oz Au, 213,463 oz Ag 1993: see Twin Creeks	upper Paleozoic sedimentary rocks	41.9 Ma
<b>Getchell (Potosi district)</b>	1989: 8.1 million tons, 0.154 opt Au mill grade and 1.43 million tons, 0.049 opt Au heap-leach ore; <i>additional geologic resource</i> : 5.7 million tons, 0.092 opt Au sulfide and 2.6 million tons, 0.055 opt Au oxide 1999: 18.1 million tons, 0.359 opt Au 2000: 2.8 million oz Au measured resources, 5.5 million oz Au indicated resources, and 6.7 million oz Au inferred resources 2002: 2.69 million oz Au proven and probable reserves; 1.51 million oz Au measured and indicated mineral resources	1938–50, 1962–67: 788,875 oz Au 1987–88: ~35,000 oz Au 1989: 120,730 oz Au, 9,407 oz Ag 1990–91: 372,987 oz Au 1992–95: 790,600 oz Au, 258,700 oz Ag 1996–97: 348,517 oz Au 1998: 175,302 oz Au, 52,490 oz Ag 1999: 111,000 oz Au 2002: 54,600 oz Au, 5,400 oz Ag	Comus and Preble Formations, granodiorite dikes, granodiorite	42–41 Ma
<b>Hycroft (formerly Crofoot/Lewis) (Sulphur district)</b>	1988: 25 million tons, 0.025 opt Au 1999: 23.8 million tons, 0.0204 opt Au proven and probable reserves; 2.3 million tons, 0.0177 opt Au indicated reserves 2000: 41.9 million tons, 0.0196 opt Au measured and indicated resources; 14.1 million tons, 0.0152 opt Au inferred resources	1988: 75,800 oz Au 1989–98: 868,544 oz Au, 2,717,170 oz Ag 1999: 40,075 oz Au, 183,190 oz Ag 2000: 13,493 oz Au, 38,418 oz Ag 2001: 3,232 oz Au, 2,000 Ag 2002: 1,771 oz Au, 217 oz Ag	Camel conglomerate, rhyolite dikes	1–2 Ma
<b>Lone Tree (Buffalo Mountain district)</b>	1990: 5.4 million tons oxide mill ore, 0.159 opt Au, 5.7 million tons heap-leach ore, 0.025 opt Au and 1.2 million oz Au in sulfide ore 1994: 4 million oz Au 2000: 40.8 million tons, 0.060 opt Au proven and probable reserves (Lone Tree Complex) 2001: 29.2 million tons, 0.065 opt Au proven and probable reserves; 7.9 million tons, 0.032 opt Au mineralized material 2002: 21 million tons, 0.069 opt Au proven and probable reserves; 2 million tons, 0.057 opt Au measured and indicated mineralized material; 1 million tons, 0.047 opt Au inferred mineralized material	1991–99: 546,335 oz Au 1995: 240,000 oz Au, 11,000 oz Ag 1996–97: 536,820 oz Au 1998: 257,702 oz Au, 27,484 oz Ag 1999: 191,975 oz Au, 35,617 oz Ag 2000: 281,022 oz Au, 38,346 oz Ag 2001: 260,518 oz Au, 29,974 oz Ag 2002: 327,160 oz Au, 65,905 oz Ag	Havallah Formation and dacite porphyry	38 Ma

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**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>HUMBOLDT COUNTY (continued)</b>				
<b>Marigold (Battle Mountain district)</b>	1987: 8 million tons, 0.0935 opt Au 1990: 4.3 million tons, 0.105 opt Au mill ore, 7.6 million tons, 0.026 opt Au heap-leach ore 1999: 19.09 million tons, 0.032 opt Au 2000: 30.2 million tons, 0.035 opt Au proven and probable reserves; 20.7 million tons, 0.029 opt Au measured and indicated resources 2001: 75.5 million tons, 0.027 opt Au proven and probable reserves; 109.9 million tons, 0.014 opt Au measured and indicated resources 2002: 79.1 million tons, 0.026 opt Au proven and probable reserves; 129.7 million tons, 0.014 opt Au mineral resource	1989–93: 322,219 oz Au, 9,784 oz Ag 1994–98: 363,771 oz Au 1999: 74,000 oz Au 2000: 68,000 oz Au 2001: 84,784 oz Au, 401 oz Ag 2002: 83,321 oz Au, 1,281 oz Ag	Paleozoic chert, argillite, and carbonate rocks	early Oligocene
<b>North Stonehouse (Buffalo Mountain district)</b>	1991: 2.5 million tons, 0.103 oz Au mill ore		Havallah Formation and porphyry dikes	39 Ma
<b>Pinson (includes Mag pit) (Potosi district)</b>	1980: 3.245 million tons, 0.119 opt Au 1989: 480,000 oz Au 1996: 2.6 million tons, 0.072 opt Au	1980: 56,000 oz Au 1986–88: 189,864 oz Au 1989: 72,489 oz Au (includes Preble) 1990–91: 112,022 oz Au 1992–94: 145,210 oz Au, 12,700 oz Ag 1995: 44,854 oz Au 1996–98: 128,935 oz Au, 7,990 oz Ag 1999: 11,975 oz Au, 442 oz Ag 2000: 1,116 oz Au, 31 oz Ag 2001: 679 oz Au	Comus Formation	Eocene?
<b>Preble (Potosi district)</b>	1985: 1.8 million tons, 0.062 opt Au 1986: 3.16 million tons, 0.093 opt Au heap leach, 80,000 tons, 0.242 opt Au mill grade 1989: 15,110 oz Au	1985: 17,000 oz Au 1987: 28,000 oz Au 1988: 18,828 oz Au 1989: included with Pinson 1990: 1,161 oz Au	Preble Formation	Eocene?
<b>Rabbit Creek (Potosi district)</b>	1989: 4.1 million oz Au; additional geologic resource—1 million Au in refractory material 1992: reserves—3.26 million oz Au 1993: see Twin Creeks	1990–92: 296,000 oz Au 1993: see Twin Creeks	Ordovician	Eocene?
<b>Sleeper (Awakening district)</b>	1985: 4.2 million tons, 0.13 opt Au, 0.73 opt Ag 1989: 1,975,000 oz Au 1990: 44.1 million tons, 0.038 opt Au, 0.152 opt Ag 1999: 2.1 million oz Au at average grade of 0.025 opt Au; 18.1 million oz Ag at average grade of 0.208 opt Ag	1986: 128,000 oz Au, 94,000 oz Ag 1987–88: 389,106 oz Au 1989–96: 1,149,054 oz Au, 1,838,791 oz Ag 2001: 90 oz Au, 197 oz Ag 2002: 130 oz Au, 263 oz Ag	Miocene "latite" flows and dikes, silicic ash-flow tuff, Triassic slate and phyllite	16.1 Ma
<b>Trenton Canyon (Buffalo Valley district)</b>	1994: oxide resource—14.6 million tons, 0.035 opt Au, (517,000 oz Au) 1999: 995,000 tons, 0.021 opt Au (North Peak); 10.8 million tons, 0.022 opt Au (Valmy)	2000: included with Lone Tree 2001: 24,228 oz Au, 2,996 oz Ag 2002: 3,685 oz Au, 742 oz Ag	Vinini Formation	
<b>Trout Creek (Battle Mountain district)</b>	1989: 50,000 oz Au			
<b>Twin Creeks (Chimney and Rabbit Creeks) (Potosi district)</b>	1993: 5.7 million oz Au 1999: 87.1 million tons, 0.079 opt Au proven and probable 2000: 75.2 million tons, 0.086 opt Au proven and probable 2002: 47.6 million tons, 0.081 opt Au proven and probable reserves; 55 million tons, 0.057 opt Au measured and indicated mineralized material; 1.8 million tons, 0.046 opt Au inferred mineralized material	1993–98: 3,338,026 oz Au, 1,317,456 oz Ag 1999: 879,453 oz Au, 119,191 oz Ag 2000: 779,075 oz Au, 103,909 oz Ag 2001: 831,962 oz Au, 95,721 oz Ag 2002: 786,313 oz Au, 158,401 oz Ag	Paleozoic	Eocene?
<b>Winnemucca Gold property (Winnemucca district)</b>	1998: 130,000 to 140,000 oz Au proven, 300,000 oz Au indicated			

**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>LANDER COUNTY</b>				
<b>Austin Gold Venture (Birch Creek district)</b>	1986: 1.75 million tons, 0.16 opt Au 1989: mined out 1999: 154,000 oz Au resource	1986–88: 141,000 oz Au 1989: 50,000 oz Au	Antelope Valley Limestone	Cretaceous or Tertiary
<b>Battle Mountain Complex (Battle Mountain district)</b>	1992: 500,000 oz Au 1995: <i>resource</i> (overall Battle Mountain complex)—60.2 million tons, 0.036 opt Au, including <i>reserves</i> —46.6 million tons, 0.040 opt Au 1999 (Phoenix): 5,680,000 oz Au proven and probable; 1.5 million oz Au additional mineralization 2000: 175.2 million tons, 0.034 opt Au proven and probable reserves	1994–98: 274,741 oz Au, 632,739 oz Ag 1999: 8,322 oz Au, 19,526 oz Ag 2000: 1,509 oz Au, 1,756 oz Ag 2001: see Phoenix		Eocene
<b>Buffalo Valley Gold Project (Buffalo Valley district)</b>	1988: 1.5 million tons, 0.05 opt Au 1994: 4.8 million tons, 0.07 opt Au 1997: 600,106 oz Au resource; 100,797 oz Au, other mineralized material	1988–90: 39,668 oz Au		Eocene?
<b>Cortez Joint Venture (Bullion district)</b> CJV includes original Cortez Mine, Pipeline, and South Pipeline	1968: 3.6 million tons, 0.279 opt Au (Cortez deposit) 1987: 4.8 million tons, 0.105 opt Au 1999: 189.4 million tons, 0.050 opt Au proven and probable; 119.1 million tons, 0.035 opt Au mineralized material 2000: 151.3 million tons, 0.047 opt Au proven and probable; 60.0 million tons, 0.047 opt Au mineralized material 2001: 191.1 million tons, 0.044 opt Au proven and probable; 76.6 million tons, 0.040 opt Au resources 2002: 229.3 million tons, 0.034 opt Au proven and probable reserves; 281.7 million tons, 0.025 opt Au measured and indicated mineral resources	1942–84: 2.4 million tons, 0.13 oz Au/ton; 2 million tons, 0.041 opt Au leached. Little Gold Acres: 800,000 tons, 0.124 opt Au 1988: 42,322 oz Au (includes Horse Canyon) 1989: 39,993 oz Au, 12,234 oz Ag (includes Horse Canyon) 1990–91: 107,445 oz Au, 16,750 oz Ag 1992–93: 141,850 oz Au 1995–98: 1,817,273 oz Au, 31,332 oz Ag 1999: 1,328,525 oz Au 2000: 1,009,992 oz Au 2001: 1,184,732 oz Au 2002: 1,081,677 oz Au	Roberts Mountains Formation, Wenban Limestone, Valmy Formation, quartz porphyry dikes	92.8–94 Ma and 36 Ma
<b>Crescent Pit (Bullion district)</b>	1994: 1.97 million tons mill grade, 0.125 opt Au, 2.2 million tons heap-leach, 0.029 opt Au 1997: included in Cortez Joint Venture			
<b>Crescent Valley (Bullion district)</b>	1994: <i>placer reserve</i> —8 million cu yd, 0.031 oz Au/cu yd 1995: <i>placer resource</i> —6 million cu yd, 0.03 oz Au/cu yd			
<b>Dean (Lewis district)</b>	1995: <i>proven reserve</i> —11,000 oz Au <i>possible to probable resource</i> —240,000 oz Au			
<b>Elder Creek Project/Shoshone (Lewis district)</b>	1989: 91,500 oz Au 1990: 1.5 million tons, 0.041 opt Au	1990–91: 20,102 oz Au	Valmy Formation	Cretaceous or Eocene
<b>Fire Creek (northeast of Bullion district)</b>	1982: 350,000 tons, 0.06 opt Au	1983–84: 767 oz Au	basaltic andesite	Miocene
<b>Fortitude Complex (Battle Mountain district)</b>	1984: 16 million tons, 0.15 opt Au, 0.57 opt Ag	1986: 253,000 oz Au, 902,000 oz Ag 1987: 255,000 oz Au 1988–93: 985,616 oz Au, 1,707,992 oz Ag (includes Surprise) 1994: 50,000 oz Au, 95,000 Ag (Reona Mine) 1995: see Battle Mountain Complex 2001: see Phoenix	Battle Formation Antler Peak Limestone Pumpnickel Formation	37 Ma
<b>Fortitude Extension (Battle Mountain district)</b>	1992: 500,000 oz Au 1993: <i>geologic resource</i> —900,000 oz Au 1996: included in Battle Mountain Complex			
<b>Hilltop (Hilltop district)</b>	1984: 10.3 million tons, 0.073 opt Au 1989: 10 million tons, 0.049 opt Au		Valmy Formation	Oligocene?
<b>Klondike property</b>	1989: 100,000 oz Au equivalent			

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**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>LANDER COUNTY (continued)</b>				
<b>McCoy/Cove (McCoy district)</b>	1981: 2.5 million tons, 0.08 opt Au, 1 opt Ag (McCoy) 1987: 14 million tons, 0.05 opt Au (McCoy); 4 million oz Au, 250 million oz Ag (Cove) 1989: <i>proven and probable reserves</i> 2.9 million oz Au, 128 million oz Ag <i>geologic resource</i> —3.5 million oz Au, 1.50 million oz Ag 1999: 11.8 million tons, 0.043 opt Au, 2.387 opt Ag <i>proven and probable reserves</i> ; 100,000 tons, 0.350 opt Au, 2.0 opt Ag other mineralization 2000: 4.7 million tons, 0.034 opt Au, 2.309 opt Ag <i>proven and probable reserves</i> 2001: 430,000 tons, 0.031 opt Au, 2.624 opt Ag <i>proven and probable reserves</i>	1986: 50,000 oz Au 1987–98: 3,046,660 oz Au, 85.79 million oz Ag 1999: 124,500 oz Au, 8.43 million oz Ag 2000: 162,784 oz Au, 12,328,297 oz Ag 2001: 94,633 oz Au 6,451,425 oz Ag 2002: 33,142 oz Au, 1,987,421 oz Ag	Panther Canyon Formation (conglomerate, sandstone), Augusta Mountain Formation (limestone), granodiorite	39.5 Ma
<b>Mud Springs (Bald Mtn. Zone) (Bullion district)</b>	1993: <i>geologic resource</i> —42,000 oz Au			
<b>Mule Canyon (Argenta district)</b>	1992: 8.5 million tons, 0.136 opt Au 1996: 9 million tons, 0.112 opt Au	1996: 6,743 oz Au 1999: 55,392 oz Au, 10,022 oz Ag 2000: 40,027 oz Au, 5,856 oz Ag 2001: 33,616 oz Au, 3,100 oz Ag 2002: 13,444 oz Au, 2,708 oz Ag	basalt and basaltic andesite	15–16 Ma
<b>Phoenix (Battle Mountain district)</b>	2001: 174.2 million tons, 0.034 opt Au <i>proven and probable reserves</i> ; 156.3 million tons, 0.17% Cu <i>proven and probable reserves</i> ; 73.8 million tons, 0.026 opt Au mineralized material; 99.6 million tons, 0.14% Cu mineralized material 2002: 174.2 million tons, 0.034 opt Au <i>probable reserves</i> ; 156.3 million tons, 0.16 % Cu <i>probable reserves</i> ; 1.5 million tons, 0.033 opt Au measured and indicated mineralized material; 72.3 million tons, 0.026 opt Au inferred mineralized material; 63.5 million tons, 0.14 % Cu inferred mineralized material	2001: 5,641 oz Au, 6,468 oz Ag 2002: 6,134 oz Au, 1,236 oz Ag		Eocene
<b>Pipeline (Bullion district)</b>	1991: <i>geologic resource</i> —11.3 million tons, 0.237 opt Au 1996: 136.7 million tons, 8.7 million oz Au measured resource, includes South Pipeline 1997: included in Cortez Joint Venture	included in Cortez Joint Venture	Roberts Mountains Formation	Eocene?
<b>Robertson (Bullion district)</b>	1988: 11 million tons, 0.04 opt Au 1999: Porphyry zone, 254,678 oz Au <i>proven and probable reserves</i> ; Lucky Boy, 33,000 oz Au measured; Altenburg Hill, 21,300 oz Au measured; Widows Mine, 37,300 oz Au inferred; Gold Pan, 91,400 oz Au measured	1989: 3,700 oz Au	Valmy Formation	early Oligocene
<b>Slaven Canyon property (Bateman Canyon district)</b>	1994: 50,000 oz Au 2002: 1.6 million tons, 0.043 opt Au			
<b>South Pipeline (Bullion district)</b>	1992: 9 million tons, 0.082 opt Au 1994: <i>geologic resource</i> —76.5 million tons, 0.048 opt Au 1996: see Pipeline 1997: included in Cortez Joint Venture		Roberts Mountains Formation	Eocene?
<b>Surprise (Battle Mountain district)</b>	1987: 225,000 oz Au 1988–91: production and reserve included in Fortitude figures 1994: mined out	1987: 2,000 oz Au	skarn	37 Ma
<b>Toiyabe</b>	1988: 813,400 tons, 0.066 opt Au	1988: 32,000 oz Au, 10,300 oz Ag 1990–91: 20,480 oz Au, 15,125 oz Ag	lower Paleozoic calcareous siltstone	Eocene?

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**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>LANDER COUNTY (continued)</b>				
<b>Victorine (Kingston district)</b>	1992: 915,000 tons, 0.304 opt Au 1995: <i>proven and probable reserves</i> —256,000 tons, 0.36 opt Au, plus <i>additional geologic resource</i> —31,160 oz Au 2000: 120,000 oz Au <i>proven and probable reserves</i> ; 200,000 oz Au <i>possible reserves</i>		Cambrian to Ordovician Broad Canyon sequence	
<b>LINCOLN COUNTY</b>				
<b>Atlanta gold property (Atlanta district)</b>	1980: 1.1 million tons, 0.08 opt Au, 1.6 opt Ag 1996: 300,000 oz Au, 3 million oz Ag	1980: 88,000 oz Au, 1,710,000 oz Ag	Pogonip Group, Ely Springs and Laketown Dolomites, Oligocene silicic tuff, dacite dikes	early Miocene
<b>Caliente property (Pennsylvania district)</b>	1997: <i>geologic reserves</i> —50,000 tons, 0.03 opt Au, 0.80 opt Ag; <i>geologic resource</i> —700,000 tons, 0.039 opt Au		Tertiary diorite Tertiary andesite	
<b>Easter and Delamar Project (Delamar district)</b>	1994: <i>geologic resource</i> —3.36 million tons, 0.069 opt Au 1995: 1.5 million tons, 0.069 opt Au	1994: exploration	Cambrian quartzite	Miocene
<b>LYON COUNTY</b>				
<b>Fire Angel (Como district)</b>	1989: 5,600 oz Au, <i>geologic resource</i> —148,500 oz Au			
<b>Hydra-Hercules (Como district)</b>	1997: 259,329 oz Au, 1,956,511 oz Ag	1997: exploration	Tertiary andesite	
<b>Pine Grove (Pine Grove district)</b>	1994: 2.5 million tons, 0.061 opt Au		Cretaceous granodiorite	
<b>South Comstock Joint Venture (Silver City district)</b>	1994: 3 million tons, 0.05 opt Au 1995: 100,000 oz Au			
<b>Talapoosa (Talapoosa district)</b>	1988: 2.5 million tons, 0.041 opt Au, 0.53 opt Ag <i>oxide</i> 14.9 million tons, 0.03 opt Au, 0.49 opt Ag <i>sulfide</i> 1995: <i>geologic resource</i> —45 million tons, 0.025 opt Au and 0.33 opt Ag, including <i>proven and probable reserves</i> of 29.9 million tons, 0.026 opt Au and 0.4 opt Ag		Kate Peak Formation	Miocene
<b>MINERAL COUNTY</b>				
<b>Aurora Mine (Aurora district)</b>	1989: 347,000 tons, 0.253 opt Au 1996: 900,000 tons, 0.1 opt Au	1989–90: 25,656 oz Au, 34,562 oz Ag 1991: 15,000 oz Au 1992–93: 23,600 oz Au, 52,200 oz Ag 1995: 15,000 oz Au, 35,000 oz Ag 1996: 10,374 oz Au 1997–98: 15,414 oz Au, 7,287 oz Ag	andesite, rhyolite	10 Ma
<b>Aurora Partnership (Aurora district)</b>	1983: 1.5 million tons, 0.129 opt Au, 0.3 opt Ag 1995: 230,000 tons, 0.208 opt Au (in portion of Humboldt vein system)	1930s: 100,000 oz Au 1983: 10,000 oz Au 1988: 10,302 oz Au 1989: 27,825 oz Au, 26,000 oz Ag 1991–96: 157,796 oz Au, 318,933 oz Ag	andesite, rhyolite	10 Ma
<b>Borealis (Borealis district)</b>	1981: 2.1 million tons, 0.08 opt Au, 0.5 opt Ag 1988: 1.792 million tons, 0.046 oz Au/ton 2000: 33.4 million tons, 0.044 opt Au, 0.22 opt Ag cumulative resource	1981–84: 170,000 oz Au 1986–88: 116,256 oz Au 1989–90: 107,495 oz Au, 52,401 oz Ag	rhyolite flow dome, andesite flows, breccias, volcanoclastic rocks	5 Ma

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**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>MINERAL COUNTY (continued)</b>				
<b>Candelaria Mine (Candelaria district)</b>	1982: 18.5 million tons, 1.09 opt Au, 0.009 opt Au 1988: 24 million tons, 1.267 opt Ag, 0.011 opt Au 1999: 27.3 million tons, 3.4 opt Ag unmined resource; additional 8 million oz Ag in low-grade stockpile 2000: 48,000 oz Au and 45.4 million oz Ag indicated reserves	1982: 1.7 million oz Ag, 9,000 oz Au 1987: total production was 10 million oz Ag as of June 1987 1988–98: 30.67 million oz Ag, 95,218 oz Au 1999: 96,896 oz Ag, 237 oz Au	Candelaria Formation serpentinite, granitic dikes	Cretaceous
<b>Denton-Rawhide (Rawhide district)</b>	1986: 24.1 million tons 0.045 opt Au, 0.47 opt Ag 1989: reserves—29.4 million tons, 0.040 oz Au and 0.368 opt Ag; <i>geologic resource</i> —59.3 million tons, 0.0274 opt Au, 0.298 opt Ag 1997: 447,000 oz Au, 3.9 million oz Ag	1990–98: 916,800 oz Au, 7,438,000 oz Ag 1999: 115,900 oz Au, 665,000 oz Ag 2000: 104,349 oz Au, 817,787 oz Ag 2001: 100,747 oz Au, 727,095 oz Ag 2002: 82,584 oz Au, 695,248 oz Ag	rhyolite plugs, flows, tuffs, breccias	16 Ma
<b>Mina Gold (Bell district)</b>	1997: 1.77 million tons, 0.055 opt Au geologic resource	1997: exploration	Tertiary feldspar porphyry	
<b>Mindora (Garfield district)</b>	1988: 1.0 million tons, 0.037 opt Au and 1.78 opt Ag	1988: exploration		
<b>Santa Fe (Santa Fe district)</b>	1984: 8 million tons, 0.032 opt Au, 0.26 opt Ag 1990: 6.8 million tons, 0.035 opt Au and 0.241 opt Ag	1989–95: 345,499 oz Au, 710,629 oz Ag	Luning Formation	Miocene
<b>NYE COUNTY</b>				
<b>Baxter Springs (Manhattan district)</b>	1988: 1 million tons, 0.050 opt Au 1990: <i>geologic resource</i> —5 million tons 0.050 opt Au			
<b>Bruner property, Duluth zone (Bruner district)</b>	1992: <i>geologic resource</i> —15 million tons, 0.026 opt Au	1993: exploration	Tertiary volcanic rocks	Miocene
<b>Bullfrog (Bullfrog district)</b>	1989: 18.6 million tons, 0.097 opt Au 1996: 10.2 million tons, 0.062 opt Au proven and probable reserves; 3.7 million tons, 0.040 opt Au mineralized material	1989–98: 2,237,484 oz Au, 2,935,484 oz Ag 1999: 76,159 oz Au, 90,967 oz Ag	rhyolitic ash-flow tuff	9.5 Ma
<b>Daisy (Bare Mountain district)</b>	1993: 4.7 million tons, 0.024 opt Au <i>geologic resource</i> —430,000 oz Au 1998: 4.2 million tons, 0.033 opt Au proven and probable reserves	1997–98: 64,504 oz Au 1999: 30,660 oz Au 2000: 8,740 oz Au 2001: 347 oz Au	Cambrian Bonanza King, Nopah, and Carrara Formations	11–13 Ma(?)
<b>Gold Bar (Bullfrog district)</b>	1987: 1.23 million tons Au ore 1993: idle		silicic volcanic rocks	Miocene
<b>Golden Arrow (Golden Arrow district)</b>	1997: 12.4 million tons, 0.039 opt Au resource		Tertiary rhyolite tuff	
<b>Gold Hill property (Round Mt. district)</b>	1998: 306,620 oz Au, 4,871,890 oz Ag potential resource		rhyolite ash-flow tuff	26 Ma(?)
<b>Gold Wedge property (Manhattan district)</b>	2002: 104,706 oz Au, 0.494 opt Au measured resource; 47,052 oz Au, 0.583 opt Au indicated resource; 394,626 oz Au, 0.494 opt Au inferred resource			
<b>Longstreet property (Longstreet district)</b>	1989: 4 million tons, 0.024 opt Au, <i>geologic resource</i> —9.6 million tons, 0.024 opt Au		rhyolitic volcanic rocks	Oligocene
<b>Manhattan property (Manhattan district)</b>	1989: <i>geologic resource</i> —100,000 tons, 0.50 opt Au 1997: 1.7 million tons, 0.13 opt Au proven and probable		Cambrian Gold Hill Formation	
<b>Midway (Rye Patch district)</b>	1997: 270,000 oz Au preliminary resource		Ordovician Palmetto Formation	
<b>Montgomery Shoshone (Bullfrog district)</b>	1988: 3.1 million tons, 0.072 opt Au, 0.240 opt Ag		rhyolitic ash-flow tuff	9.5 Ma

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**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>NYE COUNTY (continued)</b>				
<b>Nevada Mercury (Bare Mountain district)</b>	1994: <i>geologic resource</i> —50,000 oz Au			
<b>Northumberland (Northumberland district)</b>	1988: 12 million tons, 0.06 opt Au	1939–42: 327,000 oz Au 1981–84: 950,000 tons/year 1988: 29,667 oz Au, 130,394 oz Ag	Roberts Mountains and Hanson Creek Formations, granodiorite, tonalite, quartz porphyry dikes	
<b>Paradise Peak/Ketchup Flats pit (Fairplay district)</b>	1984: 10 million tons, 0.1 opt Au, 3 opt Ag 1989: 5.22 million tons, 0.09 opt Au, 3.62 opt Ag, mill ore; 11.52 million tons, 0.036 opt Au, 0.445 opt Ag, leachable 1996: 5 million tons, 0.022 opt Au, 0.2 opt Ag (Ketchup Flats)	1986–88: 560,000 oz Au, 8.5 million oz Ag 1989–94: 1,054,084 oz Au, 15.6 million oz Ag	rhyolite and andesite flows, ash-flow and air-fall tuffs	Miocene
<b>Reward property (Bare Mountain district)</b>	1998: 77,500 oz Au		Cambrian Wood Canyon Formation	
<b>Round Mountain (Smoky Valley) (Round Mountain district)</b>	1977: 12 million tons, 0.061 opt Au, 0.07 opt Ag 1989: <i>geologic resource</i> —271 million tons, 0.032 opt Au 1999: 320 million tons, 0.018 opt Au proven and probable reserves; 126 million tons, 0.016 opt Au mineralized material 2000: 273.2 million tons, 0.019 opt Au proven and probable reserves; 18.7 million tons, 0.022 opt Au mineralized material 2002: 192.1 million tons, 0.020 opt Au proven and probable reserves; 54.6 million tons, 0.012 opt Au mineral resource	1977–84: 313,480 oz Au, 160,419 oz Ag 1987–88: 424,300 oz Au 1989: 386,227 oz Au, 211,297 oz Ag 1990: 483,192 oz Au, 236,600 oz Ag (includes Manhattan) 1991–98: 3,248,946 oz Au, 2,607,892 oz Ag 1999: 541,808 oz Au, 464,415 oz Ag 2000: 640,133 oz Au, 424,530 oz Ag 2001: 746,949 oz Au, 509,121 oz Ag 2002: 755,493 oz Au, 627,579 oz Ag	rhyolite ash-flow tuff	26 Ma
<b>Sterling (Bare Mountain district)</b>	1983: 200,000 tons, 0.20 opt Au 1989: 469,000 tons, 0.21 opt Au 1996: 129,000 tons, 0.245 opt Au	1983–88: 75,900 oz Au 1990–91: 24,841 oz Au 1995–98: 36,811 oz Au 1999: 3,093 oz Au	Wood Canyon and Bonanza King Formations	14 Ma
<b>South Monitor (west of Ellendale district)</b>	1996: 250,000 oz Au 1997: 14 million tons, 0.026 opt Au, 0.12 opt Ag		Tertiary volcanic rock	
<b>Sullivan (Fairplay district)</b>	1987: 10.2 million tons, 0.039 opt Au, 0.086 opt Ag and 0.37% Cu 1995: <i>proven and possible</i> —17 million tons of 0.34% Cu, 0.0255 opt Au, + 8.5 million tons of 0.32% Cu		Mesozoic granodiorite and metavolcanic rocks	Mesozoic
<b>PERSHING COUNTY</b>				
<b>Bunce (Velvet district)</b>	1989: <i>geologic reserve</i> - 600,000 tons, 0.04 opt Au 1990: 500,000 tons, 0.04 opt Au		rhyolite	
<b>Colado Gold (Willard district)</b>	1997: 15 million tons, 0.022 opt Au resource		Triassic-Jurassic metasedimentary rocks	
<b>Florida Canyon (Imlay district)</b>	1987: 22 million tons, 0.023 opt Au 1988: 37 million tons, 0.023 opt Au 1997: <i>reserves</i> — 45.5 million tons, 0.024 opt Au proven and probable mineralized material, 122.8 million tons, 0.022 opt Au 2002: 20 million tons, 0.017 opt Au proven and probable reserves	1987–88: 109,300 oz Au 1989–98: 1,146,148 oz Au, 610,326 oz Ag 1999: 139,590 oz Au, 111,232 oz Ag 2000: 173,623 oz Au, 129,361 oz Ag 2001: 121,206 oz Au, 98,645 oz Ag 2002: 121,516 oz Au, 72,567 oz Ag	Grass Valley Formation	Late Tertiary?
<b>Goldbanks Project (Goldbanks district)</b>	1994: 900,000 oz Au 1996: 80.8 million tons, 0.019 opt Au proven and probable reserves; 7.4 million tons, 0.014 opt Au possible reserves; 106.8 million tons, 0.028 opt Au drill indicated resources 2000: 569,000 oz Au and 1.7 million oz Ag indicated reserves			

*continued*

**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>PERSHING COUNTY (continued)</b>				
<b>Relief Canyon (Antelope Springs district)</b>	1983: 9 million tons, 0.032 opt Au 1988: ~ 1.3 million tons, 0.03 opt Au 1996: 8.6 million tons, 0.022 opt Au	1984: 24,500 oz Au 1987–88: 82,000 oz Au 1989–90: 34,266 oz Au, 39,235 oz Ag	Natchez Pass Limestone, Grass Valley Formation	Cretaceous?
<b>Rochester (Rochester district)</b>	1981: 75 million tons, 1.5 opt Ag 1989: <i>geologic resource</i> —94.5 million tons, 0.012 opt Au, 1.40 opt Ag 1997: 74.2 million oz Ag, 603,000 oz Au 2000: 50 million oz Ag, 410,000 oz Au (includes Nevada Packard) 2001: 51.4 million tons, 0.85 opt Ag, 0.007 opt Au proven and probable reserves; 61.8 million tons, 0.75 opt Ag, 0.005 opt Au mineralized material 2002: 46.9 million tons, 0.008 opt Au, 0.85 opt Ag proven and probable reserves; 33.8 million tons, 0.009 opt Au, 0.77 opt Ag mineralized material (includes Nevada Packard)	1986–98: 810,329 oz Au, 59.3 million oz Ag 1999: 70,396 oz Au, 6.2 million oz Ag 2000: 75,886 Au, 6,678,274 oz Ag 2001: 81,200 oz Au, 6,478,916 oz Ag 2002: 71,905 oz Au, 6,417,792 oz Ag	Koipato Group, Weaver Rhyolite	Late Cretaceous
<b>Rosebud Project (Rosebud district)</b>	1992: 570,000 oz Au (0.362 opt), 5.5 million oz Ag (5.5 opt) 1999: 216,000 tons, 0.323 opt Au	1997–98: 225,651 oz Au, 815,123 oz Ag 1999: 112,652 oz Au, 247,900 oz Ag 2000: 47,944 oz Au, 191,919 oz Ag	Tertiary volcanic rocks	Miocene
<b>Standard (Imlay district)</b>	2002: 17.2 million tons, 0.019 opt Au proven and probable reserves	1939–42, 1946–49: 45,743 oz Au, 127,451 oz Ag	Natchez Pass Limestone, Grass Valley Formation argillite	
<b>Tag-Wildcat (Farrel district)</b>	1989: <i>geologic resource</i> —1.5 million tons, 0.043 opt Au; <i>reserves</i> —416,000 tons, 0.076 opt Au		Tertiary volcanic rocks	Miocene
<b>Trinity (Trinity district)</b>	1987: 1 million tons, 5.25 opt Ag	1988: active, production not reported 1989: 718,714 oz Ag, 70 oz Au	rhyolite plugs	Miocene
<b>STOREY COUNTY</b>				
<b>Comstock heap leach project (Comstock district)</b>	1992: 475,000 tons, 0.072 opt Au, 0.60 opt Ag 1996: 100,000 oz Au, 1.2 million oz Ag			
<b>Flowers (Golden Eagle) (Comstock district)</b>	1989: 1 million tons, 0.037 opt Au 1993: 362,000 tons, 0.064 opt Au, 0.97 opt Ag, <i>geologic resource</i> —88,128 oz Au and 1 million oz Ag	1988: 836 oz Au, 9,473 oz Ag 1990: 6,000 oz Au, 70,000 oz Ag 1992–97: 16,949 oz Au, 195,701 oz Ag	Alta Formation	12 Ma
<b>Oliver Hills (Comstock district)</b>	1990: 3.37 million tons, 0.054 opt Au, 1.2 opt Ag 1993: 4 million tons, 0.05 opt Au, 0.5 opt Ag, <i>geologic resource</i> —225,000 oz Au and 2.25 million oz Ag	1991: 573 oz Au, 6,947 oz Ag		
<b>WASHOE COUNTY</b>				
<b>Mountain View Gold Project (Deephole district)</b>	1995: 19.5 million tons, 0.027 opt Au 1998: 10.7 million tons, 0.055 opt Au 2002: 23.2 million tons, 0.013 opt Au indicated resources; 4.5 million tons, 0.039 opt Au inferred resources		rhyolite	Miocene
<b>Olinghouse (Olinghouse district)</b>	1994: <i>geologic resource</i> —500,000 opt Au, 0.057 opt Au 1997: 512,800 oz Au proven and probable reserves, 0.042 opt Au	1998: 2,912 oz Au, 1,879 oz Ag 1999: 28,655 oz Au, 17,598 oz Ag	Miocene andesite	Miocene
<b>Hog Ranch (Leadville district)</b>	1984: 2.5 million tons, 0.085 opt Au 1988: 5.5 million tons, 0.064 opt Au proven and probable reserves; 20.1 million tons, 0.029 opt Au <i>geologic resource</i>	1986–87: 80,000 oz Au 1988–95: 118,045 oz Au, 25,400 oz Ag	rhyolite, explosion breccia sinter	15–16 Ma

**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>WHITE PINE COUNTY</b>				
<b>Alligator Ridge (Bald Mountain district)</b>	1983: 5 million tons, 0.09 opt Au 1989: 1 million tons, 0.064 opt Au 1992: 11.5 million tons, 0.046 opt Au; <i>geologic resource</i> —661,888 oz Au, includes Casino/Winrock	1981–90: 632,057 oz Au, 84,188 oz Ag 1991–92: 27,450 oz Au 1993: included with Bald Mountain 1994: 40,000 oz Au 1995: idle 1996: included with Bald Mountain	Pilot Shale	Mesozoic or early Tertiary
<b>Bald Mountain (Top) (Bald Mountain district)</b>	1989: 6.7 million tons, 0.069 opt Au 1999: 32.6 million tons, 0.041 opt Au, proven and probable reserves; 31.7 million tons, 0.044 opt Au, mineralized material 2000: 509,000 oz Au proven and probable; 2.03 million oz Au measured and indicated resources 2002: 508,000 oz Au proven and probable reserves; 2.03 million oz Au measured mineral resources	1986: 50,000 oz Au 1988–89: 103,731 oz Au 1990–93: 287,110 oz Au, 76,745 oz Ag 1994: 80,000 oz Au 1995–96: 221,908 oz Au, 62,460 oz Ag 1997–98: 243,500 oz Au, 63,416 oz Ag 1999: 105,475 oz Au, 18,058 oz Ag 2000: 134,469 oz Au, 14,400 oz Ag 2001: 108,392 oz Au, 18,321 oz Ag 2002: 172,328 oz Au, 21,547 oz Ag	quartz porphyry, Cambrian shale and limestone	Jurassic?
<b>Bellview (White Pine district)</b>	1988: 277,000 tons, 0.04 opt Au, <i>geologic resource</i> —1 million tons, 0.036 opt Au			
<b>Casino/Winrock (Bald Mountain district)</b>	1989: <b>Casino</b> - 804,000 tons, 0.054 opt Au; <b>Winrock</b> 1.3 million tons, 0.037 opt Au 1990: <b>Winrock</b> - 993,000 tons, 39,000 oz Au 1992: see Alligator Ridge	1990–92: 46,800 oz Au	late Paleozoic sedimentary rocks	Eocene
<b>Easy Junior (Nighthawk Ridge) (White Pine district)</b>	1989: 5.68 million tons, 0.031 opt Au 1991: 137,000 oz Au	1990: 11,500 oz Au, 900 oz Ag 1997: 510 oz Au, 76 oz Ag	Devonian and Mississippian rocks	Eocene
<b>Golden Butte (Cherry Creek district)</b>	1989: 4.23 million tons, 0.031 opt Au	1989–91: 43,519 oz Au, 16,911 oz Ag	Chainman Shale	Cretaceous or Eocene
<b>Griffon Gold property (White Pine district)</b>	1993: <i>geologic resource</i> —60,000 oz Au 1994: <i>geologic resource</i> —50,454 oz Au, 0.039 opt Au 1995: <i>proven and probable reserves</i> —2,737,000 tons, 0.025 opt Au 1997: 100,000 oz Au	1998: 37,921 oz Au, 269 oz Ag 1999: 24,740 oz Au	upper Joana Limestone	
<b>Horseshoe (Bald Mountain district)</b>	1991: 1.5 million tons, 0.039 opt Au		Pilot Shale and intrusive quartz porphyry	36–38 Ma
<b>Illipah (Illipah district)</b>	1987: 57,000 oz Au	1987: ~25,000 oz Au/year 1988: 25,324 oz Au, mining ended 1989: 3,874 oz Au, heap-leached	Paleozoic sedimentary rocks	Eocene?
<b>Little Bald Mtn. (Bald Mountain district)</b>	1986: 1 million tons, 0.10 opt Au 1989: 200,000 tons, 0.13 opt Au; <i>geologic resource</i> —260,000 tons, 0.127 opt Au 1993: 140,000 tons, 0.13 opt Au, <i>geologic resource</i> —21,800 oz Au	1985–88: 21,700 oz Au 1989: 5,500 oz Au, 1,500 oz Ag	Antelope Valley Formation	35–38 Ma
<b>Mt. Hamilton (White Pine district)</b>	1988: 7.7 million tons, 0.05 opt Au, 0.5 opt Ag 1994: <i>reserve</i> —9.04 million tons, 0.052 opt Au, 0.38 opt Ag 1996: 10.8 million tons, 0.038 opt Au, 0.24 opt Ag 1997: 7.72 million tons, 0.035 opt Au	1995–97: 99,500 oz Au, 207,500 oz Ag	Dunderberg Shale	Cretaceous
<b>Pan (White Pine district)</b>	1989: 241,000 oz Au 1998: 10.86 million tons, 0.022 opt Au drill indicated and inferred		Mississippian rocks	

*continued*

**MAJOR PRECIOUS-METAL DEPOSITS (continued)**

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>WHITE PINE COUNTY (continued)</b>				
<b>Robinson (Robinson district)</b>	1989: 46.0 million tons, 0.019 opt Au; <i>geologic resource</i> —1 million oz Au 1991: <i>geologic resource</i> —200 million tons 0.012 opt Au 1999: 194 million tons, 0.59% Cu, 0.007opt Au, proven and probable reserves	1986: 48,000 oz Au, 96,000 oz Ag 1987–88: 88,957 oz Au 1989–90: 153,828 oz Au, 121,340 oz Ag 1991: 21,674 oz Au 1992: 35,581 oz Au, 55,000 oz Ag 1993: 13,432 oz Au 1996–98: 196,000 oz Au, 783,500 oz Ag, 370 million pounds Cu 1999: 26,250 oz Au, 153,104 oz Ag, 62 million pounds Cu	Rib Hill Sandstone Riepe Spring Limestone intrusions	Cretaceous
<b>Taylor (Taylor district)</b>	1980: 10 million tons, 3 opt Ag	1980: 1,200 tons/day	Guilmette and Joana Limestones, rhyolite dikes	Eocene or Oligocene
<b>White Pine (White Pine district)</b>	1989: 63,000 oz Au, 0.04 opt Au	1989: 20,654 oz Au	Pilot Shale	Oligocene?
<b>Yankee (Bald Mountain district)</b>	1992: 683,000 oz Au	1990: ~15,000 oz Au 1992: 10,800 oz Au 1993: see Bald Mountain	Pilot Shale	36–38 Ma?

**Newmont Gold Production in Carlin Trend**

Production data for individual mines owned by Newmont Gold Co. in the Carlin trend are not available in many cases. Total production of Newmont operations in the Carlin trend is as follows:

<u>Year</u>	<u>Gold (oz)</u>	<u>Silver (oz)</u>
1988	895,500	NA
1989	1,467,800	117,400
1990	1,676,000	NA
1991	1,575,700	NA
1992	1,588,000	98,000
1993	1,666,400	175,000
1994	1,554,000	158,000
1995	1,634,500	188,000
1996	1,700,000	322,000
1997	1,819,000	118,000
1998	1,575,391	150,400
1999	1,365,866	255,011
2000	1,708,665	108,111
2001	1,410,984	261,261
2002	1,335,302	268,994

NA= not available

# Industrial Minerals

*by Stephen B. Castor*

The total value of industrial minerals produced in Nevada in 2002, an estimated \$420 million, was slightly below that of 2001. In order of estimated value, the most important Nevada industrial minerals in 2002 were construction aggregate, lime, diatomite, cement, gypsum, magnesia, silica, clay, and barite, each valued at more than \$10 million. Commodities with values of less than \$10 million were lithium, dolomite, perlite, dimension stone, salt, zeolite, potassium alum, and gemstones. Borate and some zeolite were processed in Nevada but mined in California, and were not included in the estimate of total industrial mineral value. Data used for these estimates, and data reported for individual commodities below, were obtained from the Nevada Division of Minerals, the U.S. Bureau of Land Management, or directly from companies that produced the commodities. Unless noted otherwise, data are in short tons.

## **Aggregate (Sand and Gravel, Crushed Stone)**

According to the U.S. Geological Survey, in 2002 the U.S. produced about 2.7 billion metric tons (3.0 billion short tons) of sand and gravel + crushed stone, down about slightly from 2001. The average price for this material was \$5.46 per metric ton (\$4.96 per short ton). Some of the crushed stone reported by the U.S. Geological Survey is used in the manufacture of commodities such as cement and lime; such material is not included in our aggregate figures because the processed commodities are listed instead.

For the year 2002, Nevada's statewide construction aggregate production is estimated at about 35 million tons, unchanged from 2001. This production had an approximate value of \$158 million, well below that of gold but higher than that of any other of the state's mined commodities. Aggregate production from sand and gravel deposits accounted for about 73 percent of aggregate production statewide, with crushed stone and lightweight aggregate making up the balance.

Construction aggregate produced in the Las Vegas area, estimated at 26 million tons, was about the same as in 2002. Continued growth in the Las Vegas area will likely maintain demand and production, and the planned new Ivanpah Valley airport and attendant urbanization south of Las Vegas constitute major new markets.

Sand and gravel operations accounted for about 80% of the aggregate used in the Las Vegas metropolitan area in 2002, with crushed stone and lightweight aggregate making up the balance. The most important source of sand and gravel aggregate for Las Vegas is the Lone Mountain area northwest of Las Vegas, which accounted for more than 5 million tons in 2002. Significant production also comes from sand and gravel pits in the southwest part of Las Vegas. Since about 1994, portable crushers

operating at construction sites have become increasingly important producers of base aggregate; recent estimates by industry personnel put portable crusher production at as much as 30% of the total aggregate production for Las Vegas. Crushed stone, mostly crushed carbonate rock mined from outlying areas, has gained importance in the Las Vegas construction aggregate market in recent years, particularly for concrete aggregate.

Companies in the Las Vegas area that produced more than a million tons of aggregate in 2002 were Las Vegas Paving Corp., Rinker Materials, Nevada Ready Mix Corp., and Frehner Construction. Other important producers were Wells Cargo Inc., CTC Crushing LLC, Hollywood Gravel Co., and Diamond Construction.

Nevada Ready Mix mined all of its aggregate from a complex of pits in alluvium in the Lone Mountain area; minor production also comes from adjacent bedrock. Las Vegas Paving produced sand and gravel from its Blue Diamond pit (acquired from Rinker Materials in December, 2001), its Lone Mountain pit, and portable crushing operations. The company also produced crushed stone from the Apex landfill about 10 miles northeast of the metropolitan area. Rinker Materials (a subsidiary of the Australian-based CSR Group) produced sand and gravel from its Buffalo Road pit and crushed granite from the El Dorado pit near Railroad Pass. Frehner Construction mined and crushed limestone from its Sloan property a few miles south of Las Vegas. Community pits and other aggregate mining facilities administered by the U.S. Bureau of Land Management and operated by several companies contributed about 3.2 million tons to the Las Vegas area total in 2002. The Southern Nevada Lightweight operation near Jean mainly produced aggregate for lightweight concrete block and sand for use in stucco. Lightweight aggregate was also shipped from Nye County into the Las Vegas market by Cind-R-Lite Block Co. from a cinder cone near Amargosa Valley.

Production of construction aggregate in the Reno-Sparks-Carson City area, at about 6 million tons, was about the same as in 2001. Three companies in the area produced more than a million tons of aggregate in 2002: Martin Marietta Materials Inc., Granite Construction Co., and RMC Nevada. Most of Martin Marietta's production comes from the old Rocky Ridge Quarry north of Sparks. Granite Construction produced aggregate from five pits in the area. RMC Nevada, part of a U.S. holding company for a U.K. group, now owns All-Lite Aggregate and Paiute Pit Aggregates. Rilite Aggregate Co., Frehner Construction, and A & K Earthmovers, Inc., were also important producers. Crushed rock, which accounted for about 60% of the aggregate used in 2002 in the Reno-Sparks-Carson City area, included material from Martin Marietta Materials, Granite Construction, and Frehner operations, and lightweight rhyolite aggregate from All-Lite, Rilite, and Naturalite Aggregate Corp.

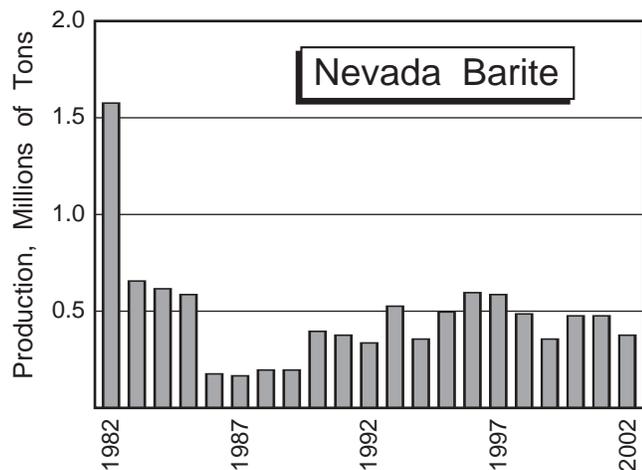
Aggregate that was produced outside of the major metropolitan areas in 2002 is estimated at about 3 million tons. Operators in Nye County together produced more than 500,000 tons of aggregate in 2002, mostly in the Pahrump area. Elko and Lyon County each produced more than 200,000 tons of aggregate. Much of the Lyon County material was sold into the Reno-Carson City metropolitan area. All other Nevada counties are estimated to have produced less than 200,000 tons of aggregate each in 2002.

### Barite

Nevada produces all of the barite mined in the United States, about 377,000 tons of barite in 2002, down considerably from the 478,000 tons produced in 2001. According to the U.S. Geological Survey, the country imported 1.43 million short tons of barite in 2002, approximately half of the amount imported in 2001. About 95% of the barite sold in the U.S. is used as a weighting agent in oil and gas well drilling fluids. Rises in oil and natural gas prices resulted in an increase in the number of domestic operating drilling rigs from 360 in 1999 to 1,270 in mid 2001, mostly for gas exploration. However, in 2002 only about 700 rigs were operating.

M.I. Drilling Fluids, which is jointly owned by Smith International and Schlumberger, was again the largest Nevada barite producer in 2002, with combined production of about 204,000 tons of screened and crushed high-grade ore from the Greystone Mine and ground and bagged barite from its Battle Mountain plant, both in Lander County.

Baroid Drilling Fluids, a subsidiary of Halliburton Co., mined barite from the Rossi Mine about 40 miles northwest of Elko in Elko County and processed it at the Dunphy Mill in Eureka County. Baker Hughes INTEQ produced barite from its Argenta property near Battle Mountain in Lander County. Standard Industrial Minerals shipped a small amount of barite from a deposit of white, paint-grade barite at the P and S Mine in Nye County to a processing plant in Bishop, California. Nevada Drilling Fluids staked claims in the Northumberland district near the Monitor Mine about 5 miles southeast of P and S Mine.



### Borate

In 2002, American Borate Co. mined borate minerals at the Billie Mine in Death Valley, California. The ore is processed in Nevada at the Lathrop Wells mill in Nye County which has a 22,000-ton annual capacity (B<sub>2</sub>O<sub>3</sub> basis), but because the ore is from out of state this production is not included in the estimate of total value of Nevada minerals.

### Cement

Based on U.S. Geological Survey data, in 2002 about 98 million short tons of cement were produced in the U.S. at an average mill price of about \$70 per ton. The only major Nevada producer, the Nevada Cement Co. in Fernley, Lyon County, has annual production in excess of 500,000 tons of cement. The cement is manufactured from limestone mined from a deposit a few miles south of Fernley, and other ingredients come from northern Nevada. The limestone deposit formed in a Tertiary lake, and shows many features that are similar to modern tufa deposits in northern Nevada.

Limestone suitable for cement production is widespread in the Las Vegas area, and several attempts have been made to initiate cement production in the area, without long-term success. In 1999, Royal Cement Co. restarted an idle cement plant near Logandale in Clark County. Limestone was mined at a site near the plant, and other raw materials were purchased from regional suppliers. According to the operator, production in 2000 was about 120,000 tons. U.S. Geological Survey personnel reported minor production in 2001 and 2002, and that the plant was shut down in 2003. According to the Directory of Nevada Mine Operations, American Cement and Aggregate, Lake Forrest, California, was the operator in 2001. In 2002, Minerals Mining staked limestone for cement in the Apex district northeast of Las Vegas. Claims were staked in carbonate terrain in the same area by Republic Dumpco, but this activity may be defensive staking of rock that is currently mined as construction aggregate.

### Clay

Nevada clay production was about the same in 2002 as in 2001, about 33,000 short tons. This does not include halloysite clay mined in Washoe County for Nevada Cement (which is included in the cement figure). According to the U.S. Geological Survey, Nevada is fifth in production of non-swelling bentonite and seventh in the production of swelling bentonite in the U.S.

IMV Nevada, owned by Mud Camp Mining Company, LLC, produced more than 30,000 tons of sepiolite, saponite, and bentonite from deposits in lacustrine sediments in the Ash Meadows area of Nye County. The company has a processing plant in Amargosa Valley, and

exports a variety of clay products worldwide. Most of the value from the operation comes from the sepiolite, which has specific uses in asbestos replacement and salt water drilling. IMV Nevada has the only commercial sepiolite deposit in North America.

Two companies campaign mine and ship relatively minor amounts of Nevada clay from several sites for use in high-cost specialty products. At its White Caps Mill near Beatty in Nye County, Vanderbilt Minerals Co. processes small amounts of clay stockpiled from several Nevada, Arizona, and California deposits. In 2002, the company mined clay from the New Discovery Mine near Beatty, the Blanco Mine in Esmeralda County, and the Buff and Satin Mines in Pershing County. The American Colloid Co. mines white bentonite from Coal Canyon in Pershing County and hectorite from the Disaster Peak Mine in Humboldt County. The clays are shipped to a plant in South Dakota, where they are blended into specialty clay products.

The Moltan Company uses clay from a deposit near Empire in northern Washoe County to mix with diatomite in clumping cat litter produced at its plant near Fernley. In 2002, Oil-Dri, the world's largest manufacturer of cat litter, was unable to proceed with development of a large calcium montmorillonite deposit in Hungry Valley north of Reno as a source of material for clumping cat litter. The company was not granted a special use permit for mining and processing by Washoe County despite getting the go ahead from the U.S. Bureau of Land Management, and the issue is in litigation. In order to proceed with its plans to become a major west coast supplier of cat litter, the company purchased a mine and plant in Taft, California, from the Clorox Company. Oil-Dri also holds the Capricorn clay deposit in northern Washoe County, but this deposit is considered to be too remote to be competitive at present. Specialty Clays Corporation has been evaluating a deposit of bentonite in Churchill County about ten miles southeast of Fallon. This bentonite is reported to have expansive qualities similar to that of Wyoming bentonite.

## Diatomite

Diatomite production in Nevada, which accounts for more than 30% of domestic production, increased about 5% from 2001 to 2002. About two-thirds of the diatomite produced is used in filtration with the remainder largely used in absorbents, fillers, and cement. Emerging small scale uses include pharmaceutical processing and nontoxic insecticides. According to the U.S. Geological Survey, the average domestic price in 2002 was about \$233 per ton f.o.b. plant.

Eagle-Picher Minerals, Inc., a division of Eagle-Picher Industries, Inc., a wholly owned subsidiary of Granaria Holdings Ltd. of the Netherlands, produces most of Nevada's diatomite at three different locations. The most productive is the Colado operation in Pershing County,

which consists of a plant at Lovelock that makes diatomaceous earth filtration products from diatomite mined from pits about 15 miles northwest of Lovelock. The company also produces diatomite used in fillers and absorbents at its Clark plant and mine in Storey County about 20 miles east of Reno, and diatomite used in insulation from a pit near Hazen in Lyon County.

Moltan Co. of Tennessee is the second largest diatomite producer in Nevada, producing absorbent products, cat litter, and soil conditioner at a mine and plant complex in Churchill County about 20 miles northeast of Fernley. Moltan, a family-owned Tennessee company, ships diatomaceous earth absorbents under several labels. The company produces two cat litter types in Nevada, a non-clumping diatomite product and a clumping product composed of diatomite and clay.

Other companies that mined diatomite in Nevada in 2002 were the Celite Corp. at Hazen in Lyon County and Grefco Inc. at Basalt near the Esmeralda/Mineral County line. Celite, a subsidiary of World Minerals Inc., part of the Alleghany Group, has a large diatomite facility in California, and recently acquired the CR Minerals mine at Hazen and plant in Fernley which produces functional filler. The Grefco operation is being expanded, and may become a second producer of filter-grade diatomaceous earth in Nevada.

## Dimension Stone

Nevada is not well known as a producer of dimension stone, and high-quality, cut and polished products are not currently produced from stone mined in the state. A recent attempt to market cut dimension stone processed from several varieties of ash flow tuff in the Beatty area was abandoned after several years due to competition in the Las Vegas market from Mexico. However, split dimension stone products are produced at two localities in Nevada, and new dimension stone operations may be developed.

Las Vegas Rock produces flagstone, ashlar, boulders, and crushed landscape rock from its Rainbow Quarries near Goodsprings, about 20 miles southwest of Las Vegas. The stone is quartz-cemented sandstone that is part of the Jurassic Aztec Sandstone, which crops out extensively in Clark County, but is too friable at most localities for building stone. The company also markets some cut stone and is planning to produce polished slabs and custom stone shapes.

Mt. Moriah Stone quarries flaggy, light-gray quartzite from the Cambrian Prospect Mountain Quartzite at a quarry about 15 miles north of Baker in White Pine County. This material, which naturally splits into slabs up to 5 feet by 8 feet by 4 inches thick, is used for flagstone and other types of uncut building stone. The company typically operates from April to December each year.

In 2001, Building Stone Associates quarried a small amount of purplish to greenish gray and locally blue mottled slate from the Precambrian McCoy Creek Group

rocks in Egan Canyon west of Cherry Creek in White Pine County. It is not known whether operation was continued into 2002.

Potential new dimension stone operations were being evaluated by Slateco International Group in variously-colored marble deposits at the old Carrara marble quarries near Beatty in Nye County, and by Natural Stone Supply Inc. in mottled pink to purple or blue dumortierite-andalusite-quartz rock at Lincoln Hill in Pershing County.

## Gemstones

Small amounts of precious opal were recovered from the Royal Peacock and Rainbow Ridge Mines in Virgin Valley, Humboldt County, where much of the opal is mined by amateurs from pay-to-dig operations and is unreported. In addition, turquoise production was reported from the Wintle (Orvil Jack) property in Lander County.

## Gypsum

In 2002, gypsum production in Nevada was about 1,850 million short tons, slightly lower than in 2001. Gypsum production in Nevada has ranged between 1.5 and 2 million tons annually over the past ten years. The state accounts for more than 10% of domestic production, ranking only behind Oklahoma and Iowa. Three large producers, PABCO Gypsum, BPB PLC, and USG, utilize most of this gypsum in local wallboard plants.

PABCO Gypsum in Clark County northeast of Las Vegas mined and processed more than a million tons of gypsum ore in 2002. Although processing yields only about 70% by weight gypsum from the ore, the company still ranks as the largest producer in Nevada. The gypsum, which is in a nearly flat-lying gypsite blanket in excess of 120 feet thick in places, occurs atop a 5-square-mile mesa.

The Blue Diamond operation of BPB PLC (until recently owned by James Hardie Gypsum) southwest of Las Vegas in Clark County was the second largest producer, at 543,000 short tons. The gypsum deposit is

the largest of several Permian deposits in the Las Vegas area. It consists of more-or-less flat-lying beds of pure gypsum as much as 30 feet thick on a table mountain that overlooks the city. The Blue Diamond area has been the site of gypsum mining since 1925, but is now in the path of metropolitan growth, and gypsum mining there may give way to up-scale housing development.

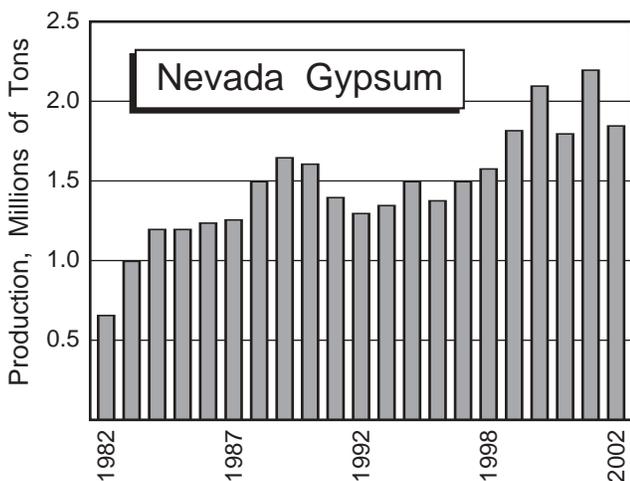
USG, the nation's largest wallboard producer, was the third largest Nevada producer in 2002, at 305,000 short tons. The company mines gypsum in western Pershing County and processes it into wallboard and plaster at a plant at Empire in Washoe County. The gypsum is of Triassic or Jurassic age and forms several masses in a 2-square-mile area. The largest mass, the Selenite ore body, contains 85 to 95 % gypsum and is generally well bedded with variable dips. Nearby in the San Emidio district in Washoe County, Sierra Cascade, a privately-owned company that mines pumice in Oregon, staked claims and filed a plan of operations on a gypsum deposit.

The Art Wilson Company of Carson City ships gypsum and anhydrite from the Adams Mine in Lyon County and the D.L. Denman Construction Company mines gypsum at the Pioneer Mine about 10 miles east of Las Vegas. Material from these relatively small operations is used in cement and agricultural applications. The Adams deposit is a folded, diapiric mass associated with limestone in Triassic metavolcanic rocks. The Pioneer Mine is in the same gypsite deposit as the nearby PABCO operation.

## Lime, Limestone, and Dolomite

In 1997, lime supplanted diatomite as Nevada's second most valuable industrial mineral. Limestone is mined for lime production at two sites in Nevada that are nearly at opposite ends of the state. The high-calcium limestone that is utilized at both sites is from the same Devonian limestone unit although it is assigned to different stratigraphic formations. In addition to lime, relatively minor amounts of crushed limestone are also shipped from both sites, and dolomite is mined at one of the sites. Although domestic production of lime has slipped more than 8% over the past five years, Nevada's lime production has increased by an estimated 20% over the same period. After a slight downturn in 2001, in 2002 the state's lime production rebounded nearly to the record levels of 2000.

In Nevada, the Pilot Peak high-calcium lime operation of Graymont Western US, Inc. (formerly Continental Lime, Inc.) 10 miles northwest of Wendover in Elko County shipped the most lime in 2002, mainly to gold-mining operations for use in cyanide-solution pH control. The Pilot Peak plant has three kilns with a combined capacity of more than 700,000 tons of quicklime per year and a hydrated lime plant capable of producing 350 tons per day. In 2000, the Pilot Peak plant was rated the ninth largest producer in the country.



Chemical Lime Co. produces lime at Apex about 20 miles northeast of Las Vegas. The operation makes high-calcium quicklime used in metallurgical processing, paper manufacturing, and environmental markets. The company also produces dolomitic lime and hydrated high calcium lime at Apex, mainly for construction uses. The Chemical Lime dolomite quarry at Sloan ceased operating in 1997, but in 2002, their Henderson plant continued to process Type S lime for building and home construction.

In addition to lime, both Graymont Western U.S. and Chemical Lime ship crushed limestone. Other carbonate rock producers in Nevada are Min-Ad, Inc., and Nutritional Additives Corp., producers of agricultural and nutritional dolomite near Winnemucca.

Columbus SM LLC has plans to initiate production of food- and pharmaceutical-grade precipitated calcium carbonate by processing a large resource of near-surface calcium-rich sediments at the Columbus Salt Marsh in Esmeralda County. The company anticipates production from more than 200,000 tons of material within four years.

Dolomite and high-calcium limestone resources in the Sloan area south of Las Vegas were staked by Rinker Materials West and Frehner Construction. These could become sources of high-purity carbonate and construction aggregate.

## Lithium

Chemetall Foote Co., a subsidiary of Chemetall GmbH, produces lithium carbonate, lithium hydroxide monohydrate, and lithium hydroxide anhydrite at Silver Peak in Esmeralda County. This operation, the only primary lithium producer in the United States, produces these chemicals from brine that is pumped from beneath Clayton Valley playa and evaporated in nearby ponds. Production figures are confidential; the most recent public information, which is from 1998 Securities and Exchange Commission data, shows production of about 12 million lbs. of lithium carbonate and 5 million lbs. of lithium hydroxide. Lithium carbonate is the main feedstock for major uses of the element in glass, ceramics, aluminum production, and lubricants. The use of lithium in batteries, while relatively minor, is expanding. In 1998 lithium carbonate prices dropped significantly due to competition from South American brine operations, but have rebounded somewhat during the past three years.

## Magnesia

Magnesium minerals have been mined at Gabbs in Nye County since 1935, and in the 1940s, ore from Gabbs was used to make magnesium metal. From the 1950s to the 1980s, mining and processing was by Basic Industries, a major producer of refractory magnesia. In 1991, Combustion Engineering Inc. sold Basic Industries to Premier Refractories Inc., which subsequently sold its U.S. magnesia chemicals business to Premier Chemicals LLC in 1999. During the 1990s, the availability of cheap foreign refractory magnesia caused production at Gabbs

to be switched to light-burned (caustic) magnesia that is mainly marketed for wastewater treatment and agricultural uses. Although production of magnesia at Gabbs is still substantially below its peak in 1981, magnesia shipments from the Gabbs operation have increased steadily since 1996.

About 60% of U.S. magnesia production comes from seawater and natural brines, and the mine at Gabbs is the only place in the country where magnesite is mined. Brucite, which is only mined domestically at Gabbs and one place in Texas, is shipped in relatively small amounts from the Gabbs operation. It is now mainly mined from pods adjacent to igneous rocks in magnesite pits. Magnesite and brucite at Gabbs occur over an area of about 2 square miles in complex replacement bodies in Triassic dolomite. The magnesite is thought to have formed by hydrothermal activity related to emplacement of granite, and the brucite by alteration of the magnesite during later granodiorite intrusion.

## Perlite

Although the U.S. is the world's largest producer of perlite, domestic perlite suffers transportation cost disadvantages in some areas of the eastern U.S. compared to Greek perlite, and domestic production has slipped for three years in a row while imports have increased.

Nevada has large perlite resources and several deposits of perlite that have been mined extensively. The largest producer was the Hollinger Mine near Pioche in Lincoln County. However, current perlite production in Nevada is restricted to relatively small-scale mining of two deposits for niche markets.

Wilkin Mining and Trucking Inc., mines perlite from the Tenacity Perlite Mine about 25 miles west of Caliente in Lincoln County. In the past, most of the perlite was shipped as crude; however, the company has a small popping plant, the Tenacity Perlite Mill, in Caliente, and present sales are almost exclusively of expanded perlite that is mainly used for horticultural purposes. Eagle-Picher Minerals Inc. produces expanded perlite at its Colado diatomite plant in Pershing County from perlite mined at the Popcorn Mine about 15 miles south of Fallon in Churchill County. The perlite is marketed as a filter aid, and plant capacity is reportedly about 8,000 tons per year.

In 2001, Noble International S.A. began mining perlite from a deposit a few miles east of the Popcorn Mine for use in the production of "Noblite" microspheres at a plant in Fallon. The material, an inorganic lightweight filler, is composed of spherical or multicellular glass particles sold in different size ranges that average between 30 and 70 microns. In 2002 the company ceased mining Nevada perlite and switched to raw material from the Tucker Hill perlite mine in Oregon.

## Potassium Alum

A small amount of potassium alum (kalinite) was mined from a deposit in Esmeralda County about 10 miles north

of Silver Peak by Rulco. The kalinite, which occurs with sulfur as veins and stringers in rhyolitic rock, is being marketed for horticultural use.

## **Salt**

The Huck Salt Company produced about 14,200 tons of salt in 2002, down 10% from 2001. The salt, mined from a playa in Fourmile Flat about 25 miles southeast of Fallon in Churchill County, is now mainly used for deicing roads. Salt has been harvested from this deposit almost continuously since the 1860s when it was hauled to the mills that processed Comstock silver and gold ore.

## **Silica**

The U.S. is by far the world's largest producer of silica sand, and domestic annual production has hovered around 31 million short tons for the past five years, despite increases in recycled glass usage. Simplot Silica Products at Overton in Clark County shipped about 676,000 tons of silica sand in 2002, a slight increase over 2001. The sand is mined from an open pit 1.5 miles long and 300 feet deep in the relatively friable Cretaceous Baseline Sandstone, washed in the pit, and transported via a 5-mile slurry pipeline to a plant where it is screened and bagged. Silica sand has been produced from the deposit since the 1930s; Simplot acquired the operation in 1955. The company plans to upgrade its processing facilities in the near future, with a view toward increasing production from current levels to as much as 850,000 tons per year.

In 2001 Silica LLC submitted a Plan of Operations to the BLM to mine as much as 80,000 tons of quartzite per year from the Sugar mining claims about 3 miles southeast of Mercury in Nye County. The quartzite is strongly brecciated and fractured and could be mined without blasting.

## **Vermiculite**

Vermiculite deposits occur in the Gold Butte area in Clark County about 50 miles east of Las Vegas. The deposits are of interest because they contain high-quality vermiculite and are near potential markets in southern California. In recent years, Stansbury Holdings Corp., which mines vermiculite in Montana and exfoliates it in California, explored for vermiculite in the Gold Butte area. However, the company is presently concentrating on deposits in Montana.

## **Wollastonite**

Wollastonite deposits in the Gilbert district in Esmeralda County were considered for development in the mid 1990s by the American Wollastonite Mining Corp. of Vancouver, Canada. Previa Resources Ltd. is current owner of American Wollastonite Mining. Development of the Gilbert wollastonite in the near future is considered unlikely in a market dominated by long-term production from deposits in New York and foreign competitors.

## **Zeolites**

Ash Meadows Zeolite LLC, a subsidiary of Badger Mining Corp., ships 1,000 to 2,000 tons annually of clinoptilolite used in water filtration, odor control, and nuclear clean-up from a plant in Amargosa Valley in Nye County. The clinoptilolite is mined from a large deposit in California that extends into Nevada.

Moltan Company mines mordenite from a deposit in the Trinity Range in Churchill County about 40 miles northeast of Fernley. The company uses the zeolite mineral to make absorbents at its Fernley plant.

# Geothermal Energy

by Ronald H. Hess

During 2002 the Nevada Division of Minerals issued the 500th geothermal well permit since 1983 when the Nevada State Legislature enacted Nevada Revised Statute 534A.060, which required permit approval by the administrator of the Division of Minerals to drill or operate a geothermal well or drill an exploratory well in Nevada. It is estimated that well over 200 assorted geothermal gradient, test, and development wells were drilled in Nevada prior to the establishment of permitting requirements. The Nevada Division of Minerals is the State agency that regulates geothermal well permitting, drilling operations, field development, and field production operations. The Web address for the Nevada Division of Minerals is <http://minerals.state.nv.us/index.htm>.

The Nevada Division of Minerals issued 14 geothermal well permits during 2002: one project area permit, four industrial production wells, two domestic wells, and seven gradient/observation wells (Nevada Division of Minerals, 2003).

During 2002 there were 157 federal geothermal leases covering 211,300 acres in Nevada. The Bureau of Land Management (BLM) has received 188 applications for geothermal leases through its noncompetitive process for geothermal projects over the last two years. Of these, 123 are pending. The BLM expects to lease 400,000 acres for potential geothermal development. (Geothermal-biz.com Newsletter, October 2002, Issue no. 3)

Lease activity during the year included the issuance of 84 noncompetitive leases for 135,543 acres and 17 competitive leases for 32,454 acres. The competitive

lease sale generated \$311,160 in bonus bid revenue for 2002. Total lease rental revenue value for 2002 was \$244,600. (R. Hoops, BLM, oral commun., 2003)

Total gross electrical production during 2002 from geothermal resources on public lands was 1.1 million megawatt-hours (MWh), an increase of 80,000 MWh over 2001; net production was approximately 979,500 MWh, an increase of 104,500 MWh over 2001. Gross electrical sales from federal lands were \$49.2 million. Production royalties on that amount equaled \$1.7 million. This represents a drop of \$11.9 million in gross sales and a \$640,000 drop in production royalties from 2001.

Gross sales value over the past two years has dropped significantly. This is primarily due to a drop in purchase price at plants that have long-term contracts that were heavily front-end loaded and guaranteed a high per-kilowatt purchase price over the first 10 years of the contract life and are now entering the second phase of the contract period at a reduced purchase price. (R. Hoops, BLM, oral commun., 2003)

By regulation, half of all Federal geothermal lease rental fees and production royalties are returned to the state. For 2002, \$850,000 in royalty production fees \$155,580 in bonus bid fees, and \$122,300 in lease rental revenue should be returned to Nevada. (R. Hoops and J. Lewis, BLM, oral commun., 2003)

Total Nevada geothermal electrical production, in 2002, from both federal and fee lands combined was 1,602,100 MWh gross and net production was 1,250,887 MWh (Nevada Division of Minerals, 2003) with an approximate sales value of \$64 million. Production

## NONDOMESTIC GEOTHERMAL WELLS REPORTED AS DRILLED OR COMPLETED IN NEVADA 2002

Area	Company	Well name	Permit#	Location	Type
<b>Churchill County</b>					
Soda Lake	AMOR IX Corporation	Soda Lake 22-33	499	NW <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> , S33, T20N, R28E	Production
Stillwater	Stillwater Holdings LLC	Commercial Production Well SF 62A-30	495	NW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> , S30, T20N, R31E	Production
Stillwater	Stillwater Holdings LLC	Industrial Production Well 53-30	501	SW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> , S30, T20N, R31E	Production
Stillwater	Stillwater Holdings LLC	Industrial Production Well 45-30	503	NE <sup>1</sup> / <sub>4</sub> SW <sup>1</sup> / <sub>4</sub> , S30, T20N, R31E	Production
Stillwater	Stillwater Holdings LLC	Thermal Gradient Hole 23-29	504	SW <sup>1</sup> / <sub>4</sub> NW <sup>1</sup> / <sub>4</sub> , S29, T20N, R31E	Gradient
Stillwater	Stillwater Holdings LLC	Thermal Gradient Hole 44-20	505	NE <sup>1</sup> / <sub>4</sub> SW <sup>1</sup> / <sub>4</sub> , S20, T20N, R31E	Gradient
Stillwater	Stillwater Holdings LLC	Observation Well 31-30	506	NE <sup>1</sup> / <sub>4</sub> NW <sup>1</sup> / <sub>4</sub> , S30, T20N, R31E	Observation
Stillwater	Stillwater Holdings LLC	Observation Well SH 1-72-31	508	NE <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> , S31, T20N, R31E	Observation
<b>Humboldt County</b>					
Blue Mountain	Noramax Corporation	Deep Blue No. 1	500	SE <sup>1</sup> / <sub>4</sub> SW <sup>1</sup> / <sub>4</sub> , S14, T36N, R34E	Observation
<b>Washoe County</b>					
Steamboat Hot Springs	SB Geo Inc.	Observation Well MTH 24-33	493	SW <sup>1</sup> / <sub>4</sub> NW <sup>1</sup> / <sub>4</sub> , S33, T18N, R20E	Observation

capacity from the currently developed geothermal resources at ten existing geothermal power production sites in Nevada is 221.5 megawatts (MW); currently installed equipment, or nameplate, capacity for the same sites total 244.3 MW. The table of Nevada geothermal power plants lists operators, plant locations, and energy production for individual Nevada geothermal power producers. Nevada is second only to California in total installed geothermal generating capacity.

## Nevada State Legislature

The 2001 State Legislature passed Senate Bill (SB) 372, which included requirements for Nevada's Renewable Energy Portfolio Standard. It requires, based on an escalating scale over time starting at 5% in 2005 and increasing to 15% by 2015, that a certain percentage of electricity sold to customers in Nevada be generated from renewable resources. This bill represents a significant move forward in requiring utilities to obtain and distribute electricity generated from renewable resources. According to Geothermal-biz.com Newsletter, October 2002, Issue No. 3, "Nevada will be the third-largest producer of green power in the country by 2012, ranking behind only the larger states of California and Texas, an updated study by the Union of Concerned Scientists (UCS) shows."

The complete text of SB 372 can be viewed at [www.leg.state.nv.us/71st/Reports/history.cfm?ID=4214](http://www.leg.state.nv.us/71st/Reports/history.cfm?ID=4214).

In response to this requirement, four new geothermal power production contracts with Nevada Power Co. were approved by the Public Utilities Commission of Nevada. The four new power plants should be online by the middle of 2005 and receive 4.2 to 5.2 cents per kilowatt-hour over the next 20 years. The projects to be built include:

**Desert Peak 2** (25 MW) and **Desert Peak 3** (13 MW) in Churchill County.

**Hot Sulphur Springs** (25 MW) in Elko County.

**Steamboat IV** (44 MW) in Washoe County.

It is estimated that the projects will employ about 500 people during construction and employ about 65 people on a permanent basis when complete (Bulletin Geothermal Resources Council, March/April 2003, v. 32, no. 2).

## Redfield Campus

The University of Nevada, Reno (UNR) and Advanced Thermal Systems, Inc. (ATS) have signed a 30-year agreement to provide geothermal power and heat to the new UNR Redfield Campus located just southwest of Reno. ATS has committed to construct and operate an 11-MW Kalina Cycle geothermal power plant near the new campus to provide electricity for the campus with excess production to be sold to Sierra Pacific Power Co. The Kalina Cycle process utilizes an ammonia-water mix as a working fluid that is vaporized in a heat exchanger

by geothermal fluids and then used to power turbine generators in the power plant. ATS will also provide hot and cold water to support a hydroponics and aquaculture research program.

When complete, the Redfield Campus will be the only college campus in the world to be completely powered by renewable energy resources. ATS has also agreed to construct a modern 800-square-foot classroom as part of the project. As part of the agreement, campus energy costs will be set at \$210,000 per year and increases will be limited to 1% annually. In ten years UNR will have an option to purchase the project. (Bulletin Geothermal Resources Council, March/April 2003, vol. 32, no. 2; and the Nevada Geothermal Update, Nevada Division of Minerals, March 2003).

## Blue Mountain Geothermal Area

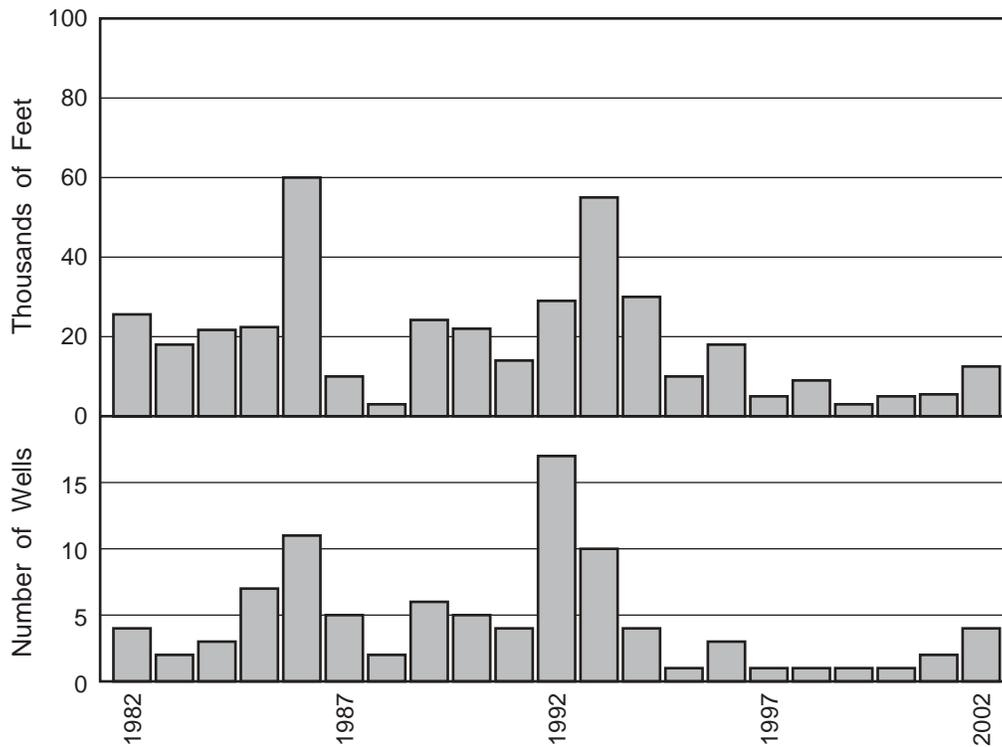
**Noramex Corp.** applied for and received a drilling permit for the Observation Well Deep Blue No. 1, permit number 500. The Blue Mountain Geothermal area is located at T36N, R34E in south-central Humboldt County. According to a press report this well reached 672 meters ( 2,200 feet) in depth and had a recorded temperature of 146°C. (Nevada Geothermal Update, Nevada Division of Minerals, March 2003)

The Blue Mountain area was originally explored for gold potential. During exploratory drilling they noted high temperatures when pulling the drill steel. Because of this near surface temperature anomaly the property was explored for geothermal potential in the late 1990s to present. **Nevada Geothermal Power Inc.** has reported that it believes the property has a potential resource capable of producing 100 MW. (Nevada Geothermal Power Inc. Web Informational Flyer, 2003, [www.continentalridge.com/blue-mountain-geothermal.htm](http://www.continentalridge.com/blue-mountain-geothermal.htm)).

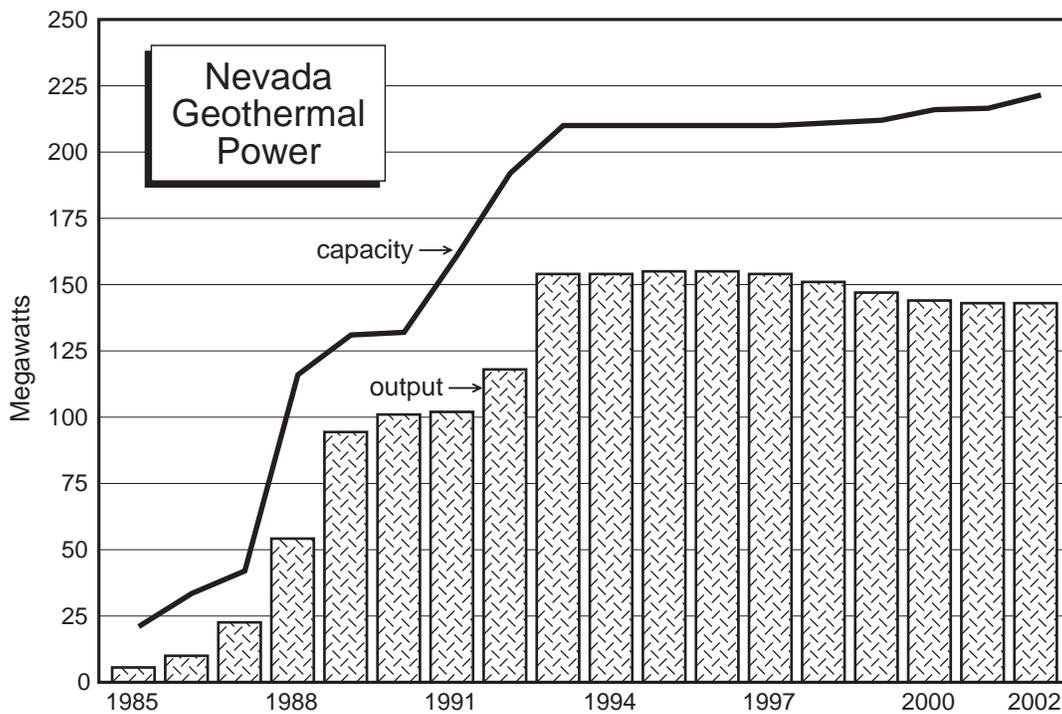
## Bradys Hot Springs

**Brady Power Partners** installed a new 5-MW Binary Ormat Energy Converter during 2002. This unit has two turbines that turn one generator. The unit uses leftover brine from the production cycle of the existing Dual Flash plant. Prior to the installation of the binary system, spent brine was injected back into the ground at 225°F. Current average injection temperature after cycling the brine through the binary system is 178°F. Production well head temperatures range from 287°F at the wells north of the plant to 340°F for one of the southern wells located on the west side of Interstate 80. The inlet fluid temperature of the flash plant is 308°F. (C.L. Morris, oral commun., 2003, Brady Power Partners; and Nevada Division of Minerals, 2003)

In addition to the new 5-MW binary unit the original Brady dual-flash geothermal plant is rated at 21.1 MW. Current production is from five production wells during the summer and four during the winter with an average



**Industrial-class (power-generation) wells drilled in Nevada, 1982–2002. Depth taken from original drilling permit.**



**Currently developed resource capacity and average net output of Nevada geothermal plants, 1985–2002. Average net output is annual sales in megawatt-hours divided by the number of hours in a year (8,760). No commercial geothermal power was produced in Nevada before 1985.**

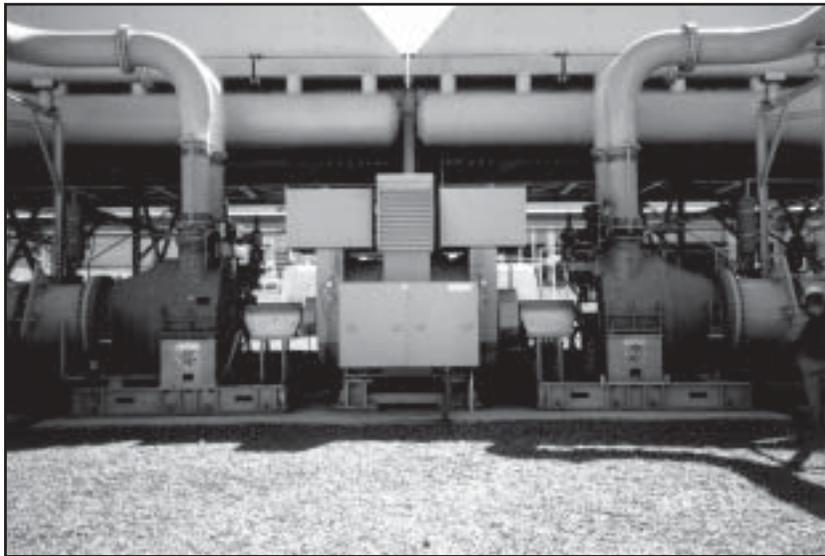
depth of 3,057 feet. During 2002, Brady Hot Springs Geothermal Power Plant produced 198,100 MWh gross and 113,632 MWh net. The Brady plant also supplies geothermal fluid to the Brady Hot Springs onion dehydration plant operated by **Gilroy Foods**, a subsidiary of **U.S.F.I.** (Nevada Division of Minerals, 2003)

### Desert Peak

**Brady Power Partners** has received the Public Utilities Commission approval on two new geothermal power production contracts with Nevada Power Co. This will allow for the development and construction of **Desert Peak 2** (25 MW) and **Desert Peak 3** (13 MW) power plants. These plants should go online in 2005.

Ormat has been selected by the Department of Energy, under the Enhanced Geothermal Systems program, to develop and demonstrate a resource enhancement project at Desert Peak. The project is designed to fracture a low permeability zone in an effort to produce an additional 2-5 MW of resource at the existing plant. (Geothermal-biz.com Newsletter, October 2002, Issue No. 3)

The Desert Peak 9.9-MW dual-flash geothermal plant produces from two production wells with an average depth of 3,683 feet and fluid temperature of 312°F. Desert Peak has two injection wells with an average depth of 4,000 feet and injection temperature of 225°F. During September 2002 the average gross plant output was 7 MW. During 2002 the Desert Peak Power Plant produced 58,094 MWh gross and 47,456 MWh net. (Nevada Division of Minerals, 2003)



**Brady Power Plant new 5-MW binary generation unit showing the generator in center and 2 turbine power units, one on each side of the generator. Photo by R. Hess, 2002.**



**Desert Peak Power Plant. Photo by R. Hess, 2002.**

## Hot Sulphur Springs

**Earth Power Resources, Inc.**, has received a power purchase agreement from Nevada Power Co. and will build a 25-MW binary geothermal plant at Hot Sulphur Springs geothermal area in Elko County. It is anticipated that the plant will come online sometime in 2005. (Nevada Power news release, November 26, 2002 and Nevada Division of Minerals, 2003)

F.E. Berkman (The Tuscarora, Nevada Geothermal Prospect, a case history, November 17, 1980, NBMG geothermal files) identified the geothermal area as located on the west side of the Independence Mountains at the north end of the Independence Valley graben. The geothermal area includes "6 springs, one geyser and one fumerole. These occur in a narrow zone approximately 3 km long within the Midas fault zone. Waters from the hot springs were analyzed and subsurface temperatures of 228°C and 167°C were indicated by the Na-K-Ca and silica geothermometers."

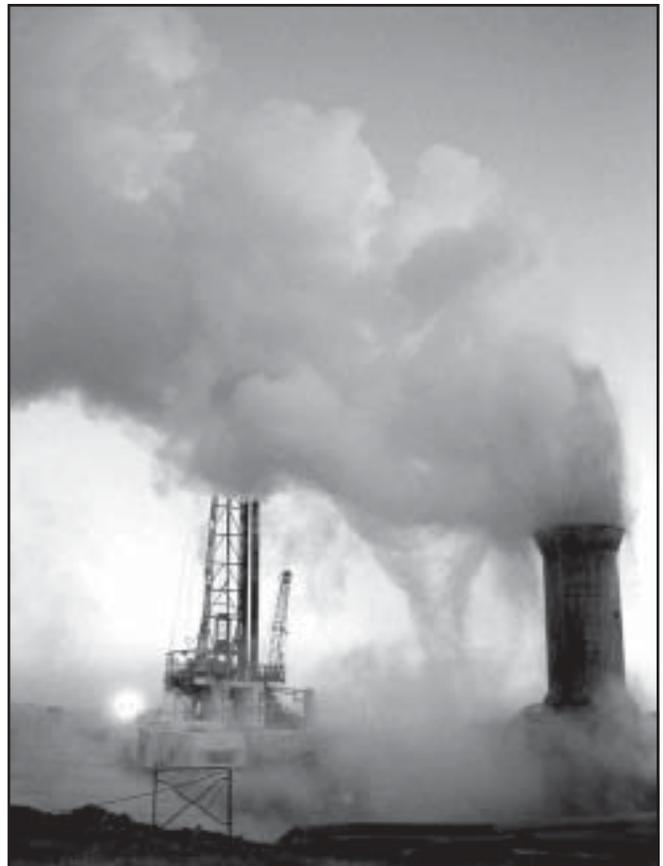
In an AMAX Exploration, Inc., Tuscarora Area, Nevada, Final Report, (August 1981, NBMG files), H.D. Pilkington reported that a test discovery well, with a total depth of 5,454 feet, encountered a low-temperature reservoir. There was some difficulty in completing the well due to some lost circulation zones. Drilling on the well had to be stopped short of target and before a high temperature reservoir was discovered. The well was flow tested at approximately 1,200 barrels per hour with temperatures ranging from 156° to 225°F.

**Mount Wheeler Power's Rye Patch 72-28 well during a 6 hour rig test on May 26, 2001. Photo by Wm.J. Ehni, A. Bailey, and R. Ewel.**

## Rye Patch

During 1995 Rye Patch Limited Partnership (OESI) terminated work on the 95% complete 12.5-MW binary power plant at Rye Patch. At the time they were only able to identify a 6-MW proven resource. Due to funding constraints and reservoir engineering problems Sierra Pacific cancelled the projects power purchase agreement and the project went into default. (Geothermal Resources Council Bulletin, May 1995, vol. 24, no. 5 and NBMG Special Publication MI-1995)

Mount Wheeler Power Co. took over development from Rye Patch Energy Co. The Mount Wheeler Power Co. successfully completed the Rye Patch 72-28 production well during 2001. This well is part of an effort to better define the production field and secure adequate geothermal fluid so that the nearly complete Rye Patch geothermal power plant can be brought online. During a short-term flow test this well produced 297°F fluid at a rate of 3,600 gallons per minute from a production zone 1,900 feet below ground surface. Other wells drilled earlier in the area, such as the 44-28, had a recorded down-hole flowing temperature of 400°F and the E-1 well had the highest static bottom-hole temperature of 353°F at 1,835 feet. It is anticipated that one or two more wells will be drilled. (Bill Ehni, personal commun., 2003)



## Steamboat Hot Springs - S.B. Geo

Advanced Thermal Systems has received a 44-MW power purchase contract from Sierra Pacific/Nevada Power. Steamboat IV, a 44-MW Kalina Cycle binary power plant, will be constructed and should be online in 2005. The Kalina Cycle process uses a closed system with an ammonia-water working fluid that is heated in a heat exchanger by the heat contained in the geothermal production fluid. The heated ammonia-water working fluid, when vaporized, is used to turn turbines that power the generators. This system, besides being very efficient, can also be adapted to different resource temperatures by simply changing the percentage of the ammonia-water mix.

The SB Geo Steamboat Hot Springs Geothermal Power Plants, during 2002, had a gross output of 387,015 MWh and a net production of 285,256 MWh (Nevada Division of Minerals, 2003).

## Steamboat Hot Springs - Yankee Caithness

Also located in the Steamboat Hot Springs KGRA is the Yankee Caithness Geothermal Power Plant. The Caithness plant is a 14.4-MW dual-flash geothermal power plant that operates on 317°F fluids from three production wells with an average depth of 2,588 feet. Injection is accomplished with one well at a depth of 3,115 feet with a fluid injection temperature of 273°F. During 2002 the Yankee Caithness Geothermal Power Plant had a gross output of 89,456 MWh and a net production of 81,200 MWh. (Geothermal Resources Council Workshop, Reno, NV, April 2002; and Nevada Division of Minerals, 2003)

## Stillwater

Stillwater Holdings, LLC of Westport Connecticut, applied for and received a geothermal project area permit, #502PA, for their planned drilling program at Stillwater. The project area plan includes development of eight production wells, one injection well, and two observation wells in Section 30, T20N, R31E, three injection wells and one observation well in Section 29, T20N, R31E; and one observation well in Section 20, T20N, R31E. All wells have an estimated total depth of 2,500 feet. During 2002 Stillwater Holdings, LLC spudded and/or completed three production wells and four gradient/observation wells. Two of the production wells predated the project area permit.

Production during 2002 at the existing Stillwater power plant was 78,040 MWh gross output and 50,580 MWh net production with an average production fluid temperature of 293°F. (Nevada Division of Minerals, 2003)

## New Nevada Geothermal Map

The Nevada Bureau of Mines and Geology has released a new 1:750,000-scale color map showing geothermal resources in Nevada. The map entitled "Nevada geothermal resources," NBMG Map 141, is authored by Lisa Shevenell and Larry J. Garside. The map shows active direct-use applications and power plants as of May 2003, and all known thermal springs and wells on a topographic base map. This map may be purchased at the Nevada Bureau of Mines and Geology publications office or on the Web at [www.nbmj.unr.edu/sales.htm](http://www.nbmj.unr.edu/sales.htm)

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For further information on geothermal resources in Nevada check the following Web sites or contact Ron Hess at 775-784-6691 ext. 121 or via e-mail at [rhess@unr.edu](mailto:rhess@unr.edu).

- Geothermal information at the Nevada Bureau of Mines and Geology Web site [www.nbmj.unr.edu/geothermal/](http://www.nbmj.unr.edu/geothermal/)
- Nevada Commission on Minerals, Nevada Division of Minerals at <http://minerals.state.nv.us/> or <http://minerals.state.nv.us/programs/ogg.htm>
- Great Basin Center for Geothermal Energy at [www.unr.edu/geothermal/index.html](http://www.unr.edu/geothermal/index.html)
- GEO-HEAT CENTER, at <http://geoheat.oit.edu/>, Oregon Institute of Technology, Klamath Falls, Oregon.
- Geothermal biz.com [www.geothermal-biz.com/](http://www.geothermal-biz.com/) is part of the U.S. Department of Energy-led GeoPowering the West (GPW) initiative to dramatically increase the use of geothermal energy in the western United States, Alaska, and Hawaii.
- GeoPowering the West at [www.eere.energy.gov/geopoweringthewest/](http://www.eere.energy.gov/geopoweringthewest/)
- Southern Methodist University Geothermal Lab at page [www.smu.edu/geothermal/](http://www.smu.edu/geothermal/)
- Geothermal Industry Temperature Profiles from the Great Basin, by John H. Sass, Susan S. Priest, Arnold J. Blanton, Penelope C. Sackett, Stephanie L. Welch, and Mark A. Walters; USGS Open-File Report 99-425 online version 1.0 on the Web at <http://wrgis.wr.usgs.gov/open-file/of99-425/webmaps/home.html>
- Nevada Public Utilities Commission [www.puc.state.nv.us/](http://www.puc.state.nv.us/)
- Nevada State Office, Bureau of Land Management, Nevada Geothermal Program [www.nv.blm.gov/minerals/geothermal/index.htm](http://www.nv.blm.gov/minerals/geothermal/index.htm)

**NEVADA GEOTHERMAL POWER PLANTS 2002**

Plant name (year on line)	Production capacity <sup>1</sup> (MW)	2002 Production (MWh)		Location	Operator
		Gross	Net (sales)		
Beowawe (1985)	16.7 (16.6)	115,123	93,569	S13,T31N,R47E	Beowawe Power, LLC 9790 Gateway Dr., Suite 220 Reno, NV 89511
Bradys Hot Springs (1992)	26.1 (26.1)	198,100	113,632	S12,T22N,R26E	Brady Power Partners 980 Greg Street Sparks, NV 89431
Desert Peak (1985)	9.9 (12.5)	58,094	47,456	S21,T22N,R27E	Western States Geothermal Co. c/o Brady Power Partners 980 Greg Street Sparks, NV 89431
Dixie Valley (1988)	66.0 (62.0)	527,457	471,646	S7,T24N,R37E S33,T25N,R37E	Caithness Dixie Valley, LLC 9790 Gateway Dr. Suite 220 Reno, NV 89511
Empire (1987)	4.6 (4.8)	30,977	25,321	S21,T29N,R23E	Empire Energy, LLC P.O. Box 40 Empire, NV 89405
Soda Lake No. 1 (1987) and Soda Lake No. 2 (1991)	16.6 (26.1)	110,109	76,924	S33,T20N,R28E	Constellation Operating Services 5500 Soda Lake Road Fallon, NV 89406
Steamboat I, I-A (1986) and Steamboat II, III (1992)	53.0 (58.6)	387,015	285,256	S29,T18N,R20E	S.B. Geo, Inc. P.O. Box 18199 1010 Power Plant Dr. Reno, NV 89511
Stillwater (1989)	13.0 (21.0)	78,040	50,580	S1,T19N,R30E S6,T19N,R31E	Stillwater Holdings, Geothermal Management Services LLC 4785 Lawrence Lane Stillwater, NV 89406
Wabuska (1984)	1.2 (2.2)	7,729	5,303	S15,16,T15N, R25E	Homestretch Geothermal P.O. Box 1150 Leeds, UT 84746
Yankee Caithness (1988)	14.44 (14.44)	89,456	81,200	S5,6,T17N,R20E	Yankee Caithness J.V.L.P. 9790 Gateway Drive, Suite 220 Reno, NV 89511
<b>TOTAL</b>	<b>221.5 (244.3)</b>	<b>1,602,100</b>	<b>1,250,887</b>		

1. Production capacity from currently developed geothermal resources (equipment capacity in parentheses).  
Sources: Plant operators, Nevada Division of Minerals, and NBMG files.

# Oil and Gas

by David A. Davis

## Production

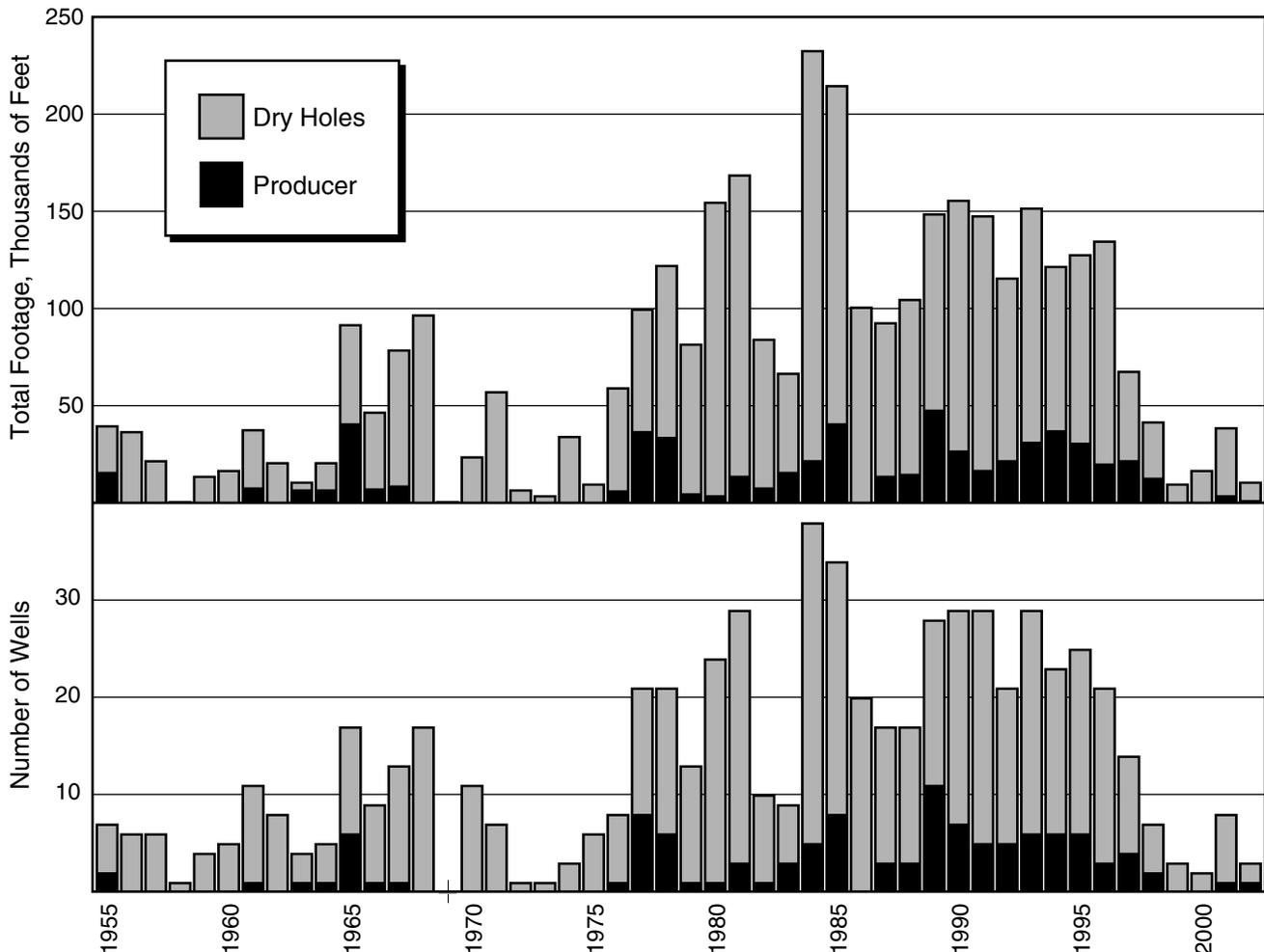
According to the Nevada Division of Minerals, Nevada's net oil production in 2002 was 553,442 barrels (0.03% of total U.S. production) from 71 actively producing wells in 13 fields in Nye and Eureka Counties, 3% less than in 2001. One other minor field was shut in throughout 2002. The average net wellhead price for Nevada crude oil increased 4.6% to \$17.91 per barrel in 2002, and the sales volume increased 1.3% to \$9,910,000.

Ninety-nine wells in 14 fields were listed as producers in 2002. Of these, one well was shut in for at least 6 months during 2002, and 26 of these were shut in for the entire year. At year's end, one well had been shut in for 1 to 2 years, four wells had been shut-in for 3 to 4 years, and 21 wells had been shut in for more than 4 years. Two wells that had been shut in for more than three years were brought back into production. One new well was completed as a producer in 2002.

Nevada's highest volume producer was Grant Canyon No. 9, which averaged 202 barrels of oil and 548 barrels of water per day during 2002. Grant Canyon No. 9 has held this ranking since 1996, Nevada's second highest volume producer was Blackburn No. 19, which averaged 88 barrels of oil and 1,294 barrels of water per day in 2002. Trap Spring No. 9, which was the second highest volume producer since 1999, fell to fourth highest, which is behind Kate No. 1A.

The Bacon Flat Field averaged 35 barrels of oil and less than 2 barrels of water per day in 2002 and accounted for 2.3% of Nevada's total oil production. Oil production decreased 9%, and water production decreased 95.6%. Only one of its three producers was active. One well has been shut in since 1993 and the other since 1988.

The Blackburn Field averaged 171 barrels of oil and 5,502 barrels of water per day in 2002, and accounted for 11.3% of Nevada's total oil production. Oil production decreased 6.7%, and water production increased 12.1%.



Oil production decreased in the five active producers. One well was shut in for 2 months. Of the two inactive producers, one has been shut in since 2001 and the other since 1998.

The Eagle Springs Field averaged 186 barrels of oil and 1,569 barrels of water per day in 2002 and accounted for 12.3% of Nevada's total oil production. Oil production increased 1.3% and water production increased 35.8%. Of the 16 active producers, oil production decreased in 15. One well shut in since 1995 was brought back into production in August. One well each was shut in for 3 months, 5 months, and 7 months. Of the five inactive producers, three have been shut in since 1997, one since 1996, and one since 1986.

The Ghost Ranch Field averaged 87 barrels of oil and 427 barrels of water per day in 2002 and accounted for 5.7% of Nevada's total oil production. Oil production decreased 12.1%, and water production decreased 17.4%. Oil production decreased in all three active producers. The one inactive producer has been shut-in since 1997.

The Grant Canyon Field averaged 235 barrels of oil and 1,192 barrels of water per day in 2002 and accounted for 15.5% of Nevada's total oil production. Oil production decreased 7.7%, and water production increased 0.8%. Oil production decreased in both active producers. Of the two inactive producers, one has been shut in since 1993 and the other since 1992.

The Kate Spring Field averaged 146 barrels of oil and 1,249 barrels of water per day in 2002 and accounted for 9.6% of Nevada's total oil production. Oil production decreased 3.2%, and water production increased 11.2%. Oil production decreased in the four active producers. Of the two inactive producers, one has been shut in since

1997 and the other since 1993. A total of 6,433 thousand cubic feet (tcf) of gas was produced from the Kate Spring Field in 2002, a decrease of 4.2% from 2001. The gas is used to operate production and related equipment at the lease sites of Makoil, Inc., and Western General, Inc.

The Sand Dune Field's only producer averaged 39 barrels of oil and 88 barrels of water per day in 2002 and accounted for 2.6% of Nevada's total oil production. Oil production increased 5.6%, and water production decreased 6.5%.

The Sans Spring Field's only active producer averaged 15 barrels of oil and 896 barrels of water per day in 2002 and accounted for 1.0% of Nevada's total oil production. Oil production decreased 13.0%, and water production increased 0.7%. Of the two inactive producers, one has been shut in since 1998 and the other since 1993 and has since been temporarily abandoned.

The Tomera Ranch Field averaged 33 barrels of oil and 259 barrels of water per day from its new producer, which accounted for 2.2% of Nevada's total oil production. The only other producer has been shut in since 2000.

The Trap Spring Field averaged 566 barrels of oil and 5054 barrels of water per day in 2002 and accounted for 37.2% of Nevada's total oil production. Oil production decreased 5.4%, and water production decreased 30.3%. Oil production decreased in all 33 active producers. One well each was shut in for 1 month, 3 months, and 5 months. Of the nine inactive producers, one has been shut in since 2001, one since 1999, two since 1998, two since 1996, one since 1992, one since 1991, and one since 1986.

Three minor fields accounted for about 0.3% of Nevada's total oil production. Oil production from the Currant Field's only producer decreased 36.3%. Oil production from the Duckwater Creek Field's only

### OIL WELL DRILLING ACTIVITY IN NEVADA IN 2002

Company	Well	Permit No.	Location	Permit Date	Spud Date	Completion Date	Depth (Ft.)	Status
<b>ELKO COUNTY</b>								
Westwood Petroleum, LLC	Dalton No. 1	847	NW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> S4 T34N R62E	Oct-02	Dec-02			TA
<b>EUREKA COUNTY</b>								
Neuhaus Winn Exploration	Tomera Ranch 33-2RR	841	SW <sup>1</sup> / <sub>4</sub> SW <sup>1</sup> / <sub>4</sub> S33 T31N R52E	Oct-01	Oct-01	Jan-02	1,179	Producer
Neuhaus Winn Exploration	Tomera Ranch No. 33-3	844	SW <sup>1</sup> / <sub>4</sub> SW <sup>1</sup> / <sub>4</sub> S33 T31N R52E	Jul-02	Aug-02			Drilled
Trail Mountain, Inc.	Lucky Seven No. 1	845	SE <sup>1</sup> / <sub>4</sub> SW <sup>1</sup> / <sub>4</sub> S13 T27N R51E	Aug-02	Dec-02			Drilling
<b>LINCOLN COUNTY</b>								
Falcon Energy/Kriac Energy, Inc.	Hamlin Wash No. 18-1R	805	SE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> S18 T8N R70E	Aug-97	Aug-97	Sep-97		TA
Falcon Energy/Kriac Energy, Inc.	Kriac No. 3	810	SE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> S18 T8N R70E	Dec-97	Jan-98			Suspended
<b>NYE COUNTY</b>								
Makoil, Inc.	Munson Ranch No. 11-44	672	SE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> S11 T9N R56E	Apr-93	Jun-94	Jun-94	3,660	TA
Big West Oil and Gas, Inc.	Federal No. 12-14	673	NW <sup>1</sup> / <sub>4</sub> SW <sup>1</sup> / <sub>4</sub> S14 T7N R56E	Apr-93	May-93	Jun-93	5,870	TA
Makoil, Inc.	Trap Spring No. 27-32X	804	SW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> S27 T9N R56E	Aug-97	Aug-97	Sep-99		Drilled
Ranken Energy Corporation	Needle Springs Federal No. 1-35	835	SE <sup>1</sup> / <sub>4</sub> S35 T11N R52E	May-01				Not drilled
Isern Oil Company	Gigante No. 1-4	837	C, NW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> S4 T12N R35E	May-01	Aug-01			TA
Sawyer Oil and Gas Co.	Blue Eagle 4-15R	842	NW <sup>1</sup> / <sub>4</sub> NW <sup>1</sup> / <sub>4</sub> S15 T8N R57E	May-02	Sep-02			TA
Trail Mountain, Inc.	White Dome No. 1	843	SW <sup>1</sup> / <sub>4</sub> NW <sup>1</sup> / <sub>4</sub> S14 T5N R61E	May-02	Jun-02	Sep-02	8,862	P&A
AmeryxEnergy, Inc.	Graham No. 11-14	846	SW <sup>1</sup> / <sub>4</sub> SW <sup>1</sup> / <sub>4</sub> S12 T10N R59E	Oct-02	Oct-02			Drilling
Alpine, Inc.	Sand Springs 1-15	848	SE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> S15 T11N R54E	Dec-02				Not drilled
<b>PERSHING COUNTY</b>								
Evans-Barton, Ltd.	Kyle Spring No. 11-43	821	NE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> S11 T29N R36E	Jul-98	Jul-98			Testing
Evans-Barton, Ltd.	Kyle Spring No. 11-42A	838	NE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> S11 T29N R36E	Jul-01	Aug-01			Testing

P&A: Plugged and abandoned, TA: Temporarily abandoned

**FEDERAL OIL AND GAS LEASES IN EFFECT IN FISCAL YEARS 2001 AND 2002<sup>1</sup>**

County	NUMBER OF LEASES						ACREAGE					
	Competitive		Noncompetitive		Simultaneous <sup>2</sup>		Competitive		Noncompetitive		Simultaneous <sup>2</sup>	
	FY01	FY02	FY01	FY02	FY01	FY02	FY01	FY02	FY01	FY02	FY01	FY02
Carson City	0	0	0	0	0	0	0	0	0	0	0	0
Churchill	0	0	0	0	2	2	0	0	0	0	5,278	5,278
Clark	0	0	0	0	0	0	0	0	0	0	0	0
Douglas	0	0	0	0	0	0	0	0	0	0	0	0
Elko	62	52	99	65	3	3	70,694	51,467	155,365	93,414	7,545	7,545
Esmeralda	0	0	2	1	0	0	0	0	3,849	2,905	0	0
Eureka	87	80	35	36	3	3	114,318	106,150	49,501	49,828	2,449	2,449
Humboldt	0	0	0	0	0	0	0	0	0	0	0	0
Lander	0	0	0	0	0	0	0	0	0	0	0	0
Lincoln	25	17	66	46	1	1	42,250	26,619	102,441	71,994	1,921	1,921
Lyon	0	0	0	0	0	0	0	0	0	0	0	0
Mineral	0	0	5	4	0	0	0	0	8,557	5,997	0	0
Nye	346	327	212	132	19	19	281,791	262,796	525,704	371,492	7,998	7,998
Pershing	8	3	1	1	0	0	7,640	3,800	1,256	1,256	0	0
Storey	0	0	0	0	0	0	0	0	0	0	0	0
Washoe	0	0	0	0	0	0	0	0	0	0	0	0
White Pine	52	45	168	134	3	0	73,562	63,978	514,546	445,572	0	0
<b>TOTAL</b>	<b>580</b>	<b>524</b>	<b>588</b>	<b>419</b>	<b>28</b>	<b>28</b>	<b>590,255</b>	<b>514,810</b>	<b>1,361,219</b>	<b>1,042,458</b>	<b>25,191</b>	<b>25,191</b>

<sup>1</sup>Data from the U.S. Bureau of Land Management. Some FY00 data have been corrected from earlier reports. Fiscal years (FY) run from Oct. 1 to Sept. 30.

<sup>2</sup>These are the remaining leases that were issued under the simultaneous leasing program that was terminated by the December 22, 1987 amendment to the 1920 Mineral Leasing Act.

**PRODUCTION OF NEVADA'S OIL FIELDS (barrels)**

*Compiled from Producer's Reports filed with the Nevada Division of Minerals*

Field (year discovered)	1954-1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Eagle Springs (1954)	4,080,335	66,565	162,296	171,638	137,278	111,562	82,067	59,394	67,024	67,908	5,006,067
Trap Spring (1976)	10,513,839	378,829	362,985	306,858	288,686	257,921	263,566	246,725	218,197	206,424	13,044,030
Currant (1979)	641	0	278	0	202	230	28	55	33	21	1,488
Bacon Flat (1981)	595,535	192,601	43,057	23,891	22,465	18,757	16,849	14,766	13,898	12,647	954,466
Blackburn (1982)	3,178,343	576,853	435,975	239,934	151,151	112,008	89,400	78,136	66,899	62,412	4,991,111
Grant Canyon (1983)	19,304,231	308,709	202,129	168,163	143,707	126,128	112,715	102,113	92,900	85,722	20,646,517
Kate Spring (1986)	1,383,287	122,436	104,574	87,789	76,280	69,768	65,315	57,644	55,197	53,408	2,075,698
Tomera Ranch 1987)	16,585	1,970	1,405	387	659	574	398	488	0	11,901	34,367
N. Willow Creek (1988)	27,446	3,736	6,419	3,619	1,478	1,502	123	146	144	573	45,186
Three Bar (1990)	23,608	229	0	0	0	0	0	0	0	0	23,837
Duckwater Creek (1990)	12,305	1,269	655	433	168	491	93	116	968	869	17,367
Sans Spring (1983)	69,478	44,279	22,174	17,228	45,001	21,759	10,956	6,990	6,361	5,532	249,758
Ghost Ranch (1996)				34,166	113,016	65,370	49,348	41,454	36,172	31,814	371,340
Deadman Creek (1996)					109	258	0	0	0	0	367
Sand Dune (1998)						12,465	15,122	12,624	13,461	14,211	67,883
<b>TOTAL</b>	<b>39,205,633</b>	<b>1,697,476</b>	<b>1,341,947</b>	<b>1,054,106</b>	<b>980,200</b>	<b>798,793</b>	<b>705,980</b>	<b>620,651</b>	<b>571,254</b>	<b>553,442</b>	<b>47,529,482</b>
Change from previous year		-9%	-21%	-21%	-7%	-19%	-12%	-12%	-8%	-3%	

producer decreased 10.1%, while water production decreased 7%. Oil production from the North Willow Creek Field's only active producer increased almost 300%, while water production decreased from 50 to 0 barrels for the year. One other minor field recorded no production for 2002. The Three Bar Field's two producers have been shut in since 1992 and 1994, respectively.

Most Nevada oil is used to make such products as No. 1 and No. 2 diesel fuel, kerosene, stove oil, and asphalt. Nevada crude oil was transported by trucks to the Energy Income Fund, Inc. (EIF) 8,000-barrel-per-day capacity refinery and asphalt storage plant near Currant in Railroad Valley. The EIF refinery and asphalt storage facility at Tonopah was used to process hydrocarbons from California and other states.

## New Producers

One new well was completed as a producer on January 14, 2002. In the Tomera Ranch Field, Tomera Ranch 33-2RR was completed to 1,179 feet by Neuhaus/Winn Exploration, and is producing from an open hole from a zone between 1,175 feet to 1,179 feet. The reservoir rock is fractured chert immediately below the Oligocene Indian Wells Formation.

## Exploration

Seven wells were permitted for oil and gas in 2002, one less than in 2001. Six wells were spudded in 2002, down from nine spudded in 2001. Drilling was completed on one well spudded in 2002, and one well spudded in 2001, totaling 10,041 feet, down 75% from 39,467 feet in 2001. Two wells spudded in 2002 were temporarily abandoned, and seven wells drilled between 1993 and 2001 continued to be listed as either temporarily abandoned, testing, or

suspended. One drill rig operated between January and February and between May June. No rigs operated between March and April. The number of rigs operating rose from two between July and August to five between September and October and then dropped to three between November and December.

On March 12, 2002, the Nevada State Office of the Bureau of Land Management held an oil and gas lease sale on 82 parcels covering 148,735 acres. No parcels were leased at that time (PI/Dwight Plus Drilling Wire, Rocky Mountain Region, Newsletter Edition, Section I, February 6, 2002; Nevada Oil Reporter, March, 2002).

On June 11, 2002, the Nevada State Office of the Bureau of Land Management held an oil and gas lease sale on 88 parcels covering 135,227 acres. The high bids totaled \$30,304 on 14 parcels covering 15,128 acres, which averaged just over \$2.00 per acre. Only one tract generated a bid of more than the \$2.00 per acre minimum. The highest bid was \$3.00 per acre made by George Vrame of Oakland, Illinois, for Parcel 25 covering the 40 acres of SE1/4, SW1/4, section 20, T8N, R56E about 3.5 miles southwest of Kate Spring (PI/Dwight Plus Drilling Wire, Rocky Mountain Region, Newsletter Edition, Section I, June 13, 2002).

On September 10, 2002, the Nevada State Office of the Bureau of Land Management held an oil and gas lease sale on 171 parcels covering 295,389 acres. The high bids totaled \$41,948 on 17 parcels covering 17,941 acres, which averaged \$2.34 per acre. Only two tracts generated bids of more than the \$2.00 per acre minimum. The highest bid was \$11.50 per acre made by Makoil, Inc. for Parcel 144 covering the 520 acres of the E1/2, NE1/4 the SW1/4, the NW1/4 and the N1/2, SE1/4 Section 33 and NE1/4 Section 34, T8N, R56E about 7 miles south of Trap Spring (PI/Dwight Plus Drilling Wire, Rocky Mountain Region, Newsletter Edition, Section I, September 13, 2002).

### Production of Water from Nevada's Oil Fields (barrels)

*Compiled from Producer's Reports filed with the Nevada Division of Minerals*

Field (year discovered)	1994-96	1997	1998	1999	2000	2001	2002	Total
Eagle Springs (1954)	925,281	364,900	410,290	325,574	275,521	421,755	572,541	3,295,862
Trap Spring (1976)	9,016,564	3,046,366	2,444,444	2,802,716	2,850,603	2,648,176	1,844,621	24,653,490
Currant (1979)	0	0	0	0	0	0	0	0
Bacon Flat (1981)	234,616	100,708	14,929	1,756	358,879	613	27	711,528
Blackburn (1982)	5,866,001	1,777,941	1,937,981	1,938,408	1,884,096	1,792,102	2,008,218	17,204,747
Grant Canyon (1983)	698,190	335,603	377,934	397,888	417,564	431,433	435,004	3,093,616
Kate Spring (1986)	1,561,312	529,503	476,346	483,483	521,464	515,205	457,264	4,544,577
Tomera Ranch (1987)	79,334	31,948	35,441	31,121	33,245	0	94,643	305,732
N. Willow Creek (1988)	2,521	135	0	4	0	50	0	2,710
Three Bar (1990)	5,958	0	0	0	0	0	0	5,658
Duckwater Creek (1990)	42,715	1,853	4,620	840	1,196	4,778	4,442	60,444
Sans Spring (1993)	789,777	233,046	363,845	328,544	240,773	324,585	326,943	2,607,513
Ghost Ranch (1996)	2,775	99,945	171,921	202,678	208,488	188,592	155,714	1,030,113
Deadman Creek (1996)		0	0	0	0	0	0	0
Sand Dune (1998)			23,335	53,115	33,308	34,369	32,123	176,250
<b>Total</b>	<b>19,225,044</b>	<b>6,521,948</b>	<b>6,261,086</b>	<b>6,566,127</b>	<b>6,825,137</b>	<b>6,361,658</b>	<b>5,931,540</b>	<b>57,692,240</b>
Change from previous year		2.5%	4.0%	4.9%	3.9%	-6.8%	-6.8%	

On December 10, 2001, the Nevada State Office of the Bureau of Land Management held an oil and gas lease sale on 5 parcels covering 5,400 acres. Only one tract drew a competitive bid. Jay Manson and Thomas Davis from Crescenta, California, bid the \$2.00 per acre minimum for Parcel NV-02-12-0001, which covers 1,120 acres in Sections 21 and 28, T18N, R56E, in White Pine County about 42 miles west-northwest of Ely (PI/Dwight Plus Drilling Wire, Rocky Mountain Region, Southeastern Edition, Section I, December 18, 2002).

### Transfers

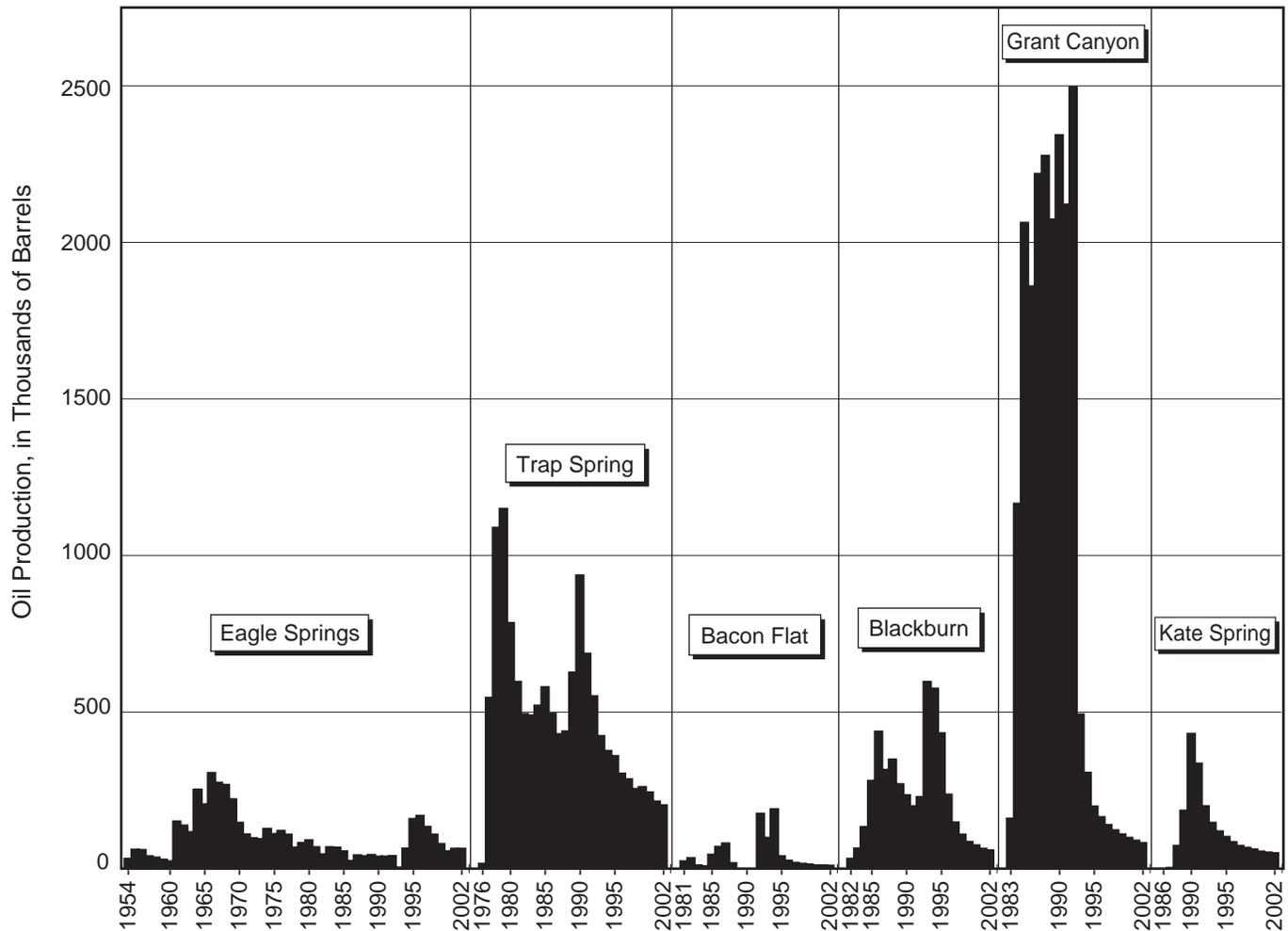
No transfers occurred in 2002.

### Other Developments

In March 2002, MidAmerican Energy Holdings Co., headquartered in Des Moines, Iowa, acquired the Kern River Gas Transmission Co. (KRGTC). In June, a final environmental report was issued for their Kern River 2003 Expansion Project. Construction began in the summer and was scheduled to be completed in May 2003. This project involves building 634.5 miles of 36-inch-diameter pipeline and supporting facilities that would help bring

more natural gas from Wyoming to consumers in Utah, Nevada, and California. The proposed pipeline would consist of 12 loops or segments running parallel to the existing KRGTC pipeline from Opal Wyoming, to Dagget, California. In Nevada, the existing pipeline crosses northeast to southwest through the far southeast corner of Lincoln County and across Clark County through Las Vegas. Due to residential and commercial development encroaching upon the existing right-of-way, a 26-mile stretch through the Las Vegas area will not be looped. In Clark County, a new compressor is proposed for the Dry Lake segment, and an existing compressor at Goodsprings is proposed to be upgraded. When completed, the Kern River system will be capable of transporting more than 1.7 billion cubic feet (bcf) of natural gas daily, which could potentially power 10 million homes. (Final Environmental Impact Statement/Environmental Impact Report, Kern River 2003 Expansion Project, June 2002; www.midamerican.com).

Desert Crossing Gas Storage and Transportation System, a company sponsored by Allegheny Energy Supply, Salt River Project, and Semptra Energy Resources, proposed a high-deliverability underground salt cavern storage system with 300 miles of associated



pipelines to connect into as many as five interstate pipelines. The main storage system is planned to hold up to 10 bcf in multiple deep salt caverns located in the Hualapai Valley about 30 miles north of Kingman, Arizona, and the pipeline is planned to transport 800 million cubic feet per day. A section of the 36-inch pipeline is proposed to cross into Nevada just north of Lake Mohave, pass north of Searchlight and Jean and connect into the Kern River pipeline at its Goodsprings compressor station. The purpose of the pipeline is to deliver natural gas to Arizona, Nevada, and other areas in the Southwest. Open-session meetings were held in early 2002 with applications to be made to the Federal Energy Regulatory Commission in the summer. Approval is expected by the end of 2003 and the pipeline is planned to be operational by summer 2004 ([www.desert-crossing.com](http://www.desert-crossing.com)).

## U.S. Oil Production and Consumption

According to the Energy Information Agency (EIA) of the U. S. Department of Energy ([www.eia.doe.gov](http://www.eia.doe.gov)), crude oil imports accounted for 60.9% of U.S. consumption in

2002, which is slightly lower than the all time peak of 61.6% set in 2001. U.S. crude oil consumption barely increased 0.03% in 2002, and production averaged 5.817 million barrels per day, up about 0.3%. However, the annual production from 2000 through 2002 was the lowest since 1950. Oil provided about 39.8% of the nation's total energy supply in 2002, down slightly from 40.0% in 2001. Both years are somewhat higher than the 38–39%, which has prevailed since 1991.

The use of oil for electrical production decreased 26.0% in 2002 after increasing 19.0% in 2001. It accounted for 2.5% of electrical production and 3.1% of oil consumption in 2002, down from 3.4% and 3.1% respectively in 2001. Oil-fired generators accounted for only about 0.1% of the electricity produced in Nevada in 2002, down sharply from 3.2% in 2001. Gasoline production increased 2.0% and accounted for 45.0% of all oil products consumption in 2002, up from 43.8% in 2001. This percentage has hovered near 43% since 1982. The price of oil increased 3.1% from an average of \$21.84 per barrel in 2001 to \$22.51 per barrel in 2002 for domestic oil. From January to April, the average monthly

<b>NEVADA OIL PRODUCERS</b> ( <a href="http://www.state.nv.us/minerals/nvoilprod.htm">www.state.nv.us/minerals/nvoilprod.htm</a> )			
<b>Company</b>	<b>Field</b>	<b>Contact</b>	<b>Address and Phone and FAX Numbers</b>
Big West Oil and Gas, Inc.	Bacon Flat Sans Spring	J. Philips Adams	333 West Center Street North Salt Lake, UT 84054 Phone (801) 296-7700
Deerfield Production Co.	Deadman Creek Eagle Springs Ghost Ranch North Willow Creek Sand Dune	Steve McDonald	136 Dwight Road Longmeadow, MA 01106 Phone (413) 565-7127 FAX (413) 567-7926
Evans-Barton, Ltd.	Trap Spring	David M. Evans	P.O. Box 3153 Reno, NV 89505 Phone (775) 827-1613
Frontier Exploration Co.	Trap Spring	Andy Pierce	3006 Highland Drive No. 206 Salt Lake City, UT 84106 Phone (801) 486-5555 FAX (801) 486-5575
Makoil, Inc.	Currant Duckwater Creek Grant Canyon Kate Spring Trap Spring	Eugene Kozlowski	500 North Rainbow Blvd. No. 300 Las Vegas, NV 89107 Phone (714) 939-7560 FAX (714) 939-7552
Petroleum Corp. of Nevada	Blackburn	Ken Chattin	P.O. Box 1447 Elko, NV 89801 Phone (775) 753-6810
Trail Mountain, Inc.	Three Bar		105 South 4th St. Artesia, NM 88210 Phone (505) 748-1471
V.F. Neuhaus Properties/ Winn Exploration	Tomera Ranch	Daniel R. Donahue	P.O. Box 1270 McAllen, TX 78505 Phone (956) 686-2491
Western General	Kate Spring	Rick Taylor	4899 South Torrey Pines No. 201 Las Vegas, NV 89103 Phone (702) 220-7065 FAX (702) 220-7066

price of oil rose sharply from \$15.89 to \$22.14 barrel and then ranged between \$22 and \$26 per barrel for the rest of the year. (www.eia.doe.gov).

Natural gas consumption decreased 3.1% to 20,289 bcf in 2002, the second annual decrease since peaking in 2000. Natural gas provided 21.8% of the nation's total energy supply in 2002, down from 22.4% in 2001, and a peak of 24.4% in 1995. The use of natural gas for electrical production decreased 0.4% in 2002 after increasing 9.7% in 2001. It accounted for 17.7% of electrical production in 2002, up from 16.8% in 2001, and 11.1% of natural gas consumption in 2002, down from 12.8% in 2001. Industrial consumption decreased 4.5%, while residential and commercial consumption increased 2.2% and 3.7% respectively in 2002. The average well-head price decreased 28.4% from \$4.12 per thousand feet (tcf) in 2001 to \$2.95 per tcf in 2002. Since June 2001, the price of natural gas has ranged between \$2.14 and \$3.88 per tcf. Though Nevada produces no commercial quantities of natural gas, gas-fired generators provided 25.0% of the electricity produced in Nevada in 2002, up from 24.2% in 2001. Electric utility net generation

decreased 10.6% from 27,896 million kilowatt-hours in 2001 to 24,930 million kilowatt-hours in 2002 (www.eia.doe.gov).

Coal consumption increased 1.0% in 2002 to 1,071,90,000 tons after remaining flat in 2001. Consumption has remained over 1 billion tons since 1996. Coal production decreased 3.0% to 1,093,800,000 tons after rising 5.0% in 2001 to a record 1,127,700,000 tons. Production has remained over 1 billion tons since 1994. Coal provided 23.0% of the nation's total energy supply in 2002, up from 22.7% in 2001. This percentage has hovered between 22% and 23% since 1983. Production of electricity accounted for 91.6% of coal consumption in 2002, from 91.0% 2001. The use of coal for electrical production increased 0.5% in 2001 after declining 10.4% in 2001. It also accounted for 50.1% of electrical production in 2002, down a 50.9% share in 2001. The average price of coal delivered to electrical utilities increased only 0.6% to \$24.84 per short ton in 2002 from \$24.68 in 2001. Though Nevada produces no coal, coal-fired generators provided 65.8% of the electricity produced in Nevada in 2002, up from 63.8% in 2001 (www.eia.doe.gov).

<b>NEVADA OIL REFINERIES</b>		
<b>Company</b>	<b>Refinery</b>	<b>Address and Phone Number</b>
Energy Income Fund, Inc.	Currant	66 Miles South of Ely Ely, NV 89301 Phone (775) 863-0229
Energy Income Fund, Inc.	Tonopah	105 Refinery Road Tonopah, NV 89049 Phone (775) 482-3555

# Directory of Mining and Milling Operations

by David A. Davis

Compiled from information supplied by the Nevada Division of Minerals and Mine Safety and Training Section.

Sand and gravel operations with less than 100,000 tons annual production are not listed.

CIL = carbon-in-leach, CIP = carbon-in-pulp, HL = heap leach, ML = mill, OP = open-pit mine, OS = other surface, UG = underground mine.

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
<b>CARSON CITY</b>							
<b>Goni Pit</b>	Cinderlite Trucking Co.	S28,T16N,R20E	decomposed granite	OP,ML	mining screening	3	1665 South Sutro Terrace Carson City, NV 89706 775-882-4483 Fax: 882-1671
<b>CHURCHILL COUNTY</b>							
<b>Celite Mine</b>	World Minerals, Inc.	S8,17,T19N,R26E	diatomite	OP,ML	mining classification drying milling	17	100 Front St. Fernley, NV 89408 775-575-2536 Fax: 575-4857 http://www.worldminerals.com
<b>Desert Mountain Aggregate Pit</b>	A and K Earthmovers	S9,16,17;T16N,R28E	aggregate	OP,ML	mining crushing screening	9	P.O. Box 1059, 1200 Auction Rd. Fallon, NV 89407 775-423-6085 Fax: 775-423-8410
<b>Huck Salt</b>	Huck Salt and Sons, Inc.	S12,T16N,R31E	salt	OS	mining solar evaporation	4	2900 Phritzie Lane Fallon, NV 89406 775-423-2055 Fax: 423-0467
<b>Moltan Mine and Plant</b>	Moltan Co.	S28,32, T23N,R27E	diatomite clay	OP,ML	mining crushing drying screening	50	P.O. Box 860 I-80 Frontage Rd. Fernley, NV 89408-0860 775-423-6668 Fax: 423-6411
<b>Popcorn Mine</b>	Eagle-Picher Filtration and Minerals, Inc.	S24,T16N,R28E; S19,T16N,R29E	perlite	OP	mining	1	P.O. Box 10480 Reno, NV 89510 775-824-7700 Fax: 824-7715 http://www.epcorp.com
<b>Trinity Zeolite Pit</b>	Moltan Company	S36,T25N,R28E	zeolite	OP	mining	3	P.O. Box 860 I-80 Frontage Rd. Fernley, NV 89408-0860 775-423-6668 Fax: 423-6411
<b>CLARK COUNTY</b>							
<b>American Sand and Gravel Pit No. 1 (Salt Lake Highway Pit)</b>	American Sand and Gravel, LLC	S24,T19S,R62E	sand gravel	OP,ML	mining crushing	11	5260 Beesley Dr. Las Vegas, NV 89115 702-452-1900 Fax: 651-0375
<b>American Sand and Gravel Pit No. 2 (Lone Mountain)</b>	American Sand and Gravel, LLC	S36,T19S,R59E	sand gravel	OP,ML	mining crushing	10	5260 Beesley Dr. Las Vegas, NV 89115 702-452-1900 Fax: 651-0375
<b>Apex Landfill Pit</b>	Las Vegas Paving Corp.	S19,T18S,R64E	sand gravel	OP,ML	mining crushing screening	4	4420 S. Decatur Boulevard Las Vegas, NV 89103 702-251-5800
<b>Apex Quarry and Plant</b>	Chemical Lime Co.	S14,22,23,26,27,34,35 T18S,R63E	limestone	OP,ML	mining calcining crushing screening	110	P.O. Box 3609 North Las Vegas, NV 89036 702-643-7702 Fax: 643-9517
<b>Apex Quarry</b>	Granite Construction Co.	S14,22,23,26,27,34,35 T18S,R63E	aggregate sand	OP,ML	mining crushing screening washing	7	P.O. Box 2087 1900 Glendale Ave. Sparks, NV 89432 775-355-3434 Fax: 329-2803 http://www.graniteconstruction.com
<b>Blue Diamond (Jones) Pit</b>	Las Vegas Paving Corp.	S26,T22S,R60E	sand gravel	OP,ML	mining crushing screening	17	4420 South Decatur Blvd. Las Vegas, NV 89103 702-251-5800
<b>Bootleg Pit</b>	Boulder Sand and Gravel, Inc.	S5,8,T23S,R64E	aggregate	OP,ML	mining crushing screening	11	624 Yucca Boulder City, NV 89005 702-294-1156 Fax: 294-0676
<b>BPB Gypsum, Inc.</b>	BPB Gypsum, Inc.	S24-26,T21S,R58E; S20,29-31,T21,R59E; S5-8,T22S,R59E	gypsum	OP,ML	mining calcining grinding	123	HCR 89033 Box 2900 Las Vegas, NV 89124 702-875-4111 Fax: 875-4213 http://www.bpb-na.com

continued

**DIRECTORY OF MINING AND MILLING OPERATIONS (continued)**

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
<b>CLARK COUNTY (continued)</b>							
<b>Buffalo Road Pit and Mill</b>	Rinker Materials Corp.	S21,T21S,R60E	sand gravel	OS,ML	mining crushing screening	25	7150 Pollock Dr. Las Vegas, NV 89119 877-260-2772 Fax: 702-260-9903 www.csra.com/nevada
<b>Cactus Pit</b>	CTC Crushing, LLC	S34,T22S,R61E	sand gravel	OP,ML	mining crushing screening	8	250 Pilot Rd., Suite No. 160 Las Vegas, NV 89120 702-407-0487 Fax: 407-0994
<b>Gornowich Pit</b>	CTC Crushing, LLC	S15,22,T22S,R63E	sand gravel	OP	mining screening washing	5	250 Pilot Rd., Suite No. 160 Las Vegas, NV 89120 702-407-0487 Fax: 407-0994
<b>Henderson Plant</b>	Chemical Lime Co.	S12,T22S,R62E	lime	ML	hydration	29	P.O. Box 127, BMI Complex Henderson, NV 89015 702-565-8991 Fax: 565-5902
<b>Infinition</b>	Infinition, LLC	S7,T13S,R66E	sand gravel	OP	mining	20	7885 Westwind Rd. Las Vegas, NV 89139 702-617-1893
<b>Lone Mountain</b>	Diamond Const.	S36,T19S,R59E	sand gravel	OP,ML	mining gravity	22	7885 Westwind Road Las Vegas, NV 89139 702-644-2216 Fax: 644-2392
<b>Lone Mountain</b>	Hollywood Gravel, Inc.	S34,T19S,R59E,	sand gravel	OP,ML	mining crushing screening	15 <sup>1</sup>	908 South Valley View Blvd. Las Vegas, NV 89107 702-870-7094 Fax: 870-8114 www.hollywoodgravel.com
<b>Lone Mountain Mendenhall Pit</b>	Las Vegas Paving Corp.	S35,T19S,R59E	sand gravel	OP,ML	mining crushing screening	7	4420 South Decatur Blvd. Las Vegas, NV 89103 702-251-5800
<b>Lone Mountain Nevada Ready Mix Pit</b>	Nevada Ready Mix Corp.	S36,T19S,R59E	sand gravel	OP,ML	mining crushing screening	32	601 West Bonanza Las Vegas, NV 89106 702-457-1115
<b>Lone Mountain Stocks Pit</b>	Southern Nevada Paving	S34,35,T19S,R59E; S3,4,T20S,R59E	sand gravel	OP,ML	mining crushing screening	11	3555 Polaris Avenue Las Vegas, NV 89102 702-876-5226
<b>Lone Mountain Community Pit</b>	Various (BLM manages pit)	S36,T19S,R59E; S1,T20S,R59E	sand gravel	OP,ML	mining crushing screening		Bureau of Land Management 4765 West Vegas Dr. Las Vegas, NV 95901 702-647-5000 Fax: 647-5023 www.blm.gov
<b>Moapa Pit</b>	Ready Mix, Inc.	S22,27;T14S,R66E	aggregate	OP,ML	mining milling	16	3430 East Flamingo Road, Suite 100 Las Vegas, NV 89021 702-433-2090 Fax: 433-0189
<b>Money Pit</b>	Southern Nevada Liteweight, Inc.	S16,T25S,R61E	aggregate	OP,ML	mining crushing screening	78	1101 E. Alexander Road Las Vegas, NV 89030 702-399-8621 Fax: 633-5787
<b>PABCO Gypsum-Apex Pit</b>	Pacific Coast Building Products, Inc.	S7,18,T20S,R64E	gypsum	OP,ML	mining crushing washing	120	1973 N. Nellis Boulevard No. 328 Las Vegas, NV 89115 702-643-1016 Fax: 643-6249 www.paccoast.com
<b>Pioneer Gypsum Mine</b>	D.L. Denman Construction Co.	S30,T19S,R64E	gypsum	OP	mining	9	4880 Donovan Way North Las Vegas, NV 89031 702-399-5939 Fax: 399-8353
<b>Pipes Pit</b>	Pipes Paving	S1,T20S,R59E	sand gravel	OS,ML	mining crushing screening	60	3529 Clayton North Las Vegas, NV 89030 702-647-1162 Fax: 647-2387
<b>Railroad Pass (El Dorado) Pit</b>	Rinker Materials Corp.	S11,T23S,R63E	sand gravel	OP,ML	mining crushing screening	31	7150 Pollock Dr. Las Vegas, NV 89119 877-260-2772 Fax: 702-260-9903 www.csra.com/nevada
<b>Rainbow Quarries</b>	Las Vegas Rock, Inc.	S34,T25S,R58E	stone	OP,ML	mining crushing	15	11635 Bermuda Rd. Las Vegas, NV 89123 702-791-7625 Fax: 702-896-4533
<b>Salt Lake Highway Pit</b>	Various (BLM manages pit)	S24,T19S,R62E	sand gravel	OP	mining		Bureau of Land Management 4765 West Vegas Dr. Las Vegas, NV 95901 702-647-5000 Fax: 647-5023 www.blm.gov

<sup>1</sup>Combined pit operations.

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**DIRECTORY OF MINING AND MILLING OPERATIONS (continued)**

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
<b>CLARK COUNTY (continued)</b>							
<b>Sandia Aggregates-PABCO Pit</b>	Pacific Coast Building Products, Inc.	S7,18,T20S,R64E	sand gravel	OP,ML	mining crushing washing	17	1973 North Nellis Blvd., No. 328 Las Vegas, NV 89115 702-643-1016 Fax: 643-6249 www.paccoast.com
<b>Simplot Silica Products Pit</b>	Simplot Industries	S2,3,11,12,T17S,R67E	silica sand	OP,ML	mining drying flotation screening	43	P.O. Box 308 Overton, NV 89040 702-397-2667 Fax: 397-2798
<b>Sloan Quarry</b>	Frehner Construction Co.	S13,T23S,R60E	sand gravel	OP,OS,ML	mining crushing screening	27	124 West Brooks Avenue North Las Vegas, NV 89030 702-649-6250 Fax: 642-2213 www.frehnerconstruction.com
<b>Spanish Trails Pit</b>	Hollywood Gravel, Inc.	S28,T21S,R60E	sand gravel	OP,ML	mining crushing screening	15 <sup>1</sup>	908 South Valley View Blvd. Las Vegas, NV 89107 702-870-7094 Fax: 870-8114 www.hollywoodgravel.com
<b>Speedway Pit</b>	Southwest Paving and Grading, Inc.	S26,T19S,R62E	sand gravel	OP,ML	mining crushing	5	2755 North Lamont St. Las Vegas, NV 89115 702-643-8389 Fax: 644-5336
<b>Spring Mountain Pit</b>	Wells Cargo, Inc.	S10,15;T21S,R60E	sand gravel	OS,ML	mining gravity	15	P.O. Box 81170 Las Vegas, NV 89160 702-873-7440 Fax: 873-1696 www.wellscargoconstruction.com

**DOUGLAS COUNTY**

<b>Dresslerville Pit</b>	Cinderlite Trucking Co.	S27,T12N,R20E	decomposed granite	OP	mining screening	2	1665 South Sutro Terrace Carson City, NV 89706 775-882-4483 Fax: 882-1671
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**ELKO COUNTY**

<b>Capstone Mine</b>	Newmont Mining Corp.	S10,T36N,R49E	gold silver mercury	OP,HL,ML	mining heap leach milling	1519 <sup>2</sup>	P.O. Box 669 Carlin, NV 89822-0669 775-778-4000 Fax: 778-4757 www.newmont.com
<b>Dunphy Mill</b>	BAROID/Halliburton Energy Services, Inc.	S26,T33N,R48E	barite	ML	crushing gravity grinding	43	912 Dunphy Ranch Road Battle Mountain, NV 89820 775-468-0515 Fax: 468-2060 www.halliburton.com
<b>Elburz Pit</b>	Vega Construction and Trucking Co.	S3,T35N,R57E	sand gravel	OS,ML	mining crushing screening	20	P.O. Box 1630 4100 Idaho, Elko, NV 89801 775-738-5381 Fax: 738-6311
<b>Jerritt Canyon Mine</b>	Queenstake Resources, Ltd.	T39-41N,R52-54E	gold	UG,ML	mining heap leach milling	421	999 Eighteenth St., Suite 2940 Denver, CO 80202 303-297-1557 Fax: 303-297-1587 www.queenstake.com
<b>Meikle Mine</b>	Barrick Goldstrike Mines, Inc.	S13,T36N,R50E	gold silver	UG,ML	mining milling roasting	567	P.O. Box 29 Elko, NV 89803 775-738-8043 Fax: 738-6543 www.barrick.com
<b>Midas (Ken Snyder) Mine</b>	Newmont Mining Corp.	S21,22,27,28,33,34;T39N,R46E	gold silver	UG,ML	mining milling	162	HC66 Box 125 Midas, NV 89414 775-635-6423 Fax: 635-6460 www.newmont.com
<b>Pardo Pit</b>	Harney Rock and Paving Co.	S16,T35N,R56E	sand gravel	OP,ML	mining crushing	10	P.O. Box 800 Hines, OR 97738 541-573-7855 Fax: 573-8319
<b>Pilot Peak Quarry and Plant</b>	Graymont Western U.S., Inc.	S14,15,22,23,26,T34N,R68E	limestone	OP,ML	mining grinding roasting rotary kiln	48	P.O. Box 2520 West Wendover, NV 89883 775-483-5463 Fax: 483-5149
<b>Rain Mine</b>	Newmont Mining Corp.	S33,T32N,R53E	gold silver mercury	UG HL,ML	mining heap leach milling	1519 <sup>2</sup>	P.O. Box 669 Carlin, NV 89822-0669 775-778-4000 Fax: 778-4757 www.newmont.com
<b>Rossi Mine</b>	BAROID/Halliburton Energy Services, Inc.	S14-16,21-23,26-28,34-35;T37N,R49E	barite	OP,ML	mining crushing	17	912 Dunphy Ranch Road Battle Mountain, NV 89820 775-468-0515 Fax: 468-2060 www.halliburton.com

<sup>1</sup>Combined pit operations.

<sup>2</sup>Combined Newmont Carlin Trend Operations.

**DIRECTORY OF MINING AND MILLING OPERATIONS (continued)**

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
<b>ESMERALDA COUNTY</b>							
<b>Basalt Mine and Plant</b>	Grefco Minerals, Inc.	S29-32,T2N,R34E	diatomite	OP,ML	mining grinding	18	P.O. Box 288 Mina, NV 89422-0288 775-573-2422 Fax: 573-2422
<b>Blanco Mine</b>	Vanderbilt Minerals Corp.	S22,T1N,R37E	clay	OP	processing shipping	4	3570 Burgundy Dr. Pahrump, NV 89048 775-537-6944 Fax: 537-0629 www.rtvanderbilt.com
<b>Heart of Rulco (Alum Mine)</b>	Rulco, LLC	S32,33,T1N,R38.5E	potassium sulfate	OP	crushing milling shipping	4	202 North Currie St., Suite 100 Carson City, NV 89703 800-658-5919 Fax: 970-883-2469
<b>Mineral Ridge Mine</b>	Golden Phoenix Minerals, Inc.	S1,2,12,T2S,R38E; S6,T2S,R39E	gold silver	OP,HL	heap leach care & maintenance	8	3595 Airway Dr., Suite 405 Reno, NV 89511 775-853-4919 Fax: 853-5010 www.golden-phoenix.com
<b>Silver Peak Operations</b>	Chemetall Foote Co.	S22,T2S,R39E	lithium carbonate	OS,ML	mining solar evaporation precipitation	68	P.O. Box 98 Silver Peak, NV 89047 775-937-2222 Fax: 937-2250 www.chemetall.com
<b>EUREKA COUNTY</b>							
<b>Betze/Post Mine</b>	Barrick Goldstrike Mines, Inc.	S23-26,T36N,R49E; S12,20,29,30; T36N,R50E	gold	OP,CIL, HL,ML	mining heap leach milling	1213	P.O. Box 29 Elko, NV 89803 775-738-8043 Fax: 738-6543 www.barrick.com
<b>Carlin North Genesis Complex</b>	Newmont Mining Corp.	S33,T36N,R50E	gold	OP,HL, ML	mining heap leach milling	1519 <sup>2</sup>	P.O. Box 669 Carlin, NV 89822-0669 775-778-4000 Fax: 778-4757 www.newmont.com
<b>Carlin North-Post and adjacent mines</b>	Newmont Mining Corp.	S19,T36N,R50E	gold	OP,HL, ML	mining heap leach milling	1519 <sup>2</sup>	P.O. Box 669 Carlin, NV 89822-0669 775-778-4000 Fax: 778-4757 www.newmont.com
<b>Carlin South-Carlin and adjacent mines</b>	Newmont Mining Corp.	S14,T35N,R50E	gold	UG,HL, ML	mining heap leach milling	1519 <sup>2</sup>	P.O. Box 669 Carlin, NV 89822-0669 775-778-4000 Fax: 778-4757 www.newmont.com
<b>Carlin South-Gold Quarry and adjacent mines</b>	Newmont Mining Corp.	S3,T33N,R51E	gold	OP,HL, ML	mining heap leach milling	1519 <sup>2</sup>	P.O. Box 669 Carlin, NV 89822-0669 775-778-4000 Fax: 778-4757 www.newmont.com
<b>Ruby Hill Mine</b>	Barrick Gold Corp.	S9-11,14,15 T19N,R53E	gold silver	OP,CIL, CIP,HL, ML	heap leach milling	23	P.O. Box 676 Eureka, NV 89316 775-237-6060 Fax: 237-5408 www.barrick.com
<b>HUMBOLDT COUNTY</b>							
<b>Getchell Underground Mine</b>	Placer Dome US, Inc.	S33,T39N,R42E	gold silver	UG	mining stockpiling	118	P.O. Box 220 Golconda, NV 89414-9702 775-529-5001 Fax: 529-0753 www.placerdome.com
<b>Hycroft Mine</b>	Hycroft Resources and Development, Inc.	S26,T35N,R29E	gold silver	OP,HL	heap leach	7	P.O. Box 3030 Winnemucca, NV 89446 775-623-5260 Fax: 623-0215 www.vistagold.com
<b>Lone Tree Mine (Lone Tree Complex)</b>	Newmont Mining Corp.	S1,11,13,15,23, T34N,R42E	gold silver	OP,HL, ML	mining flotation heap leach milling	455 <sup>3</sup>	P.O. Box 388 Valmy, NV 89438-0388 775-635-9000 Fax: 635-0111 www.newmont.com
<b>Marigold Mine</b>	Glamis Marigold Mining Co.	S8,9,18-20, T33N,R43E	gold silver	OP,HL, ML	mining heap leach milling	128	P.O. Box 160 Valmy, NV 89438 775-635-2317 Fax: 635-2551 www.glamis.com
<b>MIN-AD Mine</b>	MIN-AD, Inc.	S28,T35N,R38E	dolomite	OP,ML	mining air separation grinding screening	16	P.O. Box 39 Winnemucca, NV 89446 775-623-5944 Fax: 623-9028

<sup>2</sup>Combined Newmont Carlin Trend Operations.

<sup>3</sup>Combined Lone Tree, Mule Canyon, Phoenix Project, and Trenton Canyon

*continued*

**DIRECTORY OF MINING AND MILLING OPERATIONS (continued)**

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
<b>HUMBOLDT COUNTY (continued)</b>							
<b>Rainbow Ridge Opal Mine</b>	Rainbow Ridge Opal Mines, Inc.	S22,23,T45N,R26E	precious opal	OP	mining	1	P.O. Box 97 Denio, NV 89404 775-941-0270
<b>Royal Peacock Opal Mine</b>	Walter Wilson	S30,T45N,R26E	precious opal	OP	mining	1	P.O. Box 144 Orovada, NV 89425 775-941-0374 Fax: 272-3201 www.royalpeacock.com
<b>Sage Mine</b>	West Coast Gemstones, Inc.	S12,T43N,R35E	chalcedony	OP	mining development extraction grinding sorting	1	P.O. Box 133 College Place, WA 99324 509-522-4851 Fax: 527-1233 www.wcmining.com
<b>Sleeper</b>	Nevada Gold Mining, Inc.	S9,10,15,16,17,20, 21,22; T32N,R43E	gold silver	OP,HL, ML	heap leach milling gravity	4	600 Sod House Road Winnemucca, NV 89445 775-427-8222 Fax: 427-8169
<b>Thomas Canyon and Sonoma Pits</b>	H.E. Hunewill Construction Co.	S24,T35N,R37E; S19,T35N,R38E	sand gravel	OP,ML	mining crushing screening	6	1410 West Railroad Rd. Winnemucca, NV 89445 775-623-2888 Fax: 623-2992
<b>Trenton Canyon Mine (Lone Tree Complex)</b>	Newmont Mining Corp.	S7,18,19,T32N,R43E; S29,32,T33N,R43E	gold silver	OP,HL, ML	mining flotation heap leach milling	455 <sup>3</sup>	P.O. Box 388 Valmy, NV 89438-0388 775-635-9000 Fax: 635-0111 www.newmont.com
<b>Twin Creeks Mine</b>	Newmont Mining Corp.	S3-10,15-22,27-32 T39N,R43E	gold silver	OP,HL, ML	mining heap leach milling	476	P.O. Box 69 Golconda, NV 89414 775-623-4300 Fax: 635-4602 www.newmont.com
<b>LANDER COUNTY</b>							
<b>Argenta Mine and Mill</b>	Baker Hughes INTEQ	S6,18,19,T32N,R47E	barite	OP,ML	mining gravity grinding	19	P.O. Box 277 Battle Mountain, NV 89820 775-635-5441 Fax: 635-5455 www.bakerhughes.com
<b>Battle Mountain Grinding Plant</b>	M-I, LLC	S18,T32N,R45E	barite	ML	gravity grinding	68 <sup>4</sup>	P.O. Box 370 Battle Mountain, NV 89820 775-635-5135 Fax: 635-2191 www.midf.com
<b>Blue Ridge Mine</b>	Jay and Grace Wintle	S19,20,29,30, T28N,R47E	faustite turquoise	OP	mining screening sorting washing	2	810 Sheep Creek Road Battle Mountain, NV 89820 775-635-5231
<b>Cortez/Pipeline Mines</b>	Placer Dome U.S., Inc.	S31,33,34, T28N,R47E	gold	OP,CIL, HL,ML	mining heap leach milling	391	HC66 Box 1250 Crescent Valley, NV 89821 775-468-4400 Fax: 468-4496 www.placerdome.com
<b>Greystone Mine</b>	M-I, LLC	S35,T28N,R45E	barite	OP,ML	gravity milling shipping	68 <sup>4</sup>	P.O. Box 370 Battle Mountain, NV 89820 775-635-5135 Fax: 635-2191 www.midf.com
<b>McCoy/Cove Mine</b>	Kinross Gold Corp.	S1-11,T28N,R42E; S36,T29N,R42E	silver gold	UG,HL, ML	heap leach milling reclamation	70	P.O. Box 1658 McCoy Mine Road, No. 1 Battle Mountain, NV 89820 775-635-5500 Fax: 635-5098 www.kinross.com
<b>Mule Canyon Mine (Lone Tree Complex)</b>	Newmont Mining Corp.	S4,T31N,R47E	gold silver	OP,HL, ML	mining heap leach milling	455 <sup>3</sup>	P.O. Box 388 Valmy, NV 89438-0388 775-635-9000 Fax: 635-0111 www.newmont.com
<b>Phoenix Project</b>	Newmont Mining Corp.	S22,27,33,34, T31N,R43E	gold silver	OP,HL, ML	heap leach	455 <sup>3</sup>	P.O. Box 388 Valmy, NV 89438-0388 775-635-9000 Fax: 635-0111 www.newmont.com

<sup>3</sup>Combined Lone Tree, Mule Canyon, Phoenix Project, and Trenton Canyon

<sup>4</sup>Combined grinding plant and mine

**DIRECTORY OF MINING AND MILLING OPERATIONS (continued)**

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
<b>LINCOLN COUNTY</b>							
<b>Tenacity Perlite Mine and Mill</b>	Wilkin Mining and Trucking Co.	S34,T4S,R62E	perlite	UG,ML	mining milling	10	P.O. Box 829 Panaca, NV 89042 775-728-4463 Fax: 728-4456
<b>LYON COUNTY</b>							
<b>Adams Claim Gypsum Mine</b>	Art Wilson Co.	S25,T16N,R20E	gypsum limestone	OP,ML	mining crushing	35	P.O. Box 20160 Carson City, NV 89721 775-882-0700 Fax: 882-0790 www.awgypsum.com
<b>Hazen Pit</b>	Eagle-Picher Filtration and Minerals, Inc.	S6,9,T19N,R26E	diatomite	OP	shipping	1	P.O. Box 10480 Reno, NV 89510 775-824-7700 Fax: 824-7715 www.epcorp.com
<b>Nevada Cement Mine</b>	Nevada Cement Co.	S3-6,9,T19N,R25E; S31-33,T20N,R25E	limestone clay	OP,ML	mining crushing dry milling rotary kiln	122	P.O. Box 840 Fernley, NV 89408 775-575-2281 Fax: 575-4387
<b>MINERAL COUNTY</b>							
<b>Denton-Rawhide Mine</b>	Kennecott Rawhide Mining Co.	S4,5,8,16,17, T13N,R32E	gold silver	OP,HL ML	mining heap leach milling	111	P.O. Box 2070 Fallon, NV 89407 775-945-1015 Fax: 945-1213 www.kennecottminerals.com
<b>NYE COUNTY</b>							
<b>Ash Meadows Plant</b>	Ash Meadows Zeolite, LLC	S25,T18S,R50E	zeolite	ML	crushing screening packaging	9	HCR 70, Box 7006 Amargosa Valley, NV 89020 775-372-5524 Fax: 372-5524 www.badgerminingcorp.com
<b>Cinder Cone Pit</b>	Allied Building Materials, Inc./ Cind-R-Lite Co.	S36,T14S,R48E; S31,T14S,R49E; S1,T15S,R48E; S6,T15S,R49E	cinder	OP,ML	mining screening	8	4745 Mitchell St. North Las Vegas, NV 89031 702-651-1550 Fax: 651-1551
<b>Gabbs Mine</b>	Premier Chemicals, LLC	S23,25-27,34-36, T12N,R36E	magnesite	OP,ML	mining calcining	78	P.O. Box 177 Gabbs, NV 89409 775-285-2601 Fax: 285-4021 www.premierchemicals.com
<b>IMV Pits</b>	Mud Camp Mining Co., LLC	S28,29,T17S,R49E; S6,21,T17S,R51E	clay	OP,ML	mining drying grinding screening	34	Route Box 549 Amargosa Valley, NV 89020 775-372-5341 Fax: 372-5640
<b>Lathrop Mill</b>	American Borate Co.	S36,T17S,R49E	calcium borate	ML	calcination flotation	25	American Borate Co. Star Route 15 Box 610 Amargosa Valley, NV 89020 775-372-5339
<b>New Discovery Mine/ White Caps Mill</b>	Vanderbilt Minerals Corp.	S13,14,T12S,R46E; S18,19,T12S,R47E	clay	OP,UG, ML	bagging grinding screening	7	3570 Burgundy Dr. Pahrump, NV 89048 775-537-6944 Fax: 537-0629 www.rtvanderbilt.com
<b>P &amp; S</b>	Standard Industrial Minerals, Inc.	S14,T13N,R45E	barite	OP	mining	3	P.O. Box 10477 Reno, NV 89509 775-673-4122
<b>Pahrump Community Pit</b>	Various (BLM owns pit)	S28,29,T20S,R54E	sand gravel	OP	mining		Bureau of Land Management 4765 Vegas Dr. Las Vegas, NV 95901 702-647-5000 Fax: 647-5023 www.blm.gov
<b>Round Mountain Mine (Smoky Valley Common Operation)</b>	Round Mountain Gold Corp.	S19,20,29,30, T10N,R44E	gold silver	OP,HL, ML	mining gravity heap leach milling	642	P.O. Box 480 Smoky Valley Mine Rd. Round Mountain, NV 89405 775-377-3112 Fax: 377-3224 www.kinross.com

**DIRECTORY OF MINING AND MILLING OPERATIONS (continued)**

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
<b>PERSHING COUNTY</b>							
<b>Buff Mine</b>	Vanderbilt Minerals Corp.	S2,T27N,R32E	clay	OP	processing shipping	4	3570 Burgundy Dr. Pahrump, NV 89048 775-537-6944 Fax: 537-0629 www.rtvanderbilt.com
<b>Coeur Rochester Mine</b>	Coeur d'Alene Mines Corp., Inc.	S9-11,15,16,21,27, 28,T28N,R34E	silver gold	OP,HL, ML	mining heap leach milling	240	P.O. Box 1057 Lovelock, NV 89419 775-273-7995 Fax: 273-7423 www.coeur.com
<b>Colorado Mine</b>	Eagle-Picher Filtration and Minerals, Inc.	S6,7,16,18,21,25, T28N,R29E	diatomite perlite	OP,OS	mining	30	P.O. Box 959 150 Coal Canyon Road Lovelock, NV 89419 775-824-7540 Fax: 824-7582 www.epcorp.com
<b>Colorado Plant</b>	Eagle-Picher Filtration and Minerals, Inc.	S33,T28N,R32E	diatomite perlite	ML	drying classification grinding calcining	102	P.O. Box 959 150 Coal Canyon Road Lovelock, NV 89419 775-824-7540 Fax: 824-7582 www.epcorp.com
<b>Empire Quarry</b>	United States Gypsum Co.	S31,T31N,R24E	gypsum	OP	mining	14	P.O. Box 130 Empire, NV 89405 775-557-2341 Fax: 557-2212 www.usg.com
<b>Florida Canyon Mine</b>	Apollo Gold, Inc.	S1-4,9-15,T31N,R33E; S37-39,T31½N,R33E; S33-35,T32N,R33E	gold	OP,HL, ML	mining heap leach milling	174	P.O. Box 330 Imlay, NV 89418 775-538-7300 Fax: 538-7324 www.apollogold.com
<b>Section 8 Mine</b>	American Colloid Co.	S8,T27N,R33E	clay	OP	shipping	4	1500 West Shure Drive Arlington Heights, IL 60004 847-392-4600 Fax: 506-6199 www.colloid.com
<b>W. Glen Sexton Family Trust</b>	Nutritional Additives Co.	S5,8,T34N,R38E	dolomite	OP,ML	mining milling	4	415 Wellington Street Winnemucca, NV 89445 775-623-1151 Fax: 623-1153
<b>STOREY COUNTY</b>							
<b>All-Lite Aggregate Pit</b>	RMC Nevada, Inc.	S22,T19N,R22E	sand gravel	OS,ML	mining milling	28	333 Galletti Way Reno, NV 89512 775-329-5585 www.rmnevada.com
<b>Basalite Dayton Pit</b>	Basalite Division of Pacific Coast Building Products	S8,9,16,17, T17N,R22E	sand gravel	OS,ML	mining crushing milling	6	2600 Boeing Way Carson City, NV 89701 775-882-9336 Fax: 887-1025 http://basalite.paccoast.com
<b>Clark Mine and Mill</b>	Eagle-Picher Filtration and Minerals, Inc.	S27,33,34, T20N,R23E	diatomite	OP,ML	mining calcining drying grinding	69	P.O. Box 10480 Reno, NV 89510 775-824-7700 Fax: 824-7715 www.epcorp.com
<b>Mustang Pit</b>	Gopher Construction, Inc.	S14,T19N,R21E	decorative rock	OP	mining	4	P.O. Box 801 Fernley, NV 89408 775-575-4333 Fax: 575-1137
<b>WASHOE COUNTY</b>							
<b>Bella Vista Pit</b>	A and K Earthmovers	S3,T18N,R20E	sand gravel	OS,ML	mining screening	8	P.O. Box 1059 1200 Auction Rd. Fallon, NV 89407 775-423-6085 Fax: 423-8410
<b>Clay Mine</b>	Art Wilson Co.	S13,T27N,R19E	clay	OP	mining	3	P.O. Box 20160 Carson City, NV 89721 775-882-0700 Fax: 882-0790 www.awgypsum.com
<b>Empire Mill</b>	United States Gypsum Co.	S11,13,T31N,R23E	gypsum	ML	calcining crushing	137	P.O. Box 130 Empire, NV 89405 775-557-2341 Fax: 557-2212 www.usg.com

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**DIRECTORY OF MINING AND MILLING OPERATIONS (continued)**

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
<b>WASHOE COUNTY (continued)</b>							
<b>Lockwood Quarry</b>	Granite Construction Co.	S17,T19N,R21E	aggregate	OP,ML	mining crushing screening washing	16	P.O. Box 2087 1900 Glendale Ave. Sparks, NV 89432 775-355-3434 Fax: 329-2803 www.graniteconstruction.com
<b>Paiute Pit</b>	RMC Nevada, Inc.	S2,27,34, T21N,R24E	sand gravel	OP	mining	15	333 Galletti Way Reno, NV 89512 775-329-5585 www.rmnevada.com
<b>Rilite Aggregate Pit</b>	Rilite Aggregate Co.	S23,T18N,R20E	aggregate	OP,ML	mining grinding crushing	9	P.O. Box 11767 Reno, NV 89510 775-329-8842 Fax: 329-3593
<b>Spanish Springs Plant No. 6</b>	Martin Marietta Minerals	S15, T21N,R20E	sand gravel	OP,ML	mining crushing screening	36	11059 Pyramid Lake Rd. Sparks, NV 89436 775-425-4455 Fax: 425-5131 www.martinmarietta.com
<b>Wade Sand Pit</b>	Granite Construction Co.	S3,T20N,R24E	sand	OP	mining screening	5	P.O. Box 2087 1900 Glendale Ave. Sparks, NV 89432 775-355-3434 Fax: 329-2803 www.graniteconstruction.com
<b>WHITE PINE COUNTY</b>							
<b>Bald Mountain Mine</b>	Placer Dome U.S. Inc.	S14,15,19,20 T24N,R57E	gold	OP,HL, ML	mining heap leach milling	100	P.O. Box 2706 Elko, NV 89803 775-744-4227 www.placerdome.com
<b>Mount Moriah Quarry</b>	Mt. Moriah Stone	S22,23,26,27,34-36 T16N,R70E	stone	OP	mining	8	P.O. Box 35 Baker, NV 89311 435-855-2232 Fax: 855-2332

For additional information on Nevada's mineral resources and mineral industries see the following NBMG publications:

### **Statewide Commodity Bulletins**

Antimony (B61)	Oil and gas (B104)
Barite (B98)	Radioactive minerals (B81)
Fluorspar (B93)	Talcose minerals (B84)
Gypsum (B103)	Thermal waters (B91)
Iron (B53)	Tungsten (B105)
Mercury (B41)	Zeolites (B79)
Montmorillonite, bentonite, and fuller's earth (B96)	

### **County Mineral Resource Bulletins**

Carson City (B75)	Eureka (B64)	Nye (B77, B99B)
Churchill (B83)	Humboldt (B59)	Pershing (B89)
Clark (B62)	Lander (B88)	Storey (B70)
Douglas (B75)	Lincoln (B73)	Washoe (B70)
Elko (B106)	Lyon (B75)	White Pine (B85)
Esmeralda (B78)	Mineral (B58)	

### **Other Publications**

- Index to geothermal well files housed at NBMG (L-5)
- Gold and silver resources in Nevada (M120)
- Nevada geothermal resources (M126)
- Geothermal resources (M141)
- Industrial mineral deposits (M142)
- Oil and gas wells drilled in Nevada since 1907 (L-8)
- Nevada mining and you (SP8)
- Major mines of Nevada 2002 (P-14)
- Outline of Nevada mining history (SP15)
- Mining districts of Nevada (R47)

### **NBMG maintains an open-file office with the following information available to the public:**

- NBMG, USGS, USBM, and DOE open-file reports on Nevada geology and mineral resources
- petroleum and geothermal exploration and production
- mining district records and maps
- mineral resources and reserves
- mineral resource assessments
- core and cuttings library
- mining claim data
- wilderness study area reports
- general geologic studies
- indexes and ordering information for maps, air photos, and remote sensing imagery