

Nevada Bureau of Mines and Geology

Special Publication MI-1999

The Nevada Mineral Industry 1999

This report, twenty-first of an annual series, describes 1999 mineral, oil and gas, and geothermal activities and accomplishments in Nevada: 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

Mackay School of Mines

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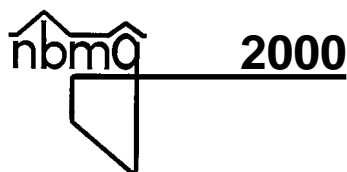
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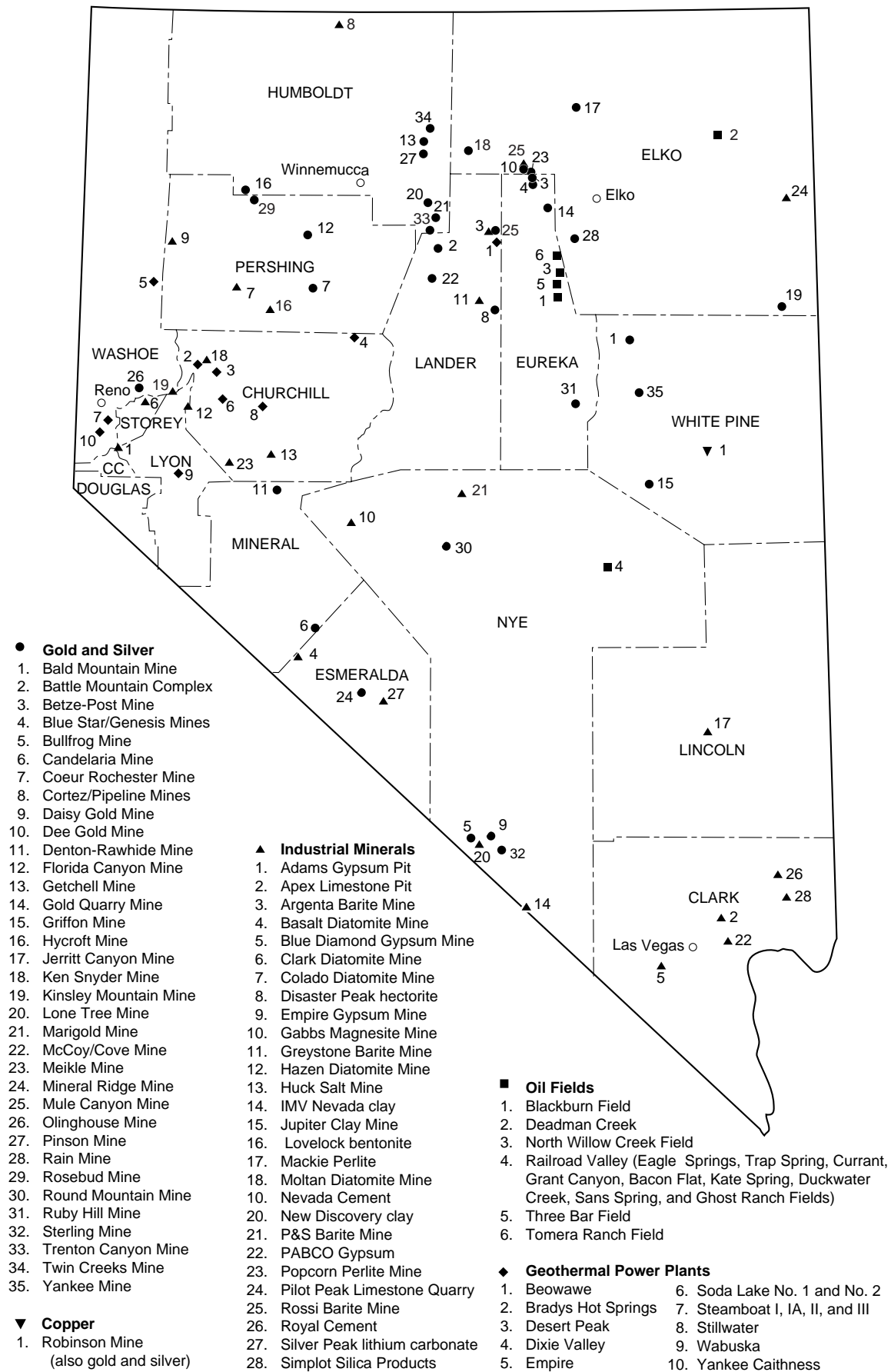
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Major mines, oil fields, and geothermal plants, 1999.

Overview

by Jonathan G. Price and Richard O. Meeuwig

Overall mineral and energy production in Nevada in 1999, valued at \$2.9 billion, continued to decline since reaching a peak in 1996. Gold production was at the second highest level in history, more than 8 million ounces, but lower gold prices than in recent years led to a sharp drop in value. Nevada led the nation in the production of gold, silver, barite, lithium, mercury, and the specialty clays, sepiolite and saponite. Other major commodities produced in Nevada in 1999 included construction aggregate (sand, gravel, and crushed stone), geothermal energy, lime, diatomite, gypsum, cement, silica (industrial sand), and magnesia.

Nevada ranked second in the United States in terms of the value of overall nonfuel (excluding oil, gas, coal, and geothermal) mineral production in 1999 (according to the U.S. Geological Survey, Mineral Commodity Summaries 2000, <http://minerals.usgs.gov/minerals/pubs/mcs/>). California, with its large demands for construction raw materials, was first, and Arizona, the nation's leading copper producer, was third.

Nevada's production of gold, 75% of the U.S. total, helped make the U.S. the second leading gold producer in the world. 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 1999. Second to gold in terms of Nevada's mineral value in 1999 was construction aggregate, \$130 million, up approximately 9% from 1998. Chiefly a by-product or co-product of gold production, silver was the third most valuable mineral commodity produced in Nevada in 1999, with a value of \$102 million.

Contributions that mining makes to the Nevada and U.S. economy 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; among the major mined products in Nevada, the U.S. relies upon imports for varying amounts of our needs for barite (67% of total U.S. consumption from imports, according to the U.S. Geological Survey), gypsum (29%), copper (27%), and silver (14%). Our exports of gold help offset the staggering U.S. trade deficit (difference between imports and exports), which reached a record annual total of \$265 billion in 1999.

Local economies also benefit 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 cement, all of which are abundant in Nevada. The mining industry directly employed approximately 12,400 people in 1999, and the industry is responsible for another 40,000 jobs related to providing the goods and services needed by the industry and its employees (Driesner and Coyner, 2000, *Major Mines of Nevada 1999*, NBMG Special Publication P-11).

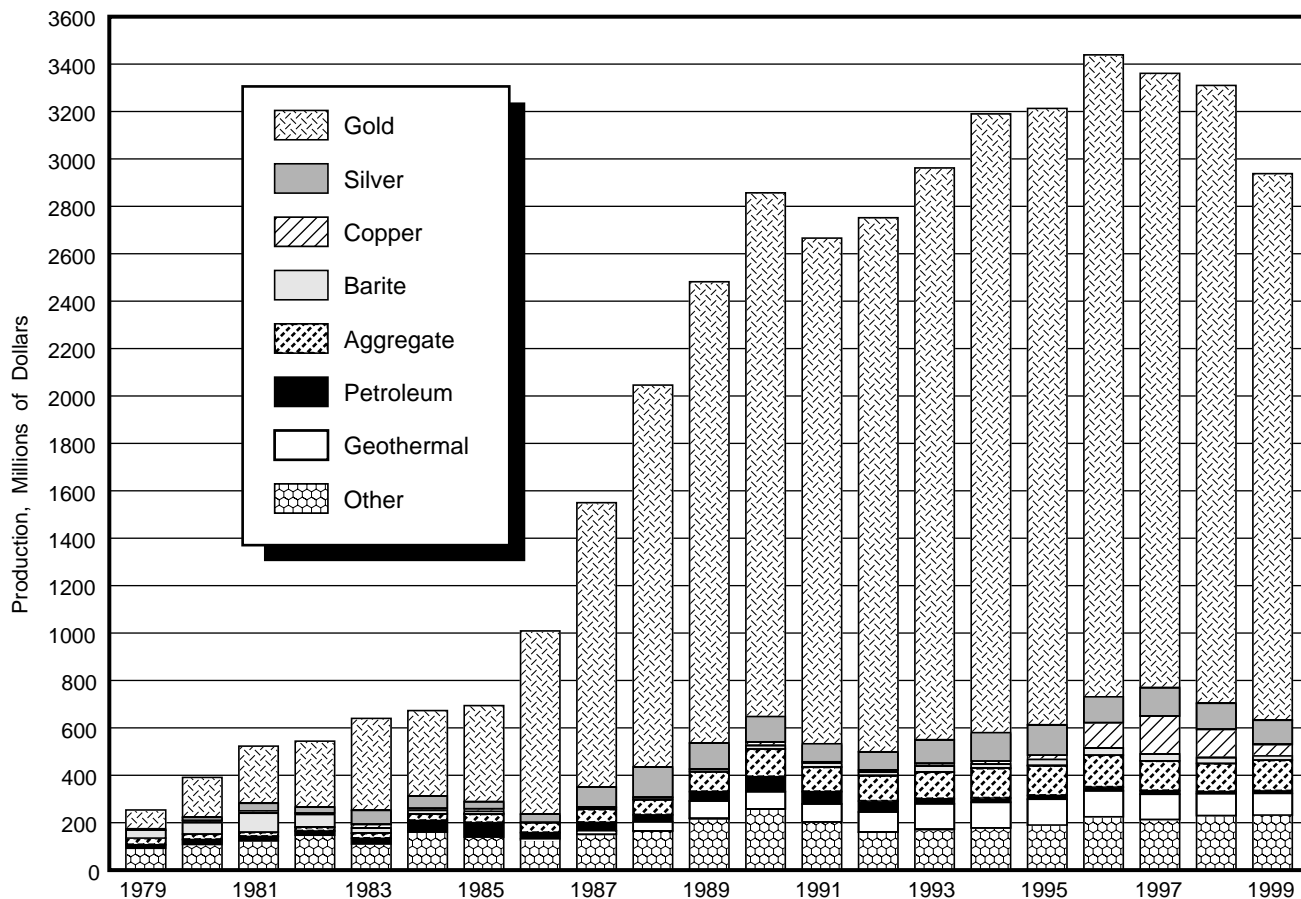
Nevada and the U.S. make significant contributions to the world's production of several mineral commodities. Thanks in part to Nevada's production, the U.S. is the world's leading producer, as well as consumer, of gypsum

MINERAL, GEOTHERMAL POWER, AND PETROLEUM PRODUCTION IN NEVADA¹

Minerals	1998		1999 preliminary		% change from 1998 to 1999	
	Quantity	Value (millions)	Quantity	Value (millions)	Quantity	Value
Gold (thousand troy ounces)	8,865	\$2,606.3	8,261	\$2,304.8	-6.8	-11.6
Silver (thousand troy ounces)	21,519	109.7	19,470	101.6	-9.5	-7.4
Copper (thousand pounds)	148,500	118.8	64,764	49.2	-56.4	-58.6
Aggregate (thousand short tons)	26,500	119.2	29,000	130.5	9.4	9.4
Gypsum (thousand short tons)	1,819	29.1	2,103	33.6	15.6	15.4
Barite (thousand short tons)	490	24.5	357	17.9	-27.1	-26.1
Geothermal energy (thousand megawatt-hours)	1,327	93.0	1,289	92.0	-2.9	-1.1
Petroleum (thousand 42-gallon barrels)	799	8.3	706	9.8	-11.6	18.1
Other minerals²	—	200.4	—	199.0	—	-0.7
Total	—	\$3,309.3	—	\$2,938.4	—	-11.2

¹ 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, colmanite 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.

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



Nevada mineral, geothermal power, and petroleum production, 1979–1999.

(with the U.S. accounting for 18% of world production in 1999) and industrial sand (25% of world production). In addition to gold, the U.S. is the second leading silver producer (12% of world production; Mexico first with 17%), copper (13% of world production; Chile first with 35%), and barite (10% of world production; China first with 40%). 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 1999 was approximately 2.6 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 another major mined material, coal. According to the U.S. Energy Information Agency, the U.S. produced and consumed approximately 1.0 billion metric tons of coal, approximately 22% of the world's coal production in 1999. Only China, with 27% of world production, consumes more coal. Although no coal is produced in Nevada, it is the primary source of energy for production 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 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 historic mining districts. In terms of production per unit area, Nevada is clearly the leader in the world in gold. This approach to comparing areas of the world is somewhat deceptive, because if only the most productive region of South Africa, the Transvaal, were compared, it would appear to be more favorable than any other part of the world.

The Fraser Institute of Vancouver, British Columbia, ranked Nevada first in terms of favorability for mineral exploration in its annual survey of mining companies (www.fraserinstitute.ca). In this survey, eighteen states, twelve Canadian provinces, and five countries (Argentina, Australia, Chile, Mexico, and Peru) were ranked. Nevada was rated first in terms of attractiveness based upon the respondents' perceptions of geologic potential and fourth (behind only New Brunswick, Manitoba, and Quebec) in terms of political effects on exploration, such as government policies on taxation, regulations, native-land claims, protected areas, infrastructure, labor, and socioeconomic factors.

This report highlights activities through 1999 in metals, industrial minerals, geothermal energy, and petroleum. Numerous graphs and charts are incorporated for rapid inspection of trends in production and price.

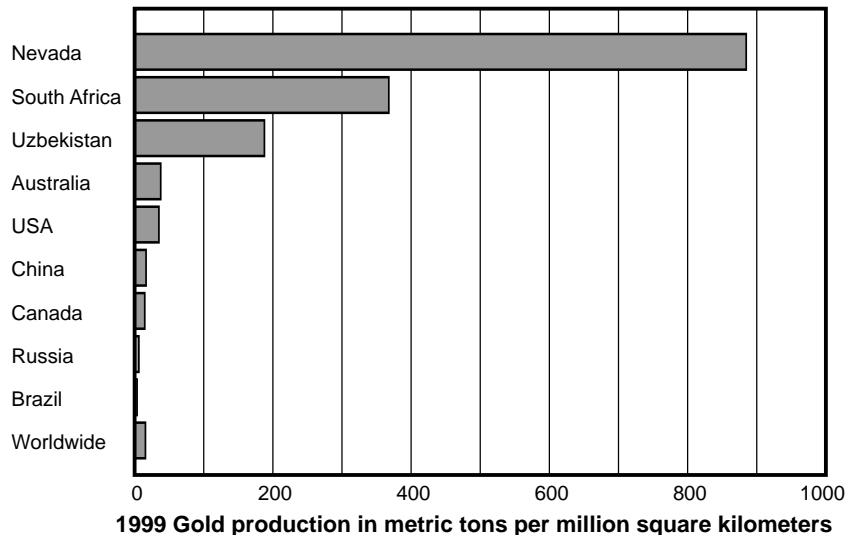
Through a survey conducted early in 2000, the Nevada Division of Minerals collected data for Nevada Bureau of Mines and Geology Special Publication P-11,

1999 WORLD PRODUCTION OF SELECTED MINERAL COMMODITIES (metric tons)*

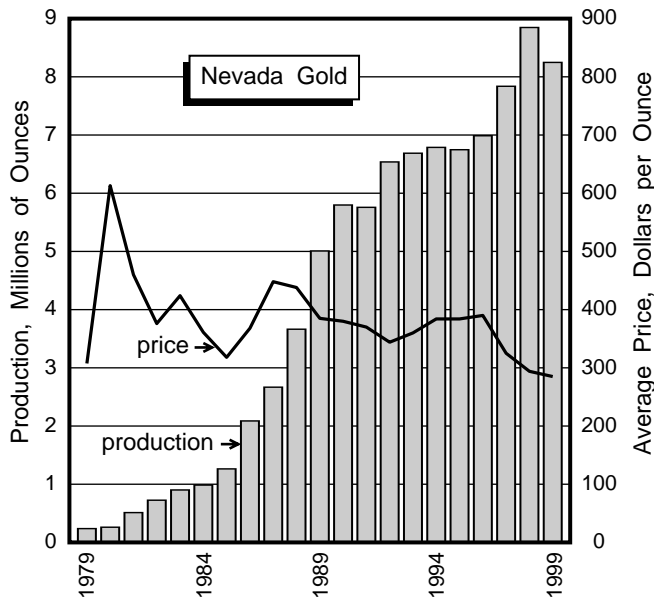
Country/State	Area (10 ⁶ km ²)	Gold	Silver	Copper	Gypsum	Barite	Industrial Sand
Australia	7.68	300	1,720	735,000	2,200,000	—	2,500,000
Austria	0.08	—	—	—	—	—	6,000,000
Belgium	0.03	—	—	—	—	—	2,400,000
Brazil	8.51	41	—	31,200	—	—	2,700,000
Canada	9.96	158	1,250	618,000	8,200,000	126,000	1,750,000
Chile	0.76	—	1,780	4,380,000	—	—	—
China	9.57	170	1,400	500,000	9,200,000	2,800,000	—
Egypt	1.00	—	—	—	2,000,000	—	—
France	0.57	—	—	—	4,500,000	60,000	6,500,000
Germany	0.36	—	—	—	—	120,000	6,200,000
India	3.28	—	—	32,400	2,500,000	600,000	1,500,000
Indonesia	1.90	—	292	740,000	—	—	—
Iran	1.65	—	—	134,000	9,000,000	170,000	—
Italy	0.30	—	—	—	2,000,000	—	3,000,000
Japan	0.38	—	—	—	5,300,000	—	3,100,000
Kazakhstan	2.72	—	575	374,000	—	13,300	—
Mexico	1.97	—	2,350	356,000	7,100,000	136,700	1,700,000
Morocco	0.45	—	—	5,000	—	330,000	—
Netherlands	0.04	—	—	—	—	—	5,000,000
Paraguay	0.41	—	—	—	—	—	10,000,000
Peru	1.28	—	2,217	540,000	—	—	—
Poland	0.31	—	1,100	460,000	1,000,000	—	—
Russia	17.07	126	375	530,000	—	—	—
South Africa	1.22	450	141	144,000	—	—	3,100,000
Spain	0.50	—	—	2,000	7,400,000	—	5,800,000
Sweden	0.45	—	—	70,000	—	—	600,000
Thailand	0.51	—	—	—	9,000,000	80,000	—
Turkey	2.59	—	—	50,000	—	130,000	—
United Kingdom	2.44	—	—	—	2,000,000	55,000	4,900,000
USA	9.37	341	1,950	1,600,000	18,800,000	434,000	28,300,000
Nevada	0.29	257	606	28,000	1,908,000	324,000	614,000
Alaska	1.53	16	—	—	—	—	—
Arizona	0.30	—	183	1,050,000	—	—	—
California	0.41	18	—	—	—	—	—
Idaho	0.22	—	416	—	—	—	—
Uzbekistan	0.45	85	—	60,000	—	—	—
Zambia	0.75	—	—	260,000	—	—	—
WORLD	149.90	2,534	16,187	12,613,000	107,400,000	5,550,000	111,000,000

*Production data for Nevada are from Driesner and Coyner (2000). Production data for all other areas are from the U.S. Geological Survey (USGS) mineral information publications (<http://minerals.usgs.gov/minerals>), with revisions for some data from USGS mineral commodity specialists; USGS statistics are adjusted to be consistent with Nevada data. Area data are from The World Almanac and Book of Facts, 1992, Pharos Books, New York, 960 p.

Major Mines of Nevada 1999. This handbook includes location maps, names and telephone numbers of operators, numbers of employees, and preliminary, non-proprietary 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/dox.htm), 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 was valued at nearly \$2.3 billion and came from 36 major mining operations. The Carlin Trend in northeastern Nevada accounted for 45% of the total production. Thirteen additional mining operations, not on the Carlin trend, each produced over 100,000 ounces of gold from mostly multimillion-ounce deposits. Underground operations accounted for 24% of total production.



Placer Dome's Cortez operation (Pipeline deposit in Crescent Valley, Lander County) was the largest producer in Nevada in 1999, with 1.3 million ounces of gold. Barrick's Betze-Post Mine in Eureka County produced 1.1 million ounces, and its Meikle Mine in Lander County, the largest underground gold mine in the U.S., produced 977,356 ounces. Newmont's overall production from several mines on the Carlin Trend totaled 1.5 million ounces. Two new mines came into production in 1999: Franco-Nevada Mining Corporation's Ken Snyder Mine in Elko County and Newmont's Trenton Canyon Mine in Humboldt County. The success of the Ken Snyder Mine, as well as other high-grade, underground operations in Nevada, has stimulated exploration for bonanza-type, high-grade veins. Several gold mines stopped production in 1999, in part as a result of declining prices: the Griffon Mine in White Pine County, the Olinghouse Mine in Washoe County, the Mineral Ridge Mine in Esmeralda County, and the Pinson Mine in Humboldt County, although exploration continued at the latter property. In addition, shortly after taking control of the Getchell property, Placer Dome suspended operations at the Turquoise Ridge Mine to focus on underground mine development and exploration in and around the deposit.

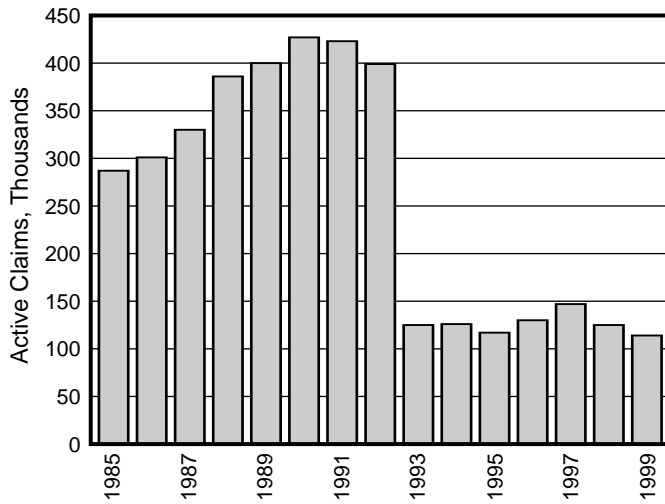
Significant additions to reserves in 1999 included Battle Mountain Gold Company's 2.2 million ounces of gold at its Phoenix Project in the Battle Mountain district in Lander County. Also in Lander County, Placer Dome announced an increase of 1.0 million ounces of gold near its Pipeline deposit.

Exploration, including grass-roots activity, work in known mining districts, and development of extensions to known deposits, added to the Nevada resource base in 1999. New mineable deposits continue to be discovered. Exploration activities are summarized in the section on **Metals**. The Nevada Bureau of Mines and Geology released Map 120, Gold and Silver Resources in Nevada, in 1999; this map shows the locations of 538 deposits discovered since 1930. The Geological Society of Nevada held a major symposium in May of 2000, at which reports were given on several new discoveries; the symposium proceedings were published later in the year (see www.gsnv.org). In 1999 companies explored in or near at least 107 Nevada mining districts. According to preliminary results of a survey of exploration activities by the Nevada Division of Minerals, the 1999 dollar amount of exploration activity decreased only slightly from 1998.

As measured by the numbers of active claims on public lands, grass-roots exploration activity has remained fairly steady in the last five years, after dropping precipitously in 1992, when a new claim-holding fee was imposed by the federal government.

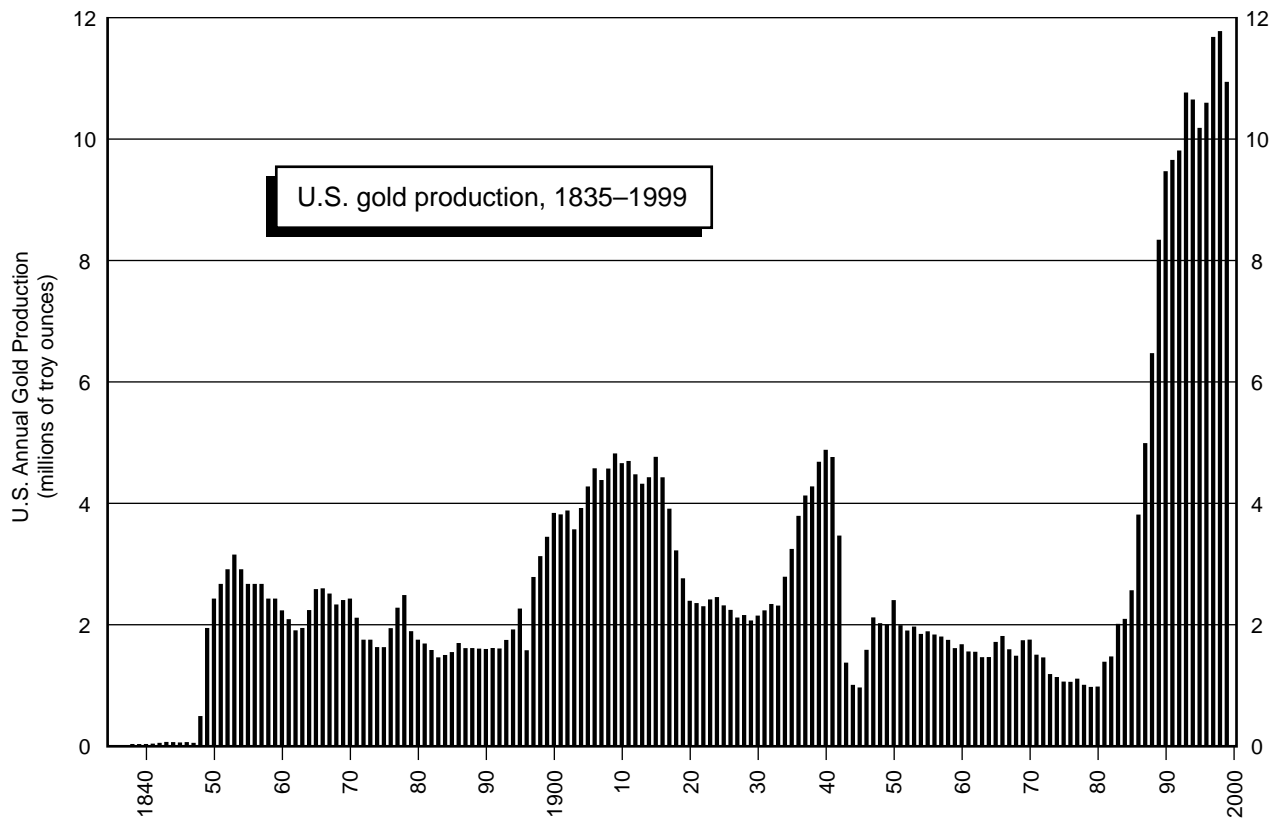
We are in the midst of the biggest gold boom in U.S. history, as the graph of historical U.S. gold production illustrates. The recent surge in production in the U.S. is largely the result of discoveries of sediment-hosted (Carlin-type) gold deposits and other deposits in which fine-grained gold is widely disseminated in the ore. These deposits are primarily in Nevada. The U.S. production so far in the current boom (1980 to 1999) has been 139 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 Comstock (Nevada) era from 1860 to 1875 (with 34 million ounces), and 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 1990 to 1999 alone was 105 million ounces.

At the end of 1999 the published gold resources in Nevada, including mineable reserves and perhaps some subeconomic resources, totaled approximately 143 million ounces of gold, enough to sustain gold production at substantial levels for 15 to 25 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.



Number of active claims in Nevada as of October 1, 1985–1999.

Data from the Nevada State Office of the Bureau of Land Management.



U.S. gold production, 1835–1999

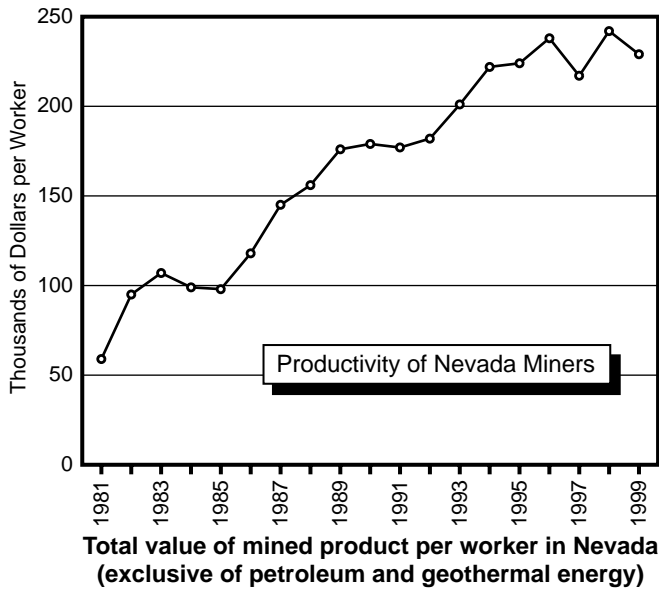
Data from The U.S. Gold Industry 1998 (NBMG Special Publication 25) by J.L. Dobra and from the U.S. Geological Survey.

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 \$229,000 in mined products in 1999. Depressed gold prices lowered the overall productivity from the peak of \$242,000 in 1998.

Challenges that face the precious metal mines in Nevada include economic, safety, and environmental concerns, including depressed metal prices; hazards of underground mining; regulatory changes; treating refractory (iron sulfide and/or carbon-bearing) ores; dewatering

mines; 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.

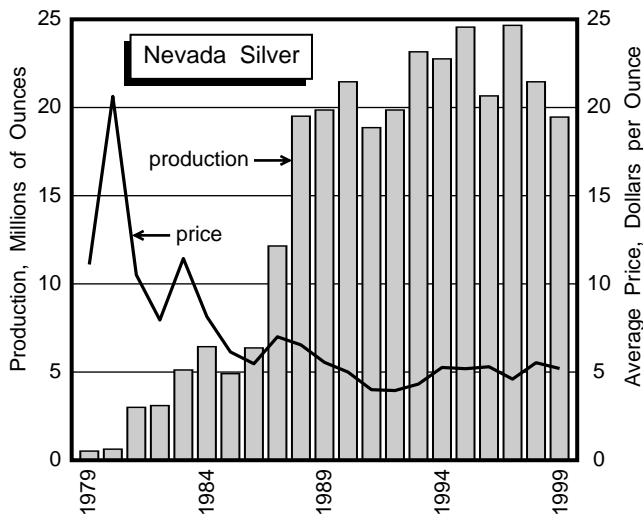
Much of Nevada’s silver production in 1999, which totaled nearly 19.5 million ounces, was a co-product or by-product of gold mining. With a ratio of value (average price of gold to average price of silver) of 53:1 in 1999,



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

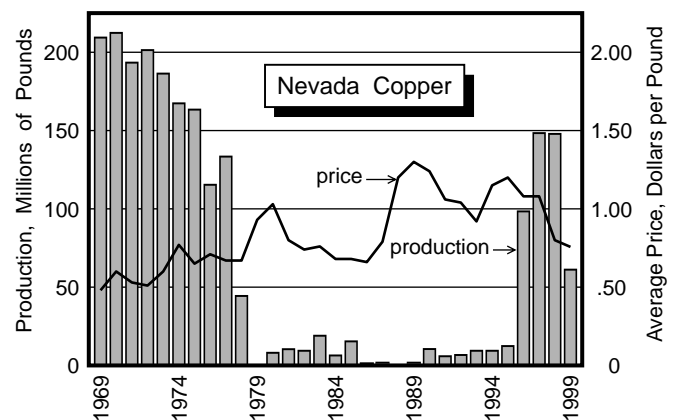
only those deposits with more than 53 times as much silver as gold can be considered primary silver deposits. Three such deposits operated in Nevada in 1999 — the McCoy/Cove operation in Lander County (with a silver to gold production ratio of 68:1 and total silver production of 8 million ounces), the Coeur Rochester Mine in Pershing County (with a silver to gold production ratio of 88:1 and total silver production of 6 million ounces), and the Candelaria Mine in Mineral County (with a silver to gold production ratio of 409:1 and total silver production of nearly 97 thousand ounces). The two largest silver operations (McCoy/Cove and Coeur Rochester) produced 75% of Nevada’s silver in 1999.

At the end of the year the published silver resources in Nevada, including mineable reserves and perhaps some subeconomic resources, totaled approximately 235 million ounces. Nevada’s production in 1999 accounted for 31% of the U.S. total and 4% of the world total. Depending on price, Nevada is likely to retain the present-day distinction of its nickname, the “Silver State.”



Copper production dropped precipitously when, in June 1999, after only four years of production, BHP Copper closed its Robinson Mine near Ely in White Pine County. Depressed copper prices, caused by oversupply, in part resulting from increased production from Chile, contributed to the company’s decision. Significant resources remain at the property. Equitorial Mining North America Inc. has opened a heap-leach, solvent-extraction-electrowinning copper operation near the Hall molybdenum mine in Nye County, and production should be reported in 2000.

In 1999, high prices for platinum-group elements prompted numerous scams and some legitimate exploration in Nevada. Nevada has minor historic production of platinum and palladium, and exploration was reported in the Bunkerville district in Clark County.

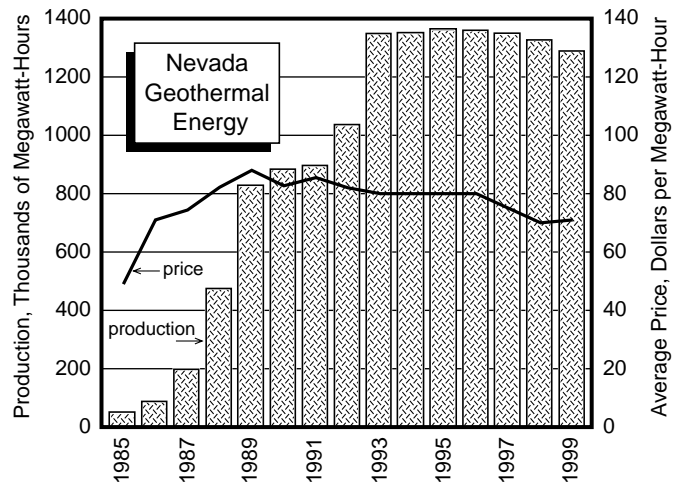
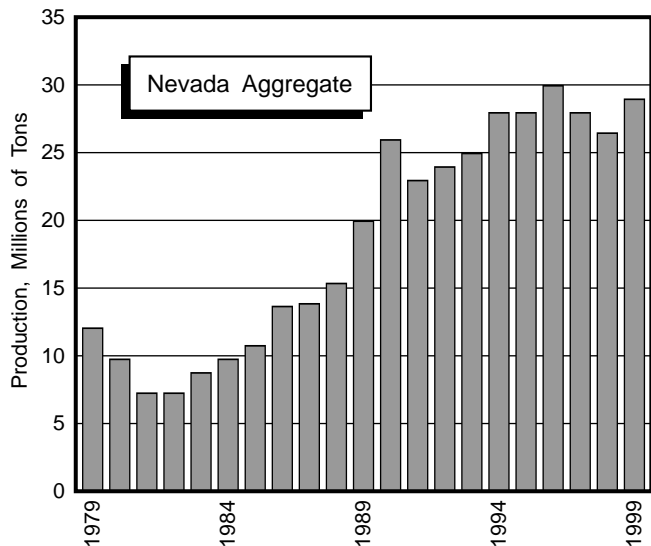


The section on **Industrial Minerals** covers developments during 1999 and gives details on important commodities produced in Nevada, such as aggregate, barite, brucite, cement, clays, diatomite, dimension stone, dolomite, gypsum, lime, limestone, lithium, magnesia, perlite, salt, and silica.

Aggregate production remains high as a result of Nevada’s expanding population with its demands for construction materials for homes, schools, and streets and as a result of building resort hotels, other businesses, airports, and highways. Demand for construction raw materials, including gypsum, which is used to make wallboard, and aggregate, is likely to remain strong owing to Nevada’s booming population. Nevada’s population in 1999 was about 1.9 million, up from 1,202,000 in 1990. The Nevada State Demographer has projected populations of 2.0 million in 2000 and 2.8 million in 2010.

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.

Nevada’s barite production, 86% of the U.S. total, made the U.S. the second leading producer of barite in



the world. However, weak demand for barite, used primarily in exploration and development drilling for oil and gas, caused a sharp decline in Nevada.

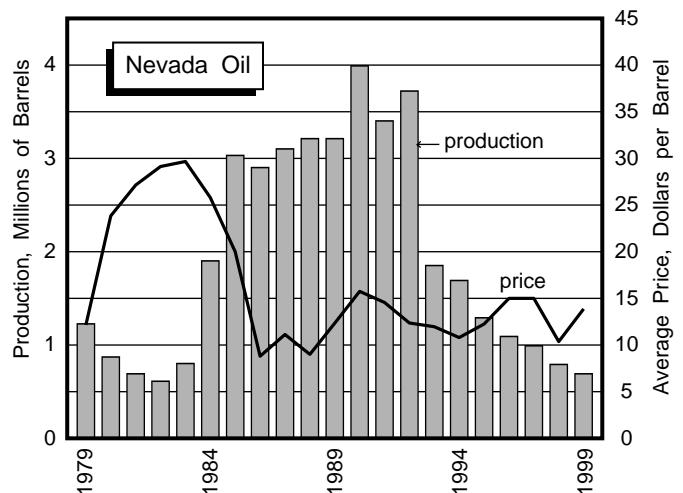
Nevada's annual lime production increased by approximately 10% from 1998. Continental Lime's Pilot Peak operation near Wendover in Elko County produces lime primarily for pH control in gold production, and Chemical Lime's Apex operation near Las Vegas in Clark County produces lime for metallurgical processing, paper manufacturing, and environmental applications.

Developments in the geothermal industry are covered in the section on **Geothermal Energy**. Electric power production in 1999 was about the same as in the previous year. Plants operating at ten sites sold \$92 million in electricity. Additionally, geothermal energy is used at numerous places in Nevada for space heating, warm water, recreation, and dehydrating vegetables, particularly onions and garlic. Relatively low prices for coal and, until recently, natural gas, have discouraged development of known geothermal resources and exploration for new resources. Senator Harry Reid and the U.S. Department of Energy are encouraging the implementation of a new program to stimulate geothermal development in Nevada and elsewhere in the West. Nevada Bureau of Mines and Geology Map 126, Nevada Geothermal Resources, shows the locations of geothermal plants, direct-use locations, and hot and warm springs and wells; it demonstrates the fact that there is considerable potential for geothermal development. The University of Nevada, Reno has assembled considerable engineering and scientific expertise into the Great Basin Center for Geothermal Energy.

Developments in Nevada's frontier 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 \$10 million in 1999) is a minor part of U.S. production. Oil production declined for the seventh consecutive year, and no new discoveries or producing wells were reported in 1999.

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 (20 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 granitic intrusions and high-grade metamorphic 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.nbmj.unr.edu) and the Nevada Division of Minerals (minerals.state.nv.us). Useful national and international data on nonfuel minerals can be obtained from the U.S. Geological Survey (minerals.usgs.gov/minerals), and the U.S. Energy Information Administration (www.eia.doe.gov) provides data on oil and gas, geothermal, and other energy sources.

Metals

by Joseph V. Tingley and Daphne D. LaPointe

Nevada produced 8.26 million oz (troy ounces) of gold in 1999 along with 19.5 million oz of silver. Nevada exceeded the 8 million oz mark for the second year in a row, but fell below the production record set in 1998 by 600,000 oz. Silver production was also lower than in 1998. In spite of the lower production, Nevada still maintained its place as the leading gold and silver producing state in the United States with 34 mines reporting gold production and 26 mines producing silver during 1999.

Newmont Mining Corp.'s Nevada operations, which include Twin Creeks and the Lone Tree Complex as well as all of Newmont's Carlin Trend mines and half of the production from the Rosebud Mine (50% owned by Hecla Mining Co.), reported production of 2,442,612 oz of gold in 1999, down from the 1998 figure of 2,769,600 oz. Newmont maintained its place as the largest gold producing company in Nevada while Barrick Gold Corp. remained in second place in Nevada output, producing 2,107,450 oz of gold in 1999. Barrick Gold's Betze-Post Mine, however, lost its place as the largest Nevada gold mine. It was replaced in the number one spot by Placer Dome's Cortez operation (Pipeline Mine), which produced 1,328,525 oz in 1999. Betze-Post production in 1999 was 1,130,094 oz, but Barrick's Meikle underground mine reported 1999 production of 977,356 oz gold, up from the 1998 figure of 847,313 oz. Other major gold producers in 1999 included Smoky Valley Common Operation's Round Mountain Mine, 541,808 oz; Independence Mining Co.'s Jerritt Canyon Mine, 363,000 oz; Franco-Nevada Mining Corp.'s Ken Snyder Mine, 182,345 oz; Florida Canyon Mining Co.'s Florida Canyon Mine, 139,590 oz; Echo Bay Minerals, 124,500 oz from its McCoy/Cove operation; and Homestake Mining Co.'s Ruby Hill Mine, 123,841 oz.

Echo Bay's McCoy/Cove Mine was Nevada's largest silver producer in 1999, producing 8,430,000 oz. The Rochester Mine, operated by Coeur D'Alene Mines Corp., produced 6,195,169 oz silver, and Franco-Nevada Mining Corp.'s Ken Snyder Mine produced 1,860,701 oz. Other large silver-producing operations included the Denton-Rawhide Mine, 665,000 oz; the Round Mountain Mine, 464,415 oz; Barrick Gold Corp.'s Meikle Mine, 263,225 oz; and the Rosebud Mine, operated by Hecla Mining Co., 247,900 oz.

Concentrates containing 61,754,667 pounds of copper, along with 26,250 oz gold and 153,104 oz silver, were shipped by BHP Copper North America from their Robinson Mine in White Pine County. This represents about one-half of a year's production for this operation, as it ceased production at the end of June 1999.

Two new gold mines came into production in Nevada in 1999. Franco-Nevada Mining Corp.'s Ken Snyder Mine in Elko County poured its first gold in December 1998, but it did not officially begin production until February 1999 and can be counted as a 1999 startup. Newmont Mining Corp.'s Trenton Canyon Mine, one of the Lone Tree Complex mines, began production in May 1999. The continuing low gold price has taken its toll on Nevada's gold mining industry. Most of the mining operations have cut both staff and production, as evidenced by Nevada's lowered annual gold output. Alta Gold Co. entered bankruptcy in 1999, and both of its operations, the Griffon Mine in White Pine County and the Olinghouse Mine in Washoe County, closed. These mines both went into production in 1998 and closed within less than a year.

EXPLORATION

Metals exploration in Nevada in 1999 continued to suffer from the effects of depressed metal prices. Although activity was reported from 107 mining districts throughout the state compared to only 69 districts in 1998, the level of activity was still low. Continuing patterns followed in the past few years, exploration activity was concentrated along the major Battle Mountain-Eureka, Carlin, Getchell, and Midas trends. Several new projects were reported in the Humboldt Range, Pershing County and, for the first time in many years, exploration was reported at historical platinum properties in the Bunkerville district, Clark County.

Figure 1 shows the location of Nevada mining districts in which exploration activity was reported during 1999.

CHURCHILL COUNTY

Bell Mountain district

Glamis Exploration reported work on its Nebell claims in the Bell Mountain district (BLM mining claim records, 11/03/1999).

Cold Springs area

Claims staked in the Cold Springs area on the west slope of the Desatoya Mountains will be explored by a mining syndicate that includes Ranger Minerals Ltd., Franc-Or, and Cordilleran Exploration. The syndicate has staked five properties in Nevada including the Cold claims at Cold Springs. All were staked on the basis of geochemical surveys and together cover a variety of geological settings and mineralizing environments. Geologic mapping and sampling are under way, with drilling expected to follow (Northern Miner, 12/20/1999).

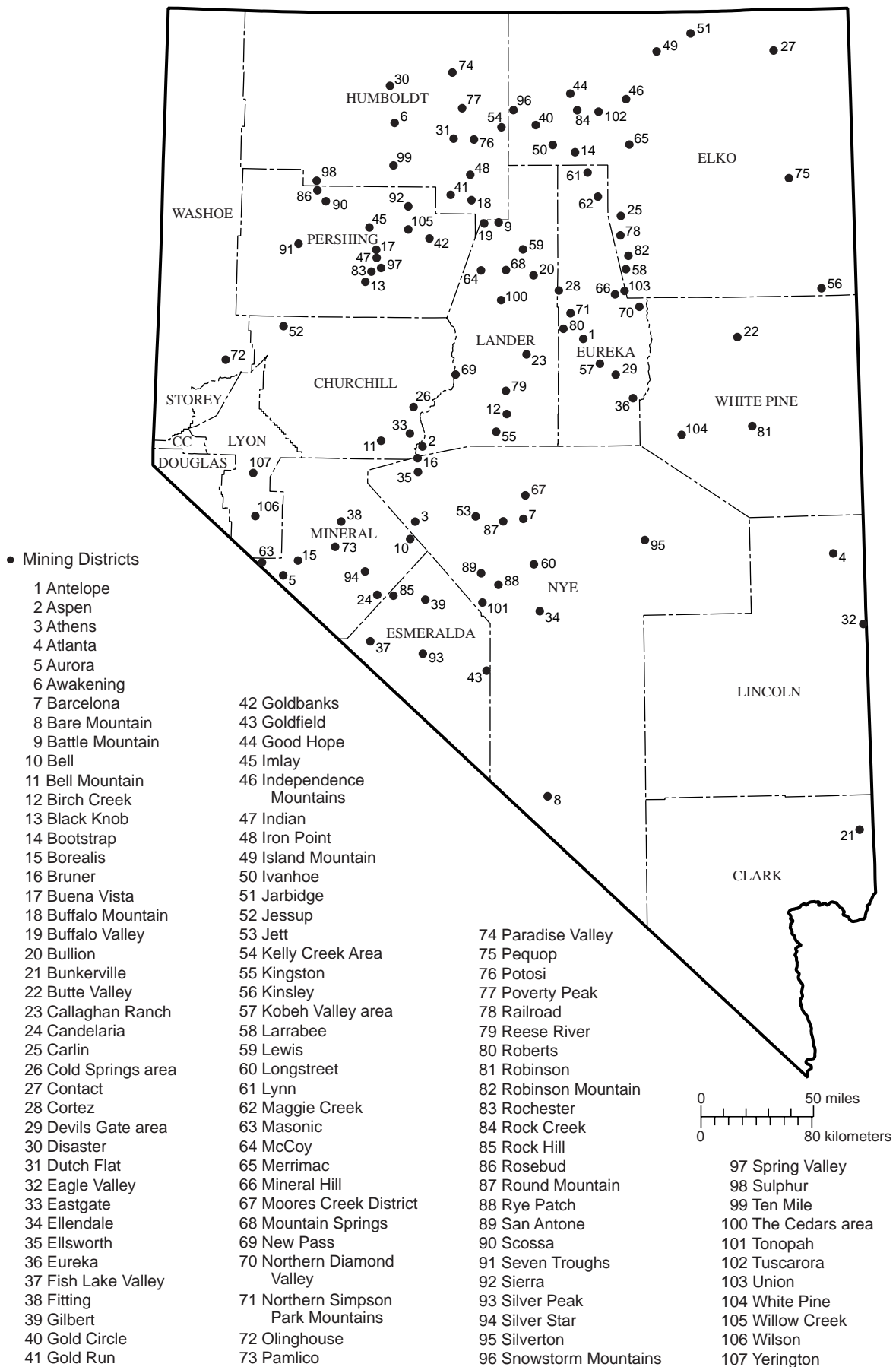


Figure 1. Nevada mining districts with reported 1999 metals exploration activity.

Eastgate district

Echo Bay Mines acquired a 51% interest in Fairmile Gold's Double Eagle Property in the Eastgate district. An exploration program on the 600-acre property will focus on the potential for extension of the identified vein system under adjacent volcanic cover (Northern Miner, 9/6/1999).

Jessup district

Americomm Resources dropped its leases on 94 claims on the Jessup property, citing depressed conditions in the gold mining industry and its intent to concentrate its resources on oil and gas exploration (The Daily Prospector, 8/17/1999).

New Pass district

White Knight Gold (U.S.) Inc. executed a Letter of Intent on its New Pass property with Echo Bay Exploration Inc. The New Pass property contains substantial gold mineralization in an extensive jasperoid occurrence hosted by Augusta Mountain limestone. Westmont, a former operator, calculated a gold resource in 1989 of 3.4 million tons with an average grade of 0.042 opt (troy ounces per ton) gold. Based on additional drilling, White Knight estimates a minimum total geologic resource of 14.3 million tons with an average grade of 0.023 opt gold (White Knight Resources Ltd., news release, 8/30/2000)

CLARK COUNTY

Bunkerville district

Conquistador Mines is carrying out a due-diligence review of the old Key West Mine. Exploration by Falconbridge and Superior Oil in the 1980s resulted the calculation of underground and surface reserves and resources of 226,600 tons at an average grade of 1.5% copper, 1.09% nickel, 0.037% cobalt, 0.06 opt platinum, 0.68 opt palladium, 0.01 opt gold, and 0.34 opt silver. Conquistador plans to carry out geologic mapping and geophysics followed by drilling, targeting areas not previously explored to establish the potential for a large tonnage system of nickel and platinum group metals (Northern Miner, 6/14/1999). In the same district, Trend Mining Co. staked mining claims covering the projected extension of platinum and palladium mineralization from the Key West property. Mineralization adjacent to and within the Trend Mining property occurs within a 2,000-foot-wide by 2-mile-long structural zone containing numerous mafic dikes. Geologic mapping has identified the extension of the host mafic dikes with similar mineralization on Trend Mining Co.'s claim block. Surface rock chip samples were collected and assay results were pending (Denver Mining Record, 5/26/1999).

ELKO COUNTY

Bootstrap district

Glamis Gold acquired the Dee Mine in March 1999 and produced 31,154 oz of gold for the company's account, the majority of which was produced from open pit ore. The new North Underground Project, which commenced during the second quarter of 1999 and entered the production phase in late 1999, was expected to produce the majority of gold for the duration of the Dee mine life (Glamis Gold, company press release, 2/28/2000). Glamis increased mineable underground reserves at the Dee project, where underground drilling into Zone One defined three separate blocks of mineralization, nearly tripling the tonnage delineated by surface drilling. The new drilling blocked out 73,500 tons of oxide gold mineralization averaging 0.18 opt gold and 1.5 opt silver, representing a reserve increase of 173%; mineralization remains open to the south. Zone One was the first of as many as 12 zones to be drilled from underground (Northern Miner, 8/2/1999; SEG Newsletter, 10/1/99; Yahoo Mining/Metals News, 7/9/1999). Later in the year, Glamis reported that underground mining and development at Dee had proceeded slower than projected and terminated the agreement with the existing underground contractor effective October 31, 1999. The company was in process of retaining a new contractor to continue the Dee North Underground Project (Yahoo Mining/Metals News, 11/8/1999).

At Barrick Gold Corp.'s adjacent Rossi property, surface exploration and development of the decline to access the '49er Zone in the Storm Resource continued on schedule. The decline (portaled in the Dee Pit) advanced to more than 3,000 feet, reaching the approximate Rossi property boundary (Yahoo Mining/Metals News, 10/21/1999).

Carlin district

The Nevada Pacific and Kennecott (Rio Tinto) Alliance acquired a mineral lease on the 3-square-mile Tonka property. This property will be added to the Alliance's South Carlin Project, which was optioned from Kennecott Exploration in 1997. The project area now comprises 20 square miles of ground and also includes the Woodruff Creek, South Carlin, and Tomera Ranch properties located in the southern portion of the Carlin Trend. Surface mapping on South Carlin Project has identified alteration and small jasperoid breccia bodies exposed along north-northeast and northwest structures. Soil and outcrop sampling in the altered areas has returned anomalous gold, arsenic, antimony, barium and mercury values. The sampling and trenching program was intended to delineate targets in preparation for an initial phase of drilling (Northern Miner, 6/14/1999; Yahoo Mining/Metals News, 4/15/1999).

Contact district

Golden Phoenix Minerals Inc. identified numerous areas of copper mineralization not previously explored on its Contact copper-silver project. Fieldwork, including mapping and sampling of areas peripheral to the Banner deposit, showed the Helen B. Smith/Mammoth Mine area to be most promising for very high grades of copper-silver-gold mineralization. These old workings previously intercepted copper grades as high as 7% and silver ranging from 10 to 20 opt. Other promising areas include the Rattler, where oxidized copper mineralization is found over a broad area in granodiorite and skarn, and the obvious strike extensions of the Banner zone to the east and west. The Contact property hosts a minimum geologic resource calculated to contain about 39.5 million tons averaging 0.952% copper at a 0.2% cutoff grade for 752 million pounds of copper. A drilling program scheduled to begin early in 2000 is designed to expand the current Banner zone copper resource with holes planned to the west, southwest, and southeast in areas previously not drilled (Yahoo Mining/Metals News, 3/22/99; Golden Phoenix Minerals, Inc, company press releases, 6/30/99, 9/14/99, 12/1/99, 12/21/99).

Gold Circle district

Franco-Nevada Mining's Ken Snyder Mine entered commercial production in February 1999 on budget and four months ahead of schedule. During calendar 1999, \$3.3 million was spent on surface exploration efforts at the property, including a total of 144,887 feet of drilling in 141 core and reverse circulation holes. Exploration in 1999 was successful in adding additional inferred resource ounces but not enough to fully compensate for both mined ounces and for the reduction in the measured and indicated resources. At year-end 1999, proven and probable reserves at the Ken Snyder Mine were 3.0 million tons grading 0.816 opt gold and 9.835 opt silver. Franco-Nevada's Midas surface exploration budget was set at \$1.8 million for calendar 2000 (Franco-Nevada company press release, 2/1/2000; Northern Miner, 6/14/1999).

In the same district, Romarco Minerals Inc. reported activity on three separate properties. Romarco commenced drilling at the company's South Midas property to test the Maui fault and the Wailea vein structure. Surface grab samples of quartz-carbonate vein and stockwork mineralization from this structure assayed trace to 0.76 opt gold (Denver Mining Record, 05/12/1999). Romarco also planned exploration drilling on its Mag Project, but decided to relinquish its interest in the Jake Creek Project, a joint venture with Echo Bay Exploration, Inc. (Elko District BLM files, 1999; Yahoo Mining/Metals News; 12/15/99; Elko Daily Free Press, 12/24/99).

Good Hope district

The only activity reported in the district was location of the TS claims by Pittston Nevada Gold Co. Ltd. (BLM mining claim records, 1999).

Independence Mountains

In the Independence Mountains district, AngloGold finalized purchase of Minorco's interest in the Jerritt Canyon Mine on March 31, 1999 (Elko Daily Free Press, 4/10/1999). Elsewhere in the district, Kennecott Exploration conducted drilling and road building on its Triple Creek Project near Independence Mountain, and Western Exploration recorded the WEX claim group (U.S. Forest Service news release, 6/9/1999; BLM mining claim records, 12/6/99).

Island Mountain district

Golden Hope Mines Ltd. drilled three holes on its Gold Creek property designed to test the St. Elmo Mine vein beneath the mine workings. A 1998 Induced Polarization (IP) survey showed significant strike extensions and parallel zones to the St. Elmo vein and numerous high-grade surface samples were coincident with this IP anomaly. Assays from the first hole revealed a 6.25-foot interval of 0.50 opt gold in quartz veins with some silver that is part of a larger mineralized zone. Golden Hope says it is encouraged with the results but more data are needed to understand and evaluate the vein system; the company is now planning a reverse circulation drill program at St. Elmo (The Daily Prospector, 8/13/99; Denver Mining Record, 8/25/99; The Daily Mining News, 9/22/99). Golden Hope also completed two diamond drill holes near Rosebud Peak, about one mile north-northwest of St. Elmo and drilled one hole to test a silver/lead/zinc showing at the Diamond Jim Mine, about 1.3 miles northwest of St. Elmo. Gold and silver values were encountered in one of the first two holes but no significant mineralization was intersected, and the hole at the Diamond Jim Mine encountered only low silver values across narrow widths (SEG Newsletter, 10/1/99).

Ivanhoe district

White Knight Resources Ltd. and Chapleau Resources Ltd. announced the results of drilling on the Squaw Creek property. During 1999, a total of 20,320 feet of drilling were completed in 14 widely spaced holes, with 13 of the 14 holes intersecting wide zones of anomalous gold mineralization in the region of the former Sheep Corral mercury mine. The gold mineralization occurs both in silicified zones in the volcanic rocks and as disseminations and fracture coatings in the underlying Paleozoic rocks. Additional drilling is planned for the year 2000. White Knight and Chapleau also entered into an agreement with Pacific Spar Corp. on the Sheep Corral Property, which adjoins the south border of the Squaw

Creek Property. During previous exploration on this property, Newmont Exploration detected zones of low-grade gold mineralization in upper plate sedimentary rocks (Denver Mining Record, 4/28/1999; The Daily Mining News, 11/10/99; company press release, 11/25/99).

In the same district, Great Basin Gold Ltd. reported that the balance of core holes drilled during 1999 at its Ivanhoe property show continuing high-grade gold-silver vein intercepts. Using a cut-off grade of 0.25 opt gold equivalent, 32 of the 53 core holes drilled during 1999 cut 72 vein intersections that averaged 5.5 feet grading 1.05 opt gold equivalent and the Clementine and Gwenivere vein systems have been extended over strike lengths of 1,500 feet and 1,100 feet respectively. Mineralization has been indicated to extend to depths of 500 feet, and both vein systems remain open for expansion along strike and depth. The Clementine and Gwenivere bonanza systems occur as multiple, close-spaced veins that include multi-stage, silica-healed vein breccias, argillically altered breccias, and multi-stage colloform banded veins. The veins and vein breccias cut a sequence of massive Valmy Formation (Ordovician) quartzite and argillite that is unconformably overlain by Tertiary volcanic tuffs and flows. Gold mineralization, delineated within the near surface Hollister disseminated deposit and the underlying feeder vein systems, extends for over 1000 vertical feet. Great Basin now plans to initiate a systematic program of angle drilling along the length of the entire Hollister deposit to explore for parallel vein systems (Yahoo Mining/Metals News, 11/29/1999). At a nearby property in the Ivanhoe district, Teck Resources planned exploration drilling on its Silver Cloud Project (BLM files, Elko District, 1999).

Jarbidge district

San Antonio Resources recorded the OR claims and continued work on the Pick and Shovel property.

Kinsley district

Mining was completed at the Kinsley Mine in March 1998, but minimal gold production is expected to continue in declining amounts through the end of 1999 (Elko Daily Free Press, 8/21/99).

Larrabee district

Phelps Dodge Exploration recorded the B.M. claims, sections 4, 9, T27N, R53E (BLM mining claim records, 6/21/99).

Merrimac district

White Knight Resources, Ltd and its joint venture partner, Kennecott Exploration Co., a subsidiary of Rio Tinto, completed 6,005 feet of drilling in four holes on White Knight's 263-claim Lone Mountain property. A geophysical survey performed earlier in the year identified large areas

of possible lower plate rocks buried beneath a thin veneer of upper plate rocks. The drilling is reported to have encountered gold mineralization at shallow depths in altered units within the upper plate rocks and in the Roberts Mountains and Hansen Creek Formations in the lower plate (Denver Mining Record, 4/14/1999; Northern Miner, 6/14/1999; The Daily Mining News, 11/27/1999).

Pequop district

Pittston Nevada Gold Co. Ltd. announced plans to the Bureau of Land Management to continue exploration on its Pequop Mountains Project in the Pequop district. Work, consisting of construction of drill sites, drilling, and reclamation, was scheduled to begin in the spring of 2000 and to be conducted in phases over approximately 3-year period if results warrant. Pittston has been exploring the area since 1995 (BLM news release, 11/2/1999; Elko Daily Free Press, 11/27/1999).

Railroad district

Exploration Mirador Inc. announced the termination of its joint venture with Kinross Gold Corp. on the Railroad Project in the Railroad district. Exploration Mirador will now manage its own exploration program on the project. The 1999 drilling reportedly demonstrated the continuity of gold mineralization and alteration at the Elliot High Ranch area and low-grade mineralization in the BMF area, but the indicated depth to possible mineralization at BMF is more than 1,000 feet (Elko Daily Free Press, 11/27/1999; Northern Miner, 6/14/99; The Daily Prospector, 12/3/99). Also in the Railroad district, Nevada Pacific Gold Ltd. announced completion of an initial three-hole, 6,480 foot drilling program on its South Carlin Project. Significant zones of alteration, hydrogen sulfide-bearing hot waters, and hydrocarbons were encountered in the drilling. Nevada Pacific's geological team believes that the initial drilling has encountered the alteration envelope related to a gold deposit and is currently designing a second phase drill program to continue exploration on the property (Yahoo Mining/Metals News, 5/26/1999, 8/12/1999, 9/23/99). In the same district, Barrick Gold Corp. planned exploration drilling on the Black Kettle Project (Elko district BLM files, 1999).

Robinson Mountain district

Barrick planned drilling on its Pony Creek Project in T29N, R53E (Elko district BLM files, 1999).

Rock Creek district

Pittston Nevada Gold located the MEX Claims, sections 29,31,32, T40N, R48E, proposing to drill nine holes and construct access roads on the property (BLM mining claim records, 5/25/99).

Snowstorm Mountains district

Three companies recorded groups of claims within the Snowstorm Mountains district. Discovery Dynamics Inc. planned sampling holes, access road construction, and drilling on its Cocoa, Kimber, Pulvo, Lucho, Tuki, and Callie claims. Bonanza Exploration Inc. recorded the KC claims in T39N, R44E, and Newmont Gold recorded the Ski Claims, in T40N, R44E (BLM mining claim records, 1999).

Tuscarora district

Franco-Nevada recorded the NT Claims, T40N, R51E (BLM mining claim records, 1999).

ESMERALDA COUNTY

Fish Lake Valley district

Romarco Minerals Inc. explored two properties within the Fish Lake Valley district during 1999. At their Mustang Canyon Project located in T1N, R33E and R34E, geological mapping and geochemical sampling were conducted to delineate drill targets for the next year. The permitting process for an exploration drilling program was expected to be completed prior to the year 2000 field season (The Daily Prospector, 12/15/1999; Elko Daily Free Press, 12/24/1999). Drilling at Romarco's Red Rock Project continued to intersect high-grade mineralization. Thirteen angle holes drilled into the discovery area extended the known mineralization to 2,400 feet. Seven of the holes contained intercepts of greater than 0.10 opt gold over 5.0 feet, while the highest grade assay was 0.503 opt gold over 5.0 feet. The company has tested mineralization over a vertical extent of 300 feet. (The Daily Mining News, 7/5/1999; Northern Miner, 7/19/1999; SEG Newsletter, 10/1/99).

Gilbert district

Two companies were reported to be active in the Gilbert district in 1999. Cordilleran Exploration filed a notice of intent to work on property in the area of the old Boss Mine (Tonopah BLM district mining claim records, 1/6/1999) and, farther to the north, Phelps Dodge Exploration recorded the MAC claims (BLM mining claim records, 12/10/1999).

Goldfield district

Romarco Minerals Inc. announced results of the first phase drilling program of 77 reverse circulation drill holes totaling 33,865 feet at the Goldfield Project. Romarco currently owns or controls approximately 15,000 acres of patented and unpatented mining claims within the historical Goldfield district. Romarco's focus in this district over the past two years has been to establish a significant land position and to identify drilling targets based upon surface mapping, sampling and review of

historical data. The objective of the 1999 drilling program was to recognize and further characterize gold mineralization along major structural trends. Using a variety of data sources, including detail surface mapping, surface geochemistry, previous drilling, and geophysics, ten target areas within five major structural zones were identified including areas with historical production and areas with high potential. Historical production areas drilled include the Main district, McMahon Ridge and the Sandstorm-Kendall Mine. Within these areas, twenty drill holes had intercepts of greater than 0.100 opt gold, with 10 intercepts (in seven different holes) running better than 0.250 opt gold. Other high-potential, non-producing areas drilled were the C.O.D. Ridge and East Goldfield areas, where, several +50-foot-thick zones of anomalous gold mineralization (0.007 to 0.05 opt gold) were encountered within major fault zones. Romarco has currently explored only 10% to 15% of its present property position and plans to continue exploration efforts in the district with additional drilling as well as mapping, sampling and geophysical (CSAMT, gradient array and ground magnetic) surveys (Yahoo Mining/Metals News, 9/28/1999).

Rock Hill district

Cordilleran Exploration filed notice with the BLM that it intended to conduct work on its Redlich property. This is one of a group of five properties currently being evaluated by a mining syndicate that includes Cordilleran Exploration, Franc-Or Resources Corp., and Ranger Minerals (Northern Miner, 12/20/1999; BLM mining claim information, 10/22/99).

Silver Peak district

Mining operations were halted at Vista Gold Corp's Mineral Ridge Mine in December after production of 27,406 ounces Au in 1999. Vista's subsidiary, Mineral Ridge Resources Inc., has sought protection under Chapter 11 of the U.S. Bankruptcy Act and expects the Mineral Ridge Mine to remain closed (Denver Mining Record, 1/1/2000; Yahoo Mining/Metals News, 12/9/1999, 1/18/2000).

Tonopah district

In the Esmeralda County portion of the district, Eastfield Resources acquired the 50% interest in the Three Hills gold property held by its joint-venture partner Prism Resources. Eastfield now has 100% ownership of the property (The Daily Prospector, 9/22/1999).

EUREKA COUNTY

Antelope district

White Knight Resources Ltd. acquired the Afgan property consisting of 225 claims in the Antelope district about 25

miles northwest of Eureka. The Afgan property hosts an oxide gold resource calculated by Phelps Dodge to be 2.8 million tons at a grade of 0.037 opt gold. White Knight believes further exploration has a reasonable chance of discovering additional resources (White Knight Resources Ltd., company news release, 8/18/1999). In the same district, Chapleau Resources and White Knight Resources resumed drilling at the Indian Ranch property. The property consists of a single block of 607 claims situated 38 miles northwest of Eureka (Northern Miner, 6/14/99).

Also in the Antelope district, U.S. Gold Corp. announced that it has a new participant at its Tonkin Springs Mine. A Sudbury Contact Mines Limited subsidiary (itself a subsidiary of Agnico-Eagle Mines Limited) purchased Gold Capital Corp.'s 60% interest at Tonkin Springs; Gold Capital was U.S. Gold's joint venture partner. Past exploration on the Tonkin Springs property was concentrated along the southern 3 miles of the trend and outlined a series of sulfide and oxide gold deposits containing an indicated resource of 1.37 million oz. Sudbury Contact has completed detailed geologic mapping and geochemical sampling throughout the property and will undertake 19,000 feet of drilling to expand known resources and test three newly discovered geochemical anomalies coincident with favorable structures. One target, Black Springs, returned 45 feet of 0.05 opt gold in previous drilling. As part of its agreement with U.S. Gold, Sudbury Contact must spend \$2 million on exploration over the next three years (Yahoo Mining/Metals News, 3/1/99). In the same district, White Knight recorded the Bob Claims in sections 19 and 30, T22N, R51E (BLM mining claim records, 1999).

Carlin district (see Elko County)

Cortez district

Barrick Gold Corp. planned exploration drilling on its Pine Valley property and Nevada Pacific Gold Co. recorded the CTZ claims, both in the Cortez district.

Devils Gate area

In the Devils Gate area northwest of Eureka, Kennecott Exploration planned drilling on the DG claims of its Buckaroo Project (BLM mining claim records, 1999).

Eureka district

Homestake Mining Co.'s Ruby Hill Mine remained Homestake's lowest cost operation for the second year in a row with the average cash cost at \$104 per oz. Homestake continued exploration of several properties within the district (Yahoo Mining/Metals News, 10/26/99). Inmet Mining planned exploration on its Yahoo property located in the western part of the district (Battle Mountain district BLM files).

Kobeh Valley area

Kennecott Exploration planned exploration drilling in the Kobeh Valley area north of Lone Mountain (Battle Mountain district BLM files).

Lynn district

Barrick Gold Corp. and Newmont Mining Corp. announced an asset swap on the northern Carlin Trend that benefits both companies by clarifying boundaries and making it easier to mine several gold deposits. The exchange is "ounce neutral," involving 2 million oz each. Newmont received Barrick's portion of the Deep Post deposit, 450,000 oz; Barrick's 40% interest in the High Desert property that includes 1.2 million oz in reserves in the Leeville, Four Corners, and Turf deposits; the land corridor between the Deep Post and Deep Star deposits; and roughly 350,000 oz contained in stockpiled ore that Newmont can process by bio-milling at Newmont's Mill No. 5. Barrick received the land corridor separating the Meikle and Betze Post Mines on the Goldstrike property; the Goldbug Deposit with reserves of 1,140,000 oz; Newmont reserves of 860,000 oz in the Betze-Post open pit; and the Banshee property to the north of the Meikle Mine (Yahoo Mining/Metals News, 2/4/1999; Elko Daily Free Press, 2/4/1999, 5/8/1999).

Newmont Mining Corp.'s development of the high-grade Deep Post underground mine (0.75 opt gold; 2.35 million oz) is ahead of schedule and production is scheduled for mid-year of 2001 (Yahoo Mining/Metals News 11/10/1999). In addition to its Betze-Post and Meikle mines, Barrick Gold Corp. has decided to develop the Rodeo Mine on the Goldstrike property. The Rodeo Mine will incorporate three underground deposits: Rodeo, Goldbug, and North Betze. An exploration program will continue in 2000 on the five-million-ounce resource to expand reserves and resources. The Rodeo mine is expected to begin production in the second half of 2001, at the rate of 350,000 oz of gold per year. Barrick is also exploring a mile-long corridor of mineralization that stretches from the Meikle Mine in the north, through Griffin to Rodeo and Goldbug in the south. Barrick has had significant drilling success along the 5,000-foot decline that connects Meikle and the Rodeo exploration shaft. Barrick is also exploring the potential of the nearby Rossi and Dee Properties, which may host more Meikle-type ore. Also in this district, Newmont planned exploration drilling on the Richmond Mountain Project and, to the south in the Maggie Creek district, Teck Resources planned exploration drilling on its Maggie Creek Project (Elko District BLM files, 1999).

Mineral Hill district

Phelps Dodge Exploration recorded the SMH claims in T26N, R52E (BLM mining claim records, 12/23/1999).

Northern Diamond Valley

MK Gold Company, Inc. planned drilling on its Diamond Valley project, in northern Diamond Valley, in sections 2, 3, 10, and 11, T25N, R54E (BLM files, Battle Mountain District).

Roberts district

Nevada Pacific Gold Ltd. acquired the Keystone property located approximately 18 miles south of the Cortez Gold Mine. The property includes base and precious metal mineralization that occurs along the edge of the Keystone window in both upper and lower plate rock, near the northern contact of a granodiorite stock. Nevada Pacific believes that the potential for high-grade ore deposits exists at Keystone and may have been overlooked during previous exploration, which focused only on the search for near-surface, bulk-mineable gold deposits. A review of historical data indicates that several holes drilled during past work on the property contained significant gold mineralization with assay results from individual intercepts ranging up to 0.13 opt gold (Nevada-Pacific Gold Ltd. news release, 6/24/99). Also working in this district, Phelps Dodge Exploration recorded the Key claims (BLM files, Battle Mountain District, 1999).

Nearby, in the northern Simpson Park Mountains, the BLM received notice of planned exploration drilling by Kennecott Exploration on their Coal Canyon property in Sections 10 and 29, T25N, R49E. Drilling was also planned by Nevada Gold Exploration Co. on their Golden Trend property, and by White Knight Gold on their Patty property (BLM files, Battle Mountain District, 1999).

Union district

Ranger, Inc. filed plans with the BLM for exploration drilling on its Z claims, located in section 19, T26N, R53E near the Eureka-Elko county line (BLM files, Battle Mountain District, 1999).

HUMBOLDT COUNTY

Awakening district

X-Cal Resources Ltd. and Kinross Gold Corp. entered into an option agreement that grants X-Cal the right to purchase the remaining Kinross interest in the Sleeper Gold Project in the Awakening district. If the option is exercised, X-Cal will also have 100% title to Kinross's Sleeper area claims. The total project area is approximately 22,000 acres, centering on the mine site and extending northwest and southeast within a geologically favorable trend. Resource figures calculated by Sierra Mining and Engineering for X-Cal show a global resource in the mine site area of 5.0 million oz of gold and 21.8 million oz of silver contained within 418.5 million tons. The addition of the above ground resource contained in the heap-leach and tailings material

brings the total inferred global number to 5.8 million oz of gold and 23.7 million oz of silver (X-Cal Resources Ltd. Annual Report, 4/20/99, 10/18/1999). X-Cal's exploration drilling efforts have been focused on three target areas: Westwood, Northeast Area, and Bedrock Casino (Yahoo Mining/Metals News, 4/27/99). In other parts of the district, Pittston Nevada Gold Co. planned drilling and road construction on its Slumbering Hills Project, and Gold Fields Exploration planned six drill holes on the SLE Project in Desert Valley. (BLM Files, Winnemucca District, 9/23/99).

Battle Mountain district

In the Humboldt County portion of the Battle Mountain district, Gold Fields Exploration planned two drill holes on its MAR Project near Valmy (BLM Files, Winnemucca District, 11/5/1999).

Buffalo Mountain district

At the Converse Gold Project, Cameco and Romarco Minerals together with 50% joint venture partner Newmont Mining Corp. drilled five holes to test a north-trending structural zone, which extends from the Redline deposit. The five holes intercepted zones of anomalous gold values along the structure, as well as alteration and several narrow dikes (Elko Daily Free Press, 12/24/99; Yahoo Mining/Metals News, 12/15/1999). The mineralization is associated with a sulfide-enriched zone peripheral to the Redline skarn system. At the contiguous Nike Project, a 10-hole drilling project during 1999 found no significant mineralization. The project is 50% owned by UUS, a subsidiary of Cameco Corp., and 50% owned by Romarco (Elko Daily Free Press, 12/24/99; Yahoo Mining/Metals News, 12/15/1999). Other companies active in the Buffalo Mountain district in 1999 were Independence Mining Co., which planned to drill 11 holes on its Pump claims, and Pittston Nevada Gold, which located the TC claims (BLM Files, Winnemucca District).

Disaster district

Newmont Mining Corp. planned exploration drilling at its Montana Mountains Project and Pittston Nevada Gold located the HH claims in the Double H Mountains (BLM Files, Winnemucca District).

Dutch Flat district

Phelps Dodge Exploration recorded the Hot claims (BLM Files, Winnemucca District).

Gold Run district

North Mining Inc. commenced core drilling on White Knight's Rock Creek Ranch property in the Gold Run district. Two core holes were designed to test geochemical targets identified as a result of a trenching and rotary drilling program conducted earlier in the year and both holes target more receptive host rocks of the Comus and

Preble Formations beneath Valmy Formation rocks (White Knight Resources Ltd. news release, 11/2/99; Denver Mining Record, 11/10/99). Also working in the Gold Run district, Western Exploration planned 11 reverse circulation drill holes and 4,800 feet of road construction on the LNL claims (BLM Files, Winnemucca District, 4/12/1999).

Iron Point district

Newmont Mining Corp. planned drilling on the PAM Claims of its Iron Point Project during 1999 (BLM Files, Winnemucca District, 10/8/1999).

Kelly Creek area

Newmont Mining Corp. planned drilling and access road construction on The Knolls project (BLM Files, Winnemucca District, 10/22/1999).

Paradise Valley district

Newmont Mining Corp. conducted drilling and access road construction on its Gouge Eye and Spring City Projects in the Paradise Valley district (BLM Files, Winnemucca District, 10/22/1999; U.S. Forest Service news release, 11/2/99).

Potosi district

Placer Dome Inc., upon taking control of the Getchell Mine property in the Potosi district in June 1999, began an aggressive exploration program focusing on the N Zone, which led to the identification of four separate mineralized zones, all open along strike to the north and south. Drilling also intersected what is believed to be a southern extension of the N Zone directly underneath the existing Turquoise Ridge Mine, more than doubling the strike length of the zone. Placer Dome is focusing on the continued development of the N Zone and on developing a plan to expand the operation by combining production from the new N Zone with ore from the Getchell and Turquoise Ridge deposits. The mill, which shut down in July so that resources could be focused on the new discoveries, will not restart until the plan to expand and optimize the operation is complete. In an attempt to further cut costs and capitalize on the full potential of the Getchell Mine, Placer Dome is closing the adjacent Turquoise Ridge Mine where mining there will be halted for about a year. Placer says that while underground operations continue at the Getchell Mine, work at Turquoise Ridge will focus on development infrastructure to support larger-scale and more cost-efficient ore extraction (Placer Dome Inc. news release, 2/4/2000, 2/24/2000; Yahoo Mining/Metals News, 1/28/99; The Daily Prospector, 7/21/99).

At Homestake Mining Co.'s Pinson Mine, which was closed in January 1999, work is ongoing to recontour, cover, and revegetate the waste rock piles and tailings facility, and to neutralize the leach pads. Residual heap leach

production continued throughout most of 1999. An exploration program with joint venture partner Barrick Gold Corp. will continue. The partners expect to spend approximately \$3 million exploring for deep orebodies on the lands controlled by the Pinson joint venture (Yahoo Mining/Metals News, 1/29/99, 7/27/1999). Also in the Potosi district, Western Exploration recorded the BU Claims in T38N, R42E, (BLM mining claim records, 4/19/1999).

Poverty Peak district

Western Exploration, Echo Bay Exploration, and Newmont Mining Corp. each recorded claims in the district: Western Exploration recorded the BP Claims in T40N, R40E; Echo Bay Exploration recorded the NE Claims in T40N, R41E; and Newmont Gold recorded the SPA Claims in T41N, R40E (BLM mining claim records).

Snowstorm Mountains district

Homestake Mining Co. planned two reverse circulation drill holes and construction of sumps and cross-country access at its Layton Springs Project (BLM files, Winnemucca District).

Sulphur district

Preliminary engineering studies conducted by Vista Gold Corp. at its Hycroft Mine in the Sulphur district demonstrated that the grade of the ore mined 1996–1998 was 12% greater than predicted by the exploration model. Vista felt that it would be profitable to restart the mining operation at gold prices below \$300 per oz if reserves could be upgraded by the same percentage, and made the decision to recalculate the mine reserves. Drilling of ten new holes in the orebody to twin earlier drilling was completed in the last quarter of 1999 and results appear to confirm that the Brimstone reserves have been undervalued by previous work. The new work on Brimstone also resulted in identification of new target areas of oxide mineralization to the south of the Brimstone and Central Fault resource areas (Yahoo Mining/Metals News, 1/18/99; Denver Mining Record, 1/1/2000). Also in the Sulphur district, Vengold Inc. explored its Mandalay claims in 1999 (Vengold Inc. website).

Ten Mile district

West of Winnemucca, M.E.T.A.L. Inc. planned trenching at its Blue Project in the Mormon Dan Butte area of the Ten Mile district (BLM Files, Winnemucca District).

LANDER COUNTY

Aspen district

Hecla Mining formed a joint venture with Fairmile Gold to explore the Highland Project. Hecla and Fairmile plan to conduct mapping, sampling, geophysics and trenching

in preparation for drilling. To date, Fairmile has outlined several low-sulfidation epithermal bonanza-style veins associated with felsic domes. Drilling by a previous owner tested only the top 200 feet of the vein system, with the best hole intersecting a 19-foot interval grading 0.13 opt gold. Another promising target, the Deb zone, has surface values of up to 0.085 opt gold but has not yet been trenched or drilled (The Daily Prospector, 9/30/1999; The Northern Miner, 10/11/99).

Battle Mountain district

In 1999, Battle Mountain Gold Co. added 2.2 million oz of gold to reserves at its Phoenix Project in the Battle Mountain district. The additions increased the anticipated mine life to over 15 years at 300,000 oz of gold per year, based on an average grade of 0.038 opt. Permitting for Phoenix is moving ahead with the BLM, and the company currently hopes to have a draft environmental impact statement by mid-year 2000. In addition to the Phoenix development work, exploration drilling at the Battle Mountain Complex during 1999 focused on the eastern side of the Copper Canyon property in the Plumas and Iron Canyon pit and 7 miles to the north at Copper Basin. The Plumas and Iron Canyon areas have potential for both new oxide (heap-leach) reserves and for higher-grade mill ore. Follow-up drilling is planned for all of these exploration areas in 2000 (Yahoo Mining/Metals News, 7/25/99, 9/14/99; Battle Mountain Gold company news release, 2/4/2000).

Golden Phoenix Minerals, Inc. announced that it has completed a joint venture agreement with International Calneva Gold Corp. and that the two companies will explore and potentially develop gold-silver properties in the Battle Mountain district. The two companies obtained from F.W. Lewis, Inc. an exploration permit with option to purchase. The Antler-Lewis properties are adjacent to Battle Mountain Gold Co.'s proposed Phoenix Gold Project. The same host rocks and mineralizing structures that control the Phoenix mineralization extend northward onto the Antler-Lewis property and previous drilling on the property has identified the presence of the Virgin deposit containing more than 100,000 oz of gold (Yahoo Mining/Metals News, 4/26/99; International Calneva Gold Corp. news release, 5/17/99).

In May 1999, Newmont began mining from its Trenton Canyon Mine in the northwest part of the district. The mine will be run as one of several satellite deposits of the Lone Tree Mine. These satellite deposits, which include Trenton Canyon, North Peak, and Valmy, are expected to offset falling production at the Lone Tree Mine (Northern Miner, 3/8/99).

Barrick Gold Corp. and Newmont Mining Corp. both had exploration projects in the Battle Mountain district in 1999. Barrick planned drilling on its Gold Basin Project, and Newmont worked on its Mug and Timber claims (BLM mining claim files, Battle Mountain District). In the Reese River Valley, south of the Battle Mountain district,

Independence Mining Co. planned exploration drilling on its Blind Faith project in sections 22,28, T30N, R43E (BLM files, Battle Mountain District).

Birch Creek district

White Knight Gold (U.S.) Inc. is planning a 2- to 3-year exploration project in the area of the former Austin Gold Venture Mine (Quito deposit) in the Birch Creek district. The proposed exploration project will include road building and drilling in three separate areas on the property. Work will be in the Russ Southwest area (11 drill sites); the Q-4 area (6 holes); and the Spires area (new road building and up to 17 holes).

Buffalo Valley district

Fairmile Gold and Santa Fe Pacific Gold (SFPG), a subsidiary of Newmont Mining Corp., signed a letter of intent to exchange mining leases in the Buffalo Valley district. One agreement allows SFPG to lease from Fairmile land located immediately south of and on strike with SFPG's North Peak open pit. The second agreement allows Fairmile to lease land in the western portion of section 33 from SFPG (The Daily Prospector, 7/2/1999).

Bullion district

Placer Dome U.S. Inc., operator of Cortez Gold Mines in the Bullion district, has updated its ore reserve estimates for the Pipeline Mining Complex. As of December 31, 1999, proven and probable reserves at the Pipeline were 159,125,000 tons, at an average grade of 0.052 opt gold containing approximately 8.2 million oz of gold. In addition to the proven and probable reserves, the property contains approximately 22.2 million tons of mineralized material at an average grade of 0.0375 opt gold. New mineralization has been discovered at the Pediment zone across the valley from the existing Pipeline deposit yielding additional reserves of one million oz. The new deposit is currently open in three directions. Cortez spent approximately \$4.3 million on development and exploration drilling at the Pipeline Mining Complex during calendar 1999, and expects to spend approximately \$3.3 million on development and exploration drilling in calendar 2000 (Placer Dome Inc. company Press Release, 2/4/2000, 2/24/2000; Yahoo Mining/Metals News, 8/20/99).

Also in the district, Claimstaker Resources Ltd. has leased the Bru-Lovie property from the Bru-Lovie Partnership and must make work expenditures of \$100,000 within the first three years of the lease. Ore grade gold values have been encountered on surface and an elongate strong gold-silver-arsenic anomaly covers the length of the property (Yahoo Mining/Metals News, 9/16/99). Homestake Mining Co. recorded the HMS claims and planned exploration drilling on its Mud Springs and Colorback Projects. Under an exploration agreement with Coral Gold, Cortez Gold Mines completed a drilling project of 46 reverse circulation holes, totaling

57,332 feet at the Robertson property to the south in the Tenabo area. While drilling returned mineralization in almost every hole, gold values remained low, with only a few high-grade intersections. The most significant intercept was 80 feet of 0.16 opt gold. Despite these results, more drilling is expected in 2000 (Coral Gold company news release, 12/20/99; Denver Mining Record, 3/24/1999; Elko Daily Free Press, 12/24/1999; Northern Miner, 1/3/2000). Other nearby activity included exploration drilling by Independence Mining Co. on its West Pipeline Project, and drilling by Newmont Mining Corp. on its Squaw Butte Project (BLM files Battle Mountain District).

Callaghan Ranch district

Newmont Mining Corp. planned exploration drilling on its Skull Creek Project in sections 2, 3, 10, and 11, T21N, R45E (BLM files Battle Mountain District).

Kingston district

Newmont Mining Corp. recorded the KIN Claims in T15N, R43E in the Kingston district (BLM files Battle Mountain District).

Lewis district

Newmont Gold recorded the SOV Claims, T29N, R45E (BLM files Battle Mountain District)

McCoy district

At the Echo Bay Mines McCoy/Cove property in the McCoy district, gold production was 124,536 oz and silver production was 8.4 million oz for 1999. During the fourth quarter, the Cove East underground program was completed, with 13,500 oz of gold and 1.5 million oz of silver produced. Development of the Cove East deposit has been utilized to provide access for exploration drifting and drilling on Cove South Deep. The Cove South Deep target has two zones of mineralization. The upper zone is smaller and relatively well defined. Economics for the upper zone appear favorable and warrant development. The company anticipates 45,000 gold-equivalent ounces of production from this area starting in early 2000. Additional work is currently under way to determine the economic viability of the lower zone of mineralization. Other underground targets have also been identified and will be explored over the next several months (Echo Bay Mines company press release, 2/10/2000; Yahoo Mining/Metals News, 11/1/99). In the same district, Kennecott Exploration recorded the MS claims in T29N, R43E (BLM mining claim records).

Mountain Springs district

Phelps Dodge Exploration planned exploration drilling in section 30, T29N, R44E, (BLM files, Battle Mountain District).

Reese River district

At the Amador Canyon property north of Austin, Sunshine Mining and Refining Company completed geophysical surveys designed to identify potential drill targets. Results from a magnetometer and VLF geophysical survey indicate several prominent anomalies over the project area and at least six potential drill targets have been identified. Additional fieldwork will follow up on these targets and drilling is planned on the most promising areas (Yahoo Mining/Metals News, 8/5/1999; Denver Mining Record, 8/25/1999). In the same area, Sunshine Precious Metals recorded the AM Claims in T20N, R44E (BLM files, Battle Mountain District).

The Cedars area

In the Cedars area, about ten miles south of the Warm Springs district, Newmont Gold Co. planned drilling on its Cedrina Project in T26N, R43&44E (BLM files, Battle Mountain District).

LINCOLN COUNTY

Atlanta district

Cordilleran Exploration staked the AT claims in the Atlanta district. This is one of five properties in Nevada staked by a mining syndicate that includes Franc-Or Resources Corp. of Toronto, Ranger Minerals Ltd. of Perth, and Cordilleran Exploration Co. All of the properties were staked on the basis of geochemical surveys and together cover a variety of geological settings and mineralizing environments. Geologic mapping and sampling are under way, with drilling expected to follow (Northern Miner, 12/20/1999).

Eagle Valley district

In the Eagle Valley district, Phelps Dodge Exploration recorded two separate claim groups, the MN claims, and the PF claims (BLM mining claim records).

LYON COUNTY

Wilson district

Inmet Mining (US) Inc. proposed an amendment to their approved plan of operations for additional mineral exploration drilling and temporary drill roads on the Rockland Exploration Project located just east of the old town of Rockland (U.S. Forest Service report, 11/4/99).

Yerington district

The Lyon copper-iron-gold property of Cyprus Amax Minerals Company (now Phelps Dodge) has been optioned by International Taurus Resources. Lyon is a giant copper-

magnetite deposit that contains more than 8 billion pounds of copper and 100 million tons of iron in magnetite. Previous work has identified three areas of the larger deposit that contain more than 350 million tons of potential ore grading 0.50% copper and 30% iron that could be mined from open pits with higher copper prices. In addition to these large, low-grade deposits are the three areas of much higher grade copper with iron and gold. These high-grade deposits are the focus of Taurus' exploration and development efforts on the property. Cyprus calculated that the high-grade skarn replacement deposits contain 12.1 million tons grading 3.41% copper with significant gold credits. Two of the deposits contain 30% to 35% iron in magnetite. There is potential to at least double the high-grade copper resource with additional drilling. Taurus is conducting additional exploration and other studies to expand the current high-grade resource and advance the project to the full feasibility stage by early 2000 (The Daily Mining News, 6/3/99).

MINERAL COUNTY

Aurora district

Deloro Minerals Ltd. reported exploration on the Golden Beauty Project, which lies within an area about two miles wide by four miles long of hot-springs sinter, opal, silicification, and mercury mineralization. Deloro's work has focused on an area of the property 500 to 700 feet wide by 1,600 feet long where erosion has penetrated through the sinter-opal-mercury mineralization to an underlying level of chalcedony veining, silicification, and gold mineralization. The principal targets on the property are bonanza type high-grade gold-silver veins amenable to underground mining. Sampling and geologic mapping are continuing on the property (Denver Mining Record, 8/1/99). Also in the Aurora district, Echo Bay Exploration recorded the BPE claims (BLM mining claim records).

Bell district

Two companies notified the BLM of planned work on separate properties in the district. Teck Resources planned exploration drilling on its CMA property, and MK Gold Company, Inc. planned exploration drilling on its nearby Dawn property (BLM Files, Carson City District).

Borealis district

Golden Phoenix Minerals, Inc. completed its study of Freedom Flats, the fourth of seven target evaluations of its Borealis gold-silver project in the Borealis district. The results of these four studies (Polaris, Borealis, Freedom Flats and Graben) identified a minimum of 20.8 million tons of ore containing 1,183,300 oz of gold (0.057 opt) and 5,477,000 oz of silver (0.263 opt). For resource evaluation, the company divided the property into two mineralized zones called the Borealis and Polaris zones.

There are four targets in the Borealis zone: Borealis Pit area, Graben, Freedom Flats, and North Borealis. There are three targets in the Polaris zone: Polaris, East Ridge, and Northeast Ridge. The next target to be studied is East Ridge. According to a 1997 study prepared by Whitney & Whitney, Inc, the Borealis Project area has an indicated 37.8 million tons containing 1.2 million oz of gold averaging 0.032 opt gold, but silver resources were not estimated. The four targets studied to date contain 55% of the Whitney & Whitney estimated tonnage, 98% of the gold and more than 5 million oz of silver. One target remains to be studied in the Borealis zone and two target areas remain to be studied in the 12,000-foot-long Polaris Zone and are now expected to bring the measured gold resource at Borealis significantly above the 1.2 million oz in the Whitney & Whitney estimate (Golden Phoenix Minerals, Inc. company news release, 12/1/99, 1/4/2000; Yahoo Mining/Metals News, 7/19/1999).

Candelaria district

Silver Standard Resources Inc. acquired a six-month option to purchase the Candelaria Mine from Kinross Candelaria Mining Co. On exercise of the option, Silver Standard will assume responsibility for the operation, which has been under reclamation by Kinross over the past few years. Both Kinross and Silver Standard have estimated the remaining silver resources at the Candelaria Mine. Kinross estimated the higher-grade underground resource at a total of 44.75 million oz of silver contained in the Deep Diablo zone (4.64 million tons grading 6.10 opt silver) and the Northern Belle zone (1.96 million tons grading 8.39 opt silver). Silver Standard contracted a bulk mineable open pit estimate which was 27.3 million tons grading 3.4 opt silver, for the total combined resource at Deep Diablo and Northern Belle. Two low-grade stockpiles contain an additional 8 million oz of silver in 4 million tons of ore. In addition, a stockpile of 37.3 million tons of ore that has been crushed, stacked, and partially leached for silver is estimated to contain 48.2 million oz of silver on the two pads. Scoping studies indicate that the Deep Diablo zone may be economic at silver prices between \$6 to \$8 per oz, but until further detailed engineering studies are completed, the property will remain on care and maintenance. (Silver Standard Resources Inc. and Kinross Candelaria Mining Co. news release, 11/1/1999; Yahoo Mining/Metals News, 11/1/1999).

Fitting district

The new mining syndicate formed by Franc-Or Resources Corp., Ranger Minerals Ltd., and Cordilleran Exploration Co. is evaluating a claim group in the Fitting district. The syndicate has staked five properties in Nevada so far and geologic mapping and sampling are reported to be underway (Northern Miner, 12/20/1999).

Masonic district

Romarco Minerals Inc. postponed the proposed 1999 exploration drill program on its Sonoma Canyon Project in the Masonic district until year 2000 to allow additional time to evaluate the property and finalize the permitting process, which was completed in November 1999. The Sonoma Canyon Project consists of 57 claims, totaling about 1,140 acres, located in the Walker Lane structural trend. The rock units within the project area have been intensely altered and commonly contain anomalous amounts of gold and copper mineralization (Yahoo Mining/Metals News, 12/15/1999; Elko Daily Free Press, 12/24/1999).

Pamlico district

Vengold Inc. is exploring for gold on its Pamlico property south of Hawthorne. The company has completed mapping and sampling of the underground workings as well as drilling (Northern Miner, 6/14/99; BLM Files, Carson City District).

Silver Star

Hecla Mining began its second drill program on the Sunset Gold property owned by Cimarron Minerals. Hecla completed its initial five-hole drill program on the property in March 1999. The first program did not work out as planned, and holes were set up to drill from the east across north-striking structures. The structures were found, however, to dip west. Testing will include holes in an easterly to southeasterly direction across surface gold mineralized structures in the Maryann Basin and gold mineralization near the old Sunset mine some 4,000 feet south of the Maryann Basin (Denver Mining Record, 5/19/99; Northern Miner, 6/14/99).

NYE COUNTY

Athens district

Claimstaker Resources signed an agreement with Nu-Apex Energy to acquire the 20-claim Warrior Extension gold property. The property lies on the Walker Lane structural zone and a strong gold, arsenic, and antimony anomaly is reported to extend the length of the property (The Daily Prospector, 12/2/1999).

Barcelona district

Royal Standard Minerals Inc. reported completion in November of a 2.5-month field program on the Antone Canyon property. The program, completed by joint venture partner North Mining Ltd., included detailed geologic mapping, rock-chip and soil sampling, and 1,800 feet of diamond core drilling. The results of the drilling and surface-sampling program extended the known near surface mineralization to over 7,000 feet. There are at

least four mineralized structures within this total strike length. North Mining will not continue the exploration program on the property in 2000, and Royal Standard is seeking a new partner (Denver Mining Record, 1/1/2000; Yahoo Mining/Metals News, 8/30/1999; The Daily Prospector, 12/30/99).

Bare Mountain district

Glamis Gold Ltd. acquired the Daisy Mine in the Bare Mountain district in March 1999. Mining was completed at Daisy in December 1999, but gold production will continue over the next two years with concurrent rinsing and reclamation activity (Glamis Gold Ltd., company press release, 2/28/2000; Yahoo Mining/Metals News, 11/8/1999).

Bruner district

Miramar Gold Corp. recorded the PL claims in section 23, T14N, R37E (BLM mining claim records).

Ellendale district

Golconda Resources Ltd. filed a notice of intent with the BLM to work on the South Monitor property during 1999. The property is located in section 1, T2N, R45E, Sec. 36, T3N, R45E, and sections 6 and 7, T2N, R46E (BLM files, Tonopah District).

Ellsworth district

Independence Mining Co. recorded the Jack claims in sections 16 and 17, T13N, R37E (BLM mining claim records).

Jett district

Miranda Industries signed a joint venture agreement with Braden Technologies Inc. for the further exploration of the Secret Basin Project in the Jett district. Miranda drilled nine reverse circulation drill holes at Secret Basin during 1997; eight out of the nine drill holes intersected thick zones of silicified volcanic rock that contain zones of strong quartz stockwork veining, quartz veins, and brecciation. Narrow intercepts of anomalous gold and silver values occur within the silicified and stockwork zones (Miranda Industries, company press release, 03/03/1999).

Longstreet district

Golconda Resources planned work in the Little White Sage Canyon area north of Big Ten Peak in sections 25 and 36, T7N, R45E (BLM files, Tonopah District).

Moore's Creek district

Homestake Mining Co. recorded the Pasco claims in T12N, R45E in the Pasco Canyon area (BLM mining claim records).

Round Mountain district

Echo Bay Mines' Round Mountain Mine had record gold production of 541,808 oz. in 1999, mainly attributable to higher mill grades. At year-end, Round Mountain's gold reserves comprised 5.9 million oz. Under the current mine plan, if no new gold reserves are discovered, which is unlikely, production will continue for approximately 11 years. In 1999, Echo Bay and its partners spent close to \$1 million on target identification and exploration in the large area of mutual interest surrounding Round Mountain. This work identified a number of targets, six of which were drilled during the year. The year 2000 exploration program will include additional drilling on a similar budget (Yahoo Mining/Metals News, 11/1/99; Echo Bay Mines Co., press release, 2/10/2000). Also in the Round Mountain district, Pittston Nevada Gold located the BS Claims in T9N, R43E (BLM mining claim records).

Rye Patch district

Golconda Resources has used a new technology to evaluate its Ralston Valley Prospect near Tonopah. The SMX Surface Geochemistry technique was able to generate a picture of mineralization at depth from surface samples. Three zones anomalous in gold and a number of pathfinder elements such as silver, arsenic, cadmium, and base metals, were outlined under an overburden cover that is estimated to be up to 120 feet thick. Golconda plans to initiate immediately a drill program to test these target anomalies (Yahoo Mining/Metals News, 11/16/1999).

San Antone district

Equatorial Mining North America, Inc. of Tucson, Arizona, has activated a heap-leach copper mining operation adjacent to the site of Anaconda Copper's former Hall Molybdenum Mine north of Tonopah (personal commun., Jon Price, 9/14/1999). Equatorial Tonopah acquired the property in 1997. Drilling and geologic evaluation completed through 1999 has resulted in a proven ore reserve of 98 million tons at 0.343% total copper. The total resource is estimated at 137.8 million tons averaging 0.314% total copper. Mining is currently from an open pit a little over one-half mile east of the old Hall Mine pit. Copper is recovered through an acid leach, solvent extraction, and electrowinning process (Mears and others, 2000, Geological Society of Nevada Symposium 2000, Field Trip 10 Guidebook).

Silverton district

Pittston Nevada Gold is reported to have recorded the BR claims in T8N, R54E in the Silverton district (BLM mining claim records).

PERSHING COUNTY

Black Knob district

Newmont Gold recorded the PF claims in T27N, R33E (BLM mining claim records).

Buena Vista district

Coeur Rochester, Inc. plans nine exploration drill holes at its Black Warrior Project, located about one mile south of the old town of Unionville in the Humboldt Range (BLM Files, Winnemucca District).

Goldbanks district

Kinross Gold Corp.'s plans to open the Kinross Goldbanks Mine have been put on an indefinite hold. The company plans on completing the environmental impact statement for the mine, but all other permit applications have been put on hold (Lovelock Review Miner, 2/18/99).

Imlay district

At the north end of the Humboldt Range, Apollo Gold Inc. has officially taken over operation of the Florida Canyon Mine, formerly operated by Pegasus Gold Corp. (Elko Daily Free Press, 2/13/99).

Indian district

The Moonlight property is one of several Nevada properties explored in 1999 by a Nevada mining syndicate consisting of Franc-Or Resources Corp., Ranger Minerals Ltd., and Cordilleran Exploration. Cordilleran staked the Grant claims and plans to trench and open one adit at the Grant (Moonlight) Project. Cordilleran is also working in the adjacent Spring Valley district (Northern Miner, 12/20/99; BLM Files, Winnemucca District).

Rochester district

Coeur Rochester purchased the mineral rights of the Nevada Packard property, adjacent to the company's Rochester Mine. The acquisition is expected to add 6.5 million tons of ore containing 8.5 million oz silver and 17,000 oz gold. The acquisition is expected to enhance Rochester's production by approximately 5.4 million equivalent ounces over the period 2001-2004. Coeur plans to continue with the permitting of the Nevada Packard property and continue with a substantive near-mine exploration program (Denver Mining Record, 8/25/1999). Also in the Rochester district, Gold Fields Exploration planned to drill three holes on its REL Project in Packard Flat (BLM Files, Winnemucca District).

Rosebud district

Encouraging drill intercepts at Hecla's Rosebud Mine in the Rosebud district have fueled optimism for increasing

the underground mine's life. Underground exploration drilling has led the mine geologists to believe they may have found the feeder structures of the Rosebud deposit and raised hopes of finding another deposit in the area. A drill hole below and to the west of the deposit intercepted a banded quartz vein structure, and another drill hole along a fault in this area returned assays averaging approximately 0.5 opt gold over 16 feet and 0.25 opt gold over 9 feet (Denver Mining Record, 6/16/1999, 12/1/99; Hecla Mining Co. press release, 3/23/2000).

Scossa district

Romios Gold Resources completed the balance of the underground sampling and the surface geological mapping on its Scossa gold property in the Scossa district. The property, consisting of 16 unpatented mineral claims, contains a number of steeply dipping gold-bearing quartz breccia veins and fault breccias. Results from the surface sampling and geological mapping program confirmed the existence of multiple, steeply dipping, parallel structures containing gold-bearing quartz veins and swarms of quartz veinlets. Eleven shafts were mapped and sampled along various levels, and Romios says that exposures within the shafts indicate the existence of at least five major, vein-filled structures, which Romios believes to extend beyond the immediate area of historic workings. Four additional parallel structures were also identified with little or no evidence of any previous work (Northern Miner, 6/14/1999; The Daily Mining News, 11/16/99).

Seven Troughs district

The Seven Troughs Joint Venture recorded the NM claims in T30N, R38E (BLM mining claim records).

Sierra district

Independence Mining Co. planned to drill eight holes and construct 3,000 feet of road on the NP claims (Sunshine Project) in the district during 1999 (BLM files, Winnemucca District).

Willow Creek district

Silverthorn Exploration Inc. planned to dig placer test pits and sumps at its Spaulding Canyon Placer property (BLM files, Winnemucca District).

Spring Valley district

Cordilleran Exploration recorded the Grant 113 et al, claims, section 30, T29N, R35E (BLM mining claim records).

WASHOE COUNTY

Olinghouse district

Alta Gold suspended mining, crushing, and milling operations at its Olinghouse Mine in the Olinghouse district. The company says the suspension was necessary to conserve cash pending a hearing by the U.S. Bankruptcy Court on the company's motion to dismiss its bankruptcy proceeding. Alta warns that there is no guarantee that the motion will be granted or that a possible sale of interest in the property will go through. In the meantime, production will continue at the mine from heap-leach processing, and the company says that it will resume operations if the motion is granted and if the sale is completed (Yahoo Mining/Metals News, 4/14/1999; The Daily Prospector, 8/11/1999).

WHITE PINE COUNTY

Butte Valley district

Nevada Pacific Gold Ltd. reported that Newmont Mining Corp. completed its first phase of drilling at the Limousine Butte Joint Venture, and the program identified an area of gold-bearing alteration measuring over three miles in length. Highly anomalous gold was encountered in 13 of 20 drill holes, and eight of the 13 holes returned numerous gold intercepts of more than 0.01 opt gold. The drill program was designed to test target areas identified during geological mapping, soil geochemistry, and ground geophysical surveys. Newmont is currently evaluating the results from the drilling prior to determining their next course of action. The project covers a large hydrothermal gold system that exhibits alteration features indicative of sediment/structure hosted gold deposits found on the Carlin Trend and elsewhere in Nevada. To date, Nevada Pacific has targeted district-scale disseminated, structurally controlled and skarn-hosted gold deposits related to a large mineralized porphyry complex located beneath the valley floor. Porphyry copper exploration previously carried out on the property (1960–1980) identified porphyry related gold mineralization up to 0.070 opt gold and skarn style gold mineralization grading up

to 0.19 opt gold in drill holes (Nevada-Pacific Gold Ltd. news releases, 4/22/1999, 9/30/1999; Northern Miner, 6/14/1999; The Daily Prospector, 12/2/1999; Elko Daily Free Press, 12/18/1999).

Robinson district

On June 25, 1999, after only four years of production, Broken Hill Proprietary closed its Robinson Mine (The Daily Prospector, 6/25/1999).

White Pine district

Latitude Minerals released results from a soil survey program conducted over the recently identified Middle Pan gold target in the western part of the White Pine district. The company says that soil samples contained gold values up to 0.122 opt, with values reportedly outlining at least five major anomalous areas. Two of the areas are more than 1,000 feet long and lie along the Pan fault. Latitude says the values verify and expand targets identified during a reconnaissance rock-sampling program in May. Rock samples contained values of up to 0.140 opt gold. The zone may link the company's North and South Pan deposits (Yahoo Mining/Metals News, 2/3/99, 4/20/99, 5/12/99; Denver Mining Record, 6/16/1999; The Daily Prospector, 7/13/99; 1/26/2000).

To the east, in the central White Pine district, Victoria Resource Corp. has acquired the 6,200-acre Monte Cristo property. The property hosts the Shell Deposit, a deep gold replacement deposit discovered in 1964 during a porphyry copper exploration program. Since the previous exploration did not focus on gold, areas of favorable stratigraphy and structure have not been tested for gold. The company plans to commence a program of geologic mapping, data compilation and ground geophysics (CSAMT), and plans to drill test favorable targets (The Daily Prospector, 7/31/99; Denver Mining Record, 8/11/99).

In another part of the district, Alta Gold Co. suspended mining at its Griffon Mine in April 1999 (Elko Daily Free Press, 8/21/99), and Bema Gold Corp. recorded the M.C. claims in T16N, R57E in the district (BLM mining claim records).

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
CHURCHILL COUNTY				
Bell Mountain (Bell Mountain district)	1982: 1 million tons, 0.055 opt Au, 1.4 opt Ag 1989: <i>reserves</i> —30,000 oz Au, 125,000 oz Ag 1997: 2.5 million tons, 0.059 opt Au equiv. oz		rhyolitic tuff	Miocene
Buffalo Valley gold property (Eastgate district)	1996: 96,000 oz Au		rhyolitic ash-flow tuff	Tertiary
Dixie Comstock (Dixie Valley district)	1991: 2.4 million tons, 0.049 opt Au 1995: 100,000 oz Au		Tertiary rhyolite	Miocene?
Fondaway Canyon (Shady Run district)	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
New Pass property (New Pass district)	1994: 3.4 million tons, 0.042 opt Au 1997: 3.1 million tons, 0.055 opt Au		Permian greenstone	Mesozoic?

CLARK COUNTY

Crescent property (Crescent district)	1992: 390,000 tons, 0.05 opt Au; 3.3 million tons, 0.022 opt Au			
Keystone (Goodsprings district)	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

ELKO COUNTY

Big Springs (Independence Mountains district)	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
Bootstrap/Capstone/ Tara (Bootstrap district)	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	dacitic dikes, Paleozoic siltstone and laminated limestone/chert	Eocene
Cobb Creek (Mountain City district)	1988: <i>geologic resource</i> —3.2 million tons, 0.045 opt Au			
Cord Ranch (Robinson Mountain district)	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	
Dee (Bootstrap district)	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	1987–88: ~97,000 oz Au 1989–92: 135,000 oz Au, 142,000 oz Ag 1993–95: 95,079 oz Au 1996: 45,070 oz Au, 50,322 oz Ag 1997–98: 68,156 oz Au 1999: 36,329 oz Au, 68,400 oz Ag	Vinini Formation Devonian carbonates, dacitic dikes	Eocene

MAJOR PRECIOUS-METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
ELKO COUNTY (continued)				
Deep Star (Lynn district)	1996: 1.4 million tons, 0.8765 opt Au proven and probable reserves	1995: 2,800 oz Au 1996: 93,400 oz Au 1997–99: included in Newmont Gold production, page 36	Popovich Formation	Eocene
Doby George (Aura district)	1995: 3.7 million tons, 0.060 opt Au 1997: 250,000 oz Au		Schoonover Formation	
Jerritt Canyon (includes Saval Canyon and Burns Basin) (Independence Mountains district)	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	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	Hanson Creek and Roberts Mountains Formations	~40 Ma
Ken Snyder Mine (Gold Circle district)	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	1998: 4,357 oz Au, 55,329 oz Ag 1999: 189,081 oz Au, 1,938,470 oz Ag	Tertiary volcanic rocks	15.3 Ma
Kinsley Mountain (Kinsley district)	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?
Meikle (Lynn district)	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	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	Popovich and Roberts Mountains Formations	Eocene
Piñon (South Bullion and Dark Star) (Robinson Mountain district)	1996: 38.3 million tons, 0.026 opt Au geologic mineral inventory		Webb Formation siltstone Devils Gate Limestone	
Pony Creek (Carlin district)	1994: <i>geologic resource</i> —1.1 million tons, 0.057 opt Au			
Railroad Property (POD zone) (Railroad district)	1997: 1.5 million tons, 0.085 opt Au drill-indicated resource			
Rain Property (Carlin district)	1982: 3.4 million tons, 0.147 opt Au and 8.3 million tons, 0.083 opt Au			
Gnome deposit	1988: 2.7 million tons, 0.048 opt Au		Webb Formation	Eocene
Rain Emigrant Springs deposits	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 36	Webb Formation	36–37 Ma
Rain deposit	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		
SMZ deposit	1989: <i>geologic resource</i> —1.6 million tons, 0.019 opt Au			
Rossi Mine (Storm resource) (Bootstrap district)	1998: 3.1 million tons, 0.371 opt Au resource		Popovich Formation	Eocene
Trout Creek (Contact district)	1988: 1.5 million tons, 0.04 opt Au	1988: exploration	Miocene sedimentary rocks	

MAJOR PRECIOUS-METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
ELKO COUNTY (continued)				
Tuscarora (Dexter) (Tuscarora district)	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
Winters Creek (Independence Mountains district)	1986: 1.4 million tons, 0.146 opt Au		lower Paleozoic carbonate rocks	Eocene
Wright Window (Independence Mountains district)	1986: 1.3 million tons, 0.095 opt Au	1992: 3,500 oz Au	lower Paleozoic carbonate rocks	Eocene
ESMERALDA COUNTY				
Boss (Gilbert district)	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?
Castle (includes Boss) (Gilbert district)	1996: 3.7 million tons, 0.03 opt Au 1997: 10 million tons, 0.03 opt Au resource		Ordovician Palmetto Formation	
Gemfield (Goldfield district)	1996: 9.5 million tons, 0.04 opt Au 1998: 500,000 oz, 0.04 opt Au		Oligocene Sandstorm Rhyolite	21 Ma?
Goldfield Project (Goldfield district)	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
Hasbrouck (Divide district)	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
Hill of Gold deposit (Divide district)	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
Mary-Drinkwater (Silver Peak district)	1991: 531,300 tons, 0.124 opt Au	1991: 25,000 oz Au, 8,000 oz Ag	Wyman Formation	Mesozoic?
Mineral Ridge (Silver Peak district)	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	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	Wyman Formation	Mesozoic?
Tip Top (Fish Lake Valley district)	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	Tertiary quartz latite	
Three Hills (Tonopah district)	1996: 3.2 million tons, 0.036 opt Au 1997: 6.3 million tons, 0.023 opt Au		Miocene Siebert Formation and Oddie Rhyolite	
Weepah (Weepah district)	1986: 200,000 tons, 0.1 opt Au, 0.4 opt Ag	1986–87: 58,000 oz Au	Wyman Formation	Cretaceous

MAJOR PRECIOUS-METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
EUREKA COUNTY				
Afgan (Antelope district)	1996: 80,000 oz Au drill indicated resource 1999: 2.8 million tons, 0.037 opt Au oxide resource		Webb Formation	
Betze, Post (Lynn district)	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	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	Ordovician to Devonian chert, shale, siltstone, and impure carbonates; in part, Vinini Formation	Eocene
Blue Star (Lynn district)	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 1988–99: included in Newmont Gold production, page 36	lower Paleozoic sandy siltstone and carbonate rocks, granodiorite	Eocene
Bobcat (Lynn district)	1988: <i>geologic resource</i> —17.7 million tons, 0.029 opt Au		lower Paleozoic rocks	Eocene
Buckhorn property (Buckhorn district)	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
Buckhorn South/ Zeke deposit (Buckhorn district)	1989: 2 million tons, 0.056 opt Au, 0.224 opt Ag 1998: 2.4 million tons, 0.046 opt Au		lower Paleozoic rocks	
Bullion Monarch (Lynn district)	1987: 1 million tons, 0.10 opt Au		lower Paleozoic sedimentary rocks	Eocene
Carlin/Pete/ Lantern (Lynn district)	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 1997–99: included in Newmont Gold production, page 36	Roberts Mountains Formation	Eocene
Genesis (Lynn district)	1989: <i>geologic resource</i> —35.8 million tons, 0.044 opt Au 1990: 32 million tons, 0.047 opt Au (includes Blue Star)	1986: production commenced 1988–99: included in Newmont Gold production, page 36	Ordovician-Devonian limestone, argillite chert	Eocene
Genesis/North Star/ Sold (Lynn district)	1996: 22.7 million tons, 0.034 opt Au proven and probable reserves; 11 million tons, 0.050 opt Au mineralized material	1994–95: 684,600 oz Au 1996–99: included in Newmont Gold production, page 36	Ordovician-Devonian limestone, argillite chert	Eocene
Gold Bar (Antelope district)	1984: 2.8 million tons, 0.09 opt Au 1990: mined out in December 1994: 240,000 oz Au 1995: 190,000 oz Au	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?
Gold Canyon (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	(reported with Gold Bar)	Paleozoic sedimentary rocks	Eocene?
Gold Pick (Antelope district)	1988: 10 million tons, 0.06 opt Au 1993: 1.4 million tons, 0.079 opt Au	(reported with Gold Bar)	Paleozoic sedimentary rocks	Eocene?
Gold Quarry/Mac/Tusc (Maggie Creek district)	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	1985: 170,000 oz Au 1988–93: included in Newmont Gold production, page 36 1994–96: 2,978,000 oz Au 1997–99: included in Newmont Gold production, page 36	Ordovician to Devonian chert, shale, siltstone, and impure carbonates; in part, Vinini Formation	Eocene
Gold Ridge (Antelope district)	1988: 4 million tons, 0.06 opt Au 1993: 426,000 tons, 0.059 opt Au	(reported with Gold Bar)	Paleozoic sedimentary rocks	Eocene?

MAJOR PRECIOUS-METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
EUREKA COUNTY (continued)				
Goldstone (Antelope district)	1988: 1.7 million tons, 0.08 opt Au 1993: 130,928 tons, 0.104 opt Au	(reported with Gold Bar)	Paleozoic sedimentary rocks	Eocene?
Horse Canyon (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?
Maggie Creek (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
North Star (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 1989–99: included in Newmont Gold production, page 36	lower Paleozoic sedimentary rocks	Eocene
Post/Goldbug (Lynn district)	1996: 25.6 million tons, 0.190 opt Au proven and probable reserves; 43.6 million tons, 0.079 opt Au mineralized material	1999: included in Newmont Gold production, page 36	lower Paleozoic sedimentary rocks	Eocene
Ratto Canyon (Eureka district)	1984: ~200,000 oz Au		Dunderberg Shale, Hamburg Dolomite	Oligocene
Rock Creek (Eureka-Lander Co. line)	1997: 800,000 tons, 0.045 opt Au	1997: exploration	Tertiary latite tuff	
Rodeo Projects (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			Eocene
Ruby Hill (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	1997–98: 133,100 oz Au, 8,686 oz Ag 1999: 123,841 oz Au, 7,688 oz Ag	Goodwin Limestone	Cretaceous? or Oligocene?
Tonkin Springs (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?
Turf (Lynn district)	1996: 2.5 million tons, 0.367 opt Au mineralized material	included in Newmont Gold production, page 36	Roberts Mountains Formation	Eocene
Tusc (Maggie Creek district)	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 36	lower Paleozoic sedimentary rocks	Eocene
West Leeville (Newmont) (Lynn district)	1996: 2 million tons, 0.377 opt Au proven and probable reserves; 581,000 tons 0.354 opt Au mineralized material	1995–96: 272,800 oz Au 1997–99: included in Newmont Gold production, page 36	Roberts Mountains Formation	Eocene
West Leeville (Newmont-Barrick) (Lynn district)	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
Windfall (Eureka district)	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

MAJOR PRECIOUS-METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
HUMBOLDT COUNTY				
Adelaide Crown (Gold Run district)	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
Ashdown (Vicksburg district)	1987: 1.16 million tons, 0.125 opt Au 1992: 1.1 million tons, 0.12 opt Au		Mesozoic granite	Mesozoic
Buckskin (National district)	1997: 50,221 oz Au, 466,243 oz Ag estimated resource		Miocene rhyolite flows and flow breccias	15 Ma
Chimney Creek (Potosi district)	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: <i>see</i> 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: <i>see</i> Twin Creeks	upper Paleozoic sedimentary rocks	41.9 Ma
Getchell (Potosi district)	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	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	Comus and Preble Formations, granodiorite dikes, granodiorite	42–41 Ma
Hycroft (formerly Crofoot/Lewis) (Sulphur district)	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	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	Camel conglomerate, rhyolite dikes	1–2 Ma
Lone Tree (Buffalo Mountain district)	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	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	Havallah Formation and dacite porphyry	38 Ma
Marigold (Battle Mountain district)	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	1989–93: 322,219 oz Au, 9,784 oz Ag 1994–98: 363,771 oz Au 1999: 74,000 oz Au	Paleozoic chert, argillite, and carbonate rocks	early Oligocene
North Stonehouse (Buffalo Mountain district)	1991: 2.5 million tons, 0.103 oz Au mill ore		Havallah Formation and porphyry dikes	39 Ma
Pinson (includes Mag pit) (Potosi district)	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	Comus Formation	Eocene?
Preble (Potosi district)	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?
Rabbit Creek (Potosi district)	1989: 4.1 million oz Au; <i>additional geologic resource</i> —1 million Au in refractory material 1992: <i>reserves</i> —3.26 million oz Au 1993: <i>see</i> Twin Creeks	1990–92: 296,000 oz Au 1993: <i>see</i> Twin Creeks	Ordovician	Eocene?
Sleeper (Awakening district)	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	Miocene "latite" flows and dikes, silicic ash-flow tuff, Triassic slate and phyllite	16.1 Ma

MAJOR PRECIOUS-METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
HUMBOLDT COUNTY (continued)				
Trenton Canyon (Buffalo Valley district)	1994: <i>oxide resource</i> —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)		Vinini Formation	
Trout Creek (Battle Mountain district)	1989: 50,000 oz Au			
Twin Creeks (Chimney and Rabbit Creeks) (Potosi district)	1993: 5.7 million oz Au 1999: 87.1 million tons, 0.079 opt Au proven and probable	1993–98: 3,338,026 oz Au, 1,317,456 oz Ag 1999: 879,453 oz Au, 119,191 oz Ag	Paleozoic	Eocene?
Winnemucca Gold property (Winnemucca district)	1998: 130,000 to 140,000 oz Au proven, 300,000 oz Au indicated			
LANDER COUNTY				
Austin Gold Venture (Birch Creek district)	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
Battle Mountain Complex (Battle Mountain district)	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	1994–98: 274,741 oz Au, 632,739 oz Ag 1999: 8,322 oz Au, 19,526 oz Ag		Eocene
Buffalo Valley Gold Project (Buffalo Valley district)	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?
Cortez Joint Venture (Bullion district) 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	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	Roberts Mountains Formation, Wenban Limestone, Valmy Formation, quartz porphyry dikes	92.8–94 Ma and 36 Ma
Crescent Pit (Bullion district)	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			
Crescent Valley (Bullion district)	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			
Dean (Lewis district)	1995: <i>proven reserve</i> —11,000 oz Au <i>possible to probable resource</i> —240,000 oz Au			
Elder Creek Project/Shoshone (Lewis district)	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
Fire Creek (northeast of Bullion district)	1982: 350,000 tons, 0.06 opt Au	1983–84: 767 oz Au	basaltic andesite	Miocene

MAJOR PRECIOUS-METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
LANDER COUNTY (continued)				
Fortitude Complex (Battle Mountain district)	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	Battle Formation Antler Peak Limestone Pumpnickel Formation	37 Ma
Fortitude Extension (Battle Mountain district)	1992: 500,000 oz Au 1993: <i>geologic resource</i> —900,000 oz Au 1996: included in Battle Mountain Complex			
Hilltop (Hilltop district)	1984: 10.3 million tons, 0.073 opt Au 1989: 10 million tons, 0.049 opt Au		Valmy Formation	Oligocene?
Klondike property	1989: 100,000 oz Au equivalent			
McCoy/Cove (McCoy district)	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	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	Panther Canyon Formation (conglomerate, sandstone), Augusta Mountain Formation (limestone), granodiorite	39.5 Ma
Mud Springs (Bald Mtn. Zone) (Bullion district)	1993: <i>geologic resource</i> —42,000 oz Au			
Mule Canyon (Argenta district)	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	basalt and basaltic andesite	15–16 Ma
Pipeline (Bullion district)	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?
Robertson (Bullion district)	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
Slaven Canyon property (Bateman Canyon district)	1994: 50,000 oz Au			
South Pipeline (Bullion district)	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?
Surprise (Battle Mountain district)	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
Toiyabe	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?
Victorine (Kingston district)	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		Cambrian to Ordovician Broad Canyon sequence	

MAJOR PRECIOUS-METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
LINCOLN COUNTY				
Atlanta gold property (Atlanta district)	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
Caliente property (Pennsylvania district)	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	
Easter and Delamar Project (Delamar district)	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
LYON COUNTY				
Fire Angel (Como district)	1989: 5,600 oz Au, <i>geologic resource</i> —148,500 oz Au			
Hydra-Hercules (Como district)	1997: 259,329 oz Au, 1,956,511 oz Ag	1997: exploration	Tertiary andesite	
Pine Grove (Pine Grove district)	1994: 2.5 million tons, 0.061 opt Au		Cretaceous granodiorite	
South Comstock Joint Venture (Silver City district)	1994: 3 million tons, 0.05 opt Au 1995: 100,000 oz Au			
Talapoosa (Talapoosa district)	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
MINERAL COUNTY				
Aurora Mine (Aurora district)	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
Aurora Partnership (Aurora district)	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
Borealis (Borealis district)	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
Candelaria Mine (Candelaria district)	1982: 18.5 million tons, 1.09 opt Ag, 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	1982: 1.7 million oz Au, 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

MAJOR PRECIOUS-METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
MINERAL COUNTY (continued)				
Denton-Rawhide (Rawhide district)	1986: 24.1 million tons 0.045 opt Au, 0.47 opt Ag 1989: <i>reserves</i> —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	rhyolite plugs, flows, tuffs, breccias	16 Ma
Mina Gold (Bell district)	1997: 1.77 million tons, 0.055 opt Au geologic resource	1997: exploration	Tertiary feldspar porphyry	
Mindora (Garfield district)	1988: 1.0 million tons, 0.037 opt Au and 1.78 opt Ag	1988: exploration		
Santa Fe (Santa Fe district)	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
NYE COUNTY				
Baxter Springs (Manhattan district)	1988: 1 million tons, 0.050 opt Au 1990: <i>geologic resource</i> —5 million tons 0.050 opt Au			
Bruner property, Duluth zone (Bruner district)	1992: <i>geologic resource</i> —15 million tons, 0.026 opt Au	1993: exploration	Tertiary volcanic rocks	Miocene
Bullfrog (Bullfrog district)	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
Daisy (Bare Mountain district)	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	Cambrian Bonanza King, Nopah, and Carrara Formations	11–13 Ma(?)
Gold Bar (Bullfrog district)	1987: 1.23 million tons Au ore 1993: idle		silicic volcanic rocks	Miocene
Golden Arrow (Golden Arrow district)	1997: 12.4 million tons, 0.039 opt Au resource		Tertiary rhyolite tuff	
Gold Hill property (Round Mt. district)	1998: 306,620 oz Au, 4,871,890 oz Ag potential resource		rhyolite ash-flow tuff	26 Ma(?)
Longstreet property (Longstreet district)	1989: 4 million tons, 0.024 opt Au, <i>geologic resource</i> —9.6 million tons, 0.024 opt Au		rhyolitic volcanic rocks	Oligocene
Manhattan property (Manhattan district)	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	
Midway (Rye Patch district)	1997: 270,000 oz Au preliminary resource		Ordovician Palmetto Formation	
Montgomery Shoshone (Bullfrog district)	1988: 3.1 million tons, 0.072 opt Au, 0.240 opt Ag		rhyolitic ash-flow tuff	9.5 Ma
Nevada Mercury (Bare Mountain district)	1994: <i>geologic resource</i> —50,000 oz Au			
Northumberland (Northumberland district)	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	
Paradise Peak/Ketchup Flats pit (Fairplay district)	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

MAJOR PRECIOUS-METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
NYE COUNTY (continued)				
Reward property (Bare Mountain district)	1998: 77,500 oz Au		Cambrian Wood Canyon Formation	
Round Mountain (Smoky Valley) (Round Mountain district)	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	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	rhyolite ash-flow tuff	26 Ma
Sterling (Bare Mountain district)	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
South Monitor (west of Ellendale district)	1996: 250,000 oz Au 1997: 14 million tons, 0.026 opt Au, 0.12 opt Ag		Tertiary volcanic rock	
Sullivan (Fairplay district)	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
PERSHING COUNTY				
Bunce (Velvet district)	1989: <i>geologic reserve</i> - 600,000 tons, 0.04 opt Au 1990: 500,000 tons, 0.04 opt Au		rhyolite	
Colado Gold (Willard district)	1997: 15 million tons, 0.022 opt Au resource		Triassic-Jurassic metasedimentary rocks	
Florida Canyon (Imlay district)	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	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	Grass Valley Formation	Late Tertiary?
Goldbanks Project (Goldbanks district)	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			
Relief Canyon (Antelope Springs district)	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?
Rochester (Rochester district)	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	1986–98: 810,329 oz Au, 59.3 million oz Ag 1999: 70,396 oz Au, 6.2 million oz Ag	Koipato Group, Weaver Rhyolite	Late Cretaceous
Rosebud Project (Rosebud district)	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	Tertiary volcanic rocks	Miocene
Tag-Wildcat (Farrel district)	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
Trinity (Trinity district)	1987: 1 million tons, 5.25 opt Ag	1988: active, production not reported 1989: 718,714 oz Ag, 70 oz Au	rhyolite plugs	Miocene

MAJOR PRECIOUS-METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
STOREY COUNTY				
Comstock heap leach project (Comstock district)	1992: 475,000 tons, 0.072 opt Au, 0.60 opt Ag 1996: 100,000 oz Au, 1.2 million oz Ag			
Flowers (Golden Eagle) (Comstock district)	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
Oliver Hills (Comstock district)	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		
WASHOE COUNTY				
Mountain View Gold Project (Deephole district)	1995: 19.5 million tons, 0.027 opt Au 1998: 10.7 million tons, 0.055 opt Au		rhyolite	Miocene
Olinghouse (Olinghouse district)	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
Hog Ranch (Leadville district)	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
WHITE PINE COUNTY				
Alligator Ridge (Bald Mountain district)	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
Bald Mountain (Top) (Bald Mountain district)	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	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	quartz porphyry, Cambrian shale and limestone	Jurassic?
Bellview (White Pine district)	1988: 277,000 tons, 0.04 opt Au, <i>geologic resource</i> —1 million tons, 0.036 opt Au			
Casino/Winrock (Bald Mountain district)	1989: Casino - 804,000 tons, 0.054 opt Au; Winrock 1.3 million tons, 0.037 opt Au 1990: Winrock - 993,000 tons, 39,000 oz Au 1992: <i>see</i> Alligator Ridge	1990–92: 46,800 oz Au	late Paleozoic sedimentary rocks	Eocene
Easy Junior (Nighthawk Ridge) (White Pine district)	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
Golden Butte (Cherry Creek district)	1989: 4.23 million tons, 0.031 opt Au	1989–91: 43,519 oz Au, 16,911 oz Ag	Chainman Shale	Cretaceous or Eocene

MAJOR PRECIOUS-METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
WHITE PINE COUNTY (continued)				
Griffon Gold property (White Pine district)	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	
Horseshoe (Bald Mountain district)	1991: 1.5 million tons, 0.039 opt Au		Pilot Shale and intrusive quartz porphyry	36–38 Ma
Illipah (Illipah district)	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?
Little Bald Mtn. (Bald Mountain district)	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
Mt. Hamilton (White Pine district)	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
Pan (White Pine district)	1989: 241,000 oz Au 1998: 10.86 million tons, 0.022 opt Au drill indicated and inferred		Mississippian rocks	
Robinson (Robinson district)	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
Taylor (Taylor district)	1980: 10 million tons, 3 opt Ag	1980: 1,200 tons/day	Guilmette and Joana Limestones, rhyolite dikes	Eocene or Oligocene
White Pine (White Pine district)	1989: 63,000 oz Au, 0.04 opt Au	1989: 20,654 oz Au	Pilot Shale	Oligocene?
Yankee (Bald Mountain district)	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	1,371,184	255,011

NA= not available

Industrial Minerals

by Stephen B. Castor

The total value of industrial minerals produced in Nevada in 1999, an estimated \$381 million, was about 2% above the value in 1998. In order of estimated value, the most important Nevada industrial minerals in 1999 were construction aggregate, lime, diatomite, gypsum, cement, barite, lithium, silica, magnesia, and clay, each valued at more than \$5 million. Commodities with values of less than \$5 million were dolomite, limestone, perlite, salt, and brucite. Colemanite and zeolite were processed in Nevada, but mined nearby in California. Data used for these estimates, and data reported for individual commodities below, were obtained from the Nevada Division of Minerals or directly from companies that produced industrial minerals.

AGGREGATE (SAND, GRAVEL, AND CRUSHED STONE) In 1999, construction aggregate production in Nevada had an approximate total value of \$130 million and was ranked second among the state's mined commodities behind gold. For 1999, statewide aggregate production was estimated at 29 million tons, nearly 10% more than in 1998. Aggregate produced from sand and gravel deposits accounted for about 80% of aggregate production statewide, with crushed stone and lightweight aggregate making up the balance. Aggregate produced in the Las Vegas area, estimated at about 20 million tons, increased about 18% from 1998; this increase may be due, in part, to more complete data for 1999. Production from portable crushers at construction sites throughout the Las Vegas basin makes calculations of the total difficult. Production in the Reno-Sparks-Carson City area, at about 6 million tons, was also higher than in 1998.

Companies in the Las Vegas area that produced more than a million tons of aggregate in 1997, ranked in approximate order of tonnage produced, were Las Vegas Paving Corp., Nevada Ready Mix Corp., CSR (formerly WMK Transit Mix Inc.), Hanson Aggregates West (formerly Bonanza Materials Inc.), and Blue Diamond Materials Co. Other important producers were Frehner Construction Inc., Wells Cargo Inc., Granite Construction Co., and Gornowich Sand and Gravel. The largest Las Vegas producer, Las Vegas Paving Corp., mostly mined aggregate from the new Las Vegas landfill and from a pit in the Lone Mountain area. Nevada Ready Mix, the second leading producer, mined most of its aggregate from an open pit in an alluvial fan in the Lone Mountain area. Hanson Aggregates West (formerly Bonanza Materials) shut down its Stephanie Pit operation in Henderson in 1999 and now produces mainly from granite mined near Railroad Pass. Community pits and other aggregate mining facilities administered by the U.S. Bureau of Land Management and operated by several

companies, provided about 3.3 million tons to the Las Vegas area total in 1999.

In 1999, sand and gravel operations accounted for about 85% of aggregate used in the Las Vegas metropolitan area, with crushed stone and lightweight aggregate making up the balance. Major crushed stone producers in the Las Vegas area were Hanson Aggregates West, Frehner Construction Co., Granite Construction Co., and Southern Nevada Lightweight.

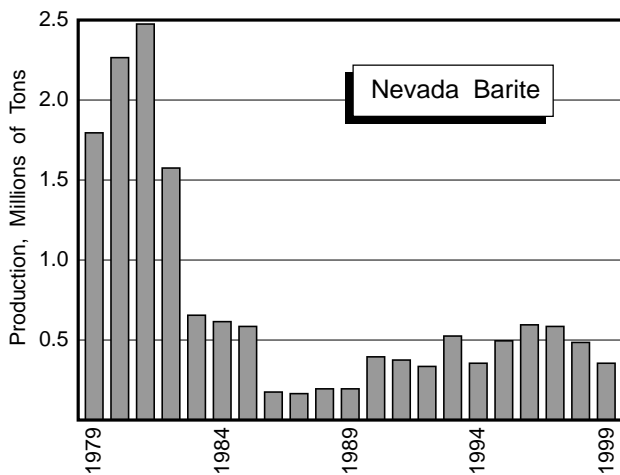
For years, the largest source of Las Vegas aggregate has been near Lone Mountain northwest of Las Vegas. Once a comfortable distance from residential areas, Lone Mountain operations have been subjected to public criticism mostly related to dust and traffic problems. Although significant production still comes from sites located in more heavily urbanized parts of the metropolitan area, such as the Buffalo Road area in the southwest part of Las Vegas, it is likely that future production will come increasingly from more distant sources. The new landfill in Apex near Interstate 80 about ten miles northeast of Las Vegas has recently become a large aggregate production area, and aggregate is being hauled as far as 50 miles from sites in Lincoln County.

In the Reno-Sparks-Carson City area, Granite Construction Co. and All-Lite Aggregate Co. produced more than a million tons of aggregate in 1999. Companies that produced 500,000 or more tons in 1999 included Rocky Ridge Inc. and Rilite Aggregate Company. Paiute Pit Aggregates and A & K Earthmovers, Inc. were also important producers. Crushed rock continued to be an important source of aggregate in this area; crushed rock operations of Granite Construction, Rocky Ridge Inc., and Frehner Construction, and lightweight rhyolite aggregate from All-Lite Aggregate Company, Rilite Aggregate Company, and Naturalite Aggregate Corp. accounted for about 65% of the aggregate used in 1999 in the Reno-Sparks-Carson City area.

BARITE In 1999, barite shipments from Nevada totalled 357,000 tons, about 25% percent less than in 1998. Production has slipped considerably in recent years (from about 600,000 tons in 1996) and is a shadow of the glory years of Nevada barite mining when more than a million tons were produced annually between 1977 and 1982. Active barite producers now number four, compared with more than twenty companies in the early 1980s. Low-priced Chinese barite imports into the Gulf Coast are the main reason for the long-term Nevada decline, although Nevada barite is highly competitive for drilling uses in terms of specific gravity and chemical purity. Somewhat higher production is predicted for 2000 due to increases in North American gas well drilling in late 1999.

M.I. Drilling Fluids Co., now owned by Smith International (60%) and Schlumberger (40%), was again the largest Nevada barite producer, with combined production of more than 200,000 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. In late 1998, Halliburton Co. acquired the Baroid Drilling Fluids Rossi Mine (owned briefly by Dresser Industries) in Elko County and in 1999 continued shipments of drill-grade barite from that property and the Dunphy processing plant in Eureka County. Baker Hughes INTEQ produced barite from its Argenta property (previously a Millpark operation) near Battle Mountain in Lander County.

Standard Industrial Minerals shipped a small amount of barite in 1999 from a deposit of white bedded barite at the P & S Mine in Nye County to a processing plant in Bishop, California. The company markets high-value finely ground (400-mesh) white paint-grade barite with brightness in excess of 80%.



BORATE American Borate Co. mined borate minerals from an underground operation in Death Valley, California, in 1999. The ore is processed at the Lathrop Wells mill in Nye County, but because the ore is from out of state, this production is not included in the estimate of total value of Nevada minerals.

CEMENT The Nevada Cement Co., a subsidiary of Centex Construction Products, Inc., produces Portland cement at a plant at Fernley in Lyon County. Annual production exceeds 500,000 tons of cement. Limestone is mined from Cenozoic lacustrine deposits south of Fernley, and other ingredients come mostly from northern Nevada.

In 1999, Royal Cement Company refurbished and restarted an idle plant near Logandale in Clark County that was formerly operated by Las Vegas Cement. Limestone is mined at a site near the plant; other raw materials are purchased from regional suppliers. Anticipated annual production is in the 250,000 to 300,000 ton range.

CLAY Nevada clay production increased slightly from 1998 to 1999. IMV Nevada, owned by Mud Camp Mining Company, mined about 33,000 tons of sepiolite and saponite from deposits in Neogene 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. It is the only producer of sepiolite and saponite in the United States.

Other Nevada producers ship relatively minor amounts of clay minerals. Vanderbilt Minerals Co. shipped a small amount of clay from widely scattered Nevada deposits from a crushing plant at the New Discovery Mine near Beatty in Nye County in 1999. American Colloid Co. shipped some Nevada clay in 1999, including white bentonite from Coal Canyon near Lovelock in Pershing County and hectorite from the Disaster Peak deposit in Humboldt County. The Art Wilson Co. sold less than 100 tons of montmorillonite from the Jupiter Mine in Lyon County in 1999 for aquaculture. The company also mined halloysite clay from a deposit in Washoe County for Nevada Cement Co.; however the halloysite is not reported as clay in NBMG mineral production figures because it is included in portland cement.

In 1999, Oil Dri, which has been producing cat litter for more than 30 years and produces about 25% of the cat litter used in the United States, announced a discovery of a large montmorillonite clay deposit in Hungry Valley north of Reno. The clay is considered to be excellent material for cat litter, and the company is proceeding with permitting despite local opposition.

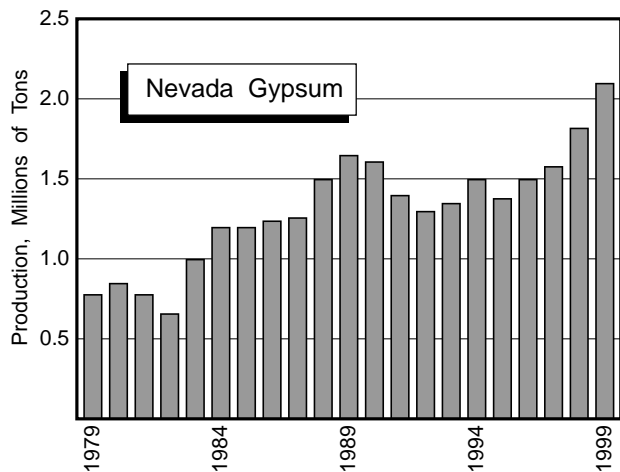
Specialty Clays Corp. of Reno continued development of a deposit of montmorillonite in Churchill County about 12 miles southeast of Fallon, stripping overburden, stockpiling clay, and building a drying and screening plant in 1999. The clay is reportedly comparable to Na-montmorillonite from Wyoming, and the company hopes to market it for drilling and environmental uses.

DIATOMITE Eagle-Picher Minerals, Inc., a division of Eagle-Picher Industries, Inc., produces most of Nevada's diatomite at three different operations. The largest is the Colado operation in Pershing County, which consists a plant east of Lovelock that produces diatomaceous earth filtration products from beds of pure diatomite mined northwest of Lovelock. The company also produces diatomite that is mainly used in fillers and absorbents at its Clark plant and mine in Storey County, and diatomite used in insulation from a pit near Hazen in Lyon County. The company was recently named Nevada Exporter of the Year on the basis of its strong international performance.

Moltan Co. of Tennessee is the second largest diatomite miner in Nevada, producing cat litter, oil absorbent, and soil conditioner from diatomite mined in Churchill County northeast of Fernley. Other companies that produced diatomite in Nevada in 1999 were CR Minerals at Hazen in Lyon County and Grefco Inc. at its Basalt operation near the Esmeralda/Mineral County line.

DIMENSION STONE Nevada Neanderthal Stone had quarried and cut Tertiary tuff near Beatty in Nye County for floor tile and other stone products for about ten years. The operation ceased production in 1999 because of drastic sales declines due to competition from material imported from Mexico following ratification of NAFTA. Decorative stone is produced at several Nevada sites. Las Vegas Rock, which mainly produces crushed landscape rock, produces some sandstone building stone at Goodsprings in Clark County. In 1999, Mount Moriah Stone, of Baker, renewed production of quartzite from quarries in eastern White Pine County under new ownership. The company reportedly produced over 1,000 tons of stone for flagstone, ashlar, and other uses during the year.

GYPSUM Gypsum production in Nevada increased from 1.8 million tons in 1998 to 2.1 million tons in 1999. PABCO Gypsum in Clark County east of Las Vegas was the largest producer, mining over a million tons of ore in 1999; however, actual gypsum production was lower because the ore must be beneficiated to produce a gypsum concentrate. PABCO processes most of this gypsum into wallboard in a plant adjacent to the mine, and also makes plaster. The Blue Diamond operation of James Hardie Gypsum, just southwest of Las Vegas in Clark County, was the second largest producer in 1999 at about 650,000 tons. USG Corp., which mines gypsum in northern Pershing County, was the third largest producer at about 580,000 tons. USG processes the gypsum into wallboard and plaster at its Empire plant in northern Washoe County. The Art Wilson Company, Carson City, shipped about 145,000 tons of gypsum and anhydrite from the Adams Mine in Lyon County for use in cement and agricultural markets. The company is finalizing plans for a bagging plant.



LIME, LIMESTONE, AND DOLOMITE In 1999, lime production in Nevada continued at record levels, increasing 10% over 1998. The lime is produced from Devonian limestone deposits that are located at nearly opposite ends

of the state. The Continental Lime, Inc. Pilot Peak high-calcium lime operation near Wendover in Elko County shipped the most lime in 1999, mainly to Nevada gold mining operations for use in pH control. The Pilot Peak plant, which began as a one kiln operation in 1989, now consists of 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.

Chemical Lime Co. produces lime at Apex near of Las Vegas. The operation mainly produces high-calcium quicklime used in metallurgical processing, paper manufacturing, and environmental markets. The operation also produces dolomitic lime and hydrated high-calcium lime, mainly for use in construction. In late 1997, Chemical Lime shut down its dolomite mining operation at Sloan, south of Las Vegas, where limestone and dolomite had been mined since 1910. Frehner Construction Co. purchased the Sloan property, and is producing construction aggregate from limestone at the site.

In addition to lime, both Continental Lime and Chemical Lime ship crushed limestone. Other carbonate rock producers in Nevada were Min-Ad, Inc. and Nutritional Additives Corp., producers of agricultural dolomite near Winnemucca in Humboldt County. Min-Ad, the larger of the two, shipped about 64,000 tons of ground dolomite in 1999, a slight increase over 1998.

LITHIUM In late 1998, Chemetall GmbH, a subsidiary of the giant international Metallgesellschaft AG, purchased the Silver Peak, Esmeralda County, lithium operation from Cyprus Amax Minerals Company, changing the operator name from Cyprus Foote Mineral Co. to Chemetall Foote Corp. The operation, which produces lithium carbonate and lithium hydroxide compounds from brine that is pumped from beneath Clayton Valley playa and evaporated in nearby ponds, has been active since 1965. In recent years, the Nevada operation benefited from increasing prices, but a new lithium brine operation in South America caused price reductions for large orders of lithium carbonate from about \$2.00/lb to about \$0.90/lb during 1998. In 1999, the bulk price rebounded to about \$1.30/lb. On the basis of Securities Exchange information, production at Silver Peak for 1998 was estimated at 12 million lbs lithium carbonate and 5 million lbs lithium hydroxide.

MAGNESIA Production of magnesia from magnesite at Gabbs in Nye County by Premier Services Corp. was nearly 15% more in 1999 than in 1998. Magnesite and brucite deposits in the Gabbs area have a production history of more than 30 years; for most of this time, including a period of magnesium metal production during World War II and refractory production until the 1980s, the operator was Basic Industries. The magnesia produced presently by the Gabbs plant is light-burned magnesia, which is mainly used in agriculture. Relatively small amounts of brucite are also shipped from Gabbs.

PERLITE In 1999, Eagle-Picher Minerals Inc. produced expanded perlite at the Colado diatomaceous earth facility in Pershing County from perlite that is mined at the Popcorn Mine in Churchill County. The perlite is marketed as a filter aid, and plant capacity is reportedly about 8,000 tons per year.

The Wilkin Mining and Trucking Company mines perlite from the Mackie Mine in Lincoln County. In the past, most of the perlite was shipped as crude; however, the company built a small popping plant in Caliente in 1987 and now sales are almost exclusively of expanded perlite. Shipments in 1999 totaled about 2,000 tons, mainly of large sizes of perlite (including the difficult-to-obtain #4 size) for horticultural uses.

SALT The Huck Salt Co. produced about 15,000 tons of salt in 1999. The salt, mined from a playa deposit on Fourmile Flat near Fallon in Churchill County, is now mainly used for deicing roads. Salt has been harvested from this deposit more or less continuously since it was hauled to the mills that processed Comstock silver and gold ore in the 1860s.

SILICA Simplot Silica Products in Clark County shipped 677,000 tons of silica sand in 1999, an increase of nearly

6% over the 1998 production. The sand is mined from a large deposit of friable Cretaceous sandstone, washed in the pit, and transported via a slurry pipeline to a plant at Overton where it is dried, screened, and shipped in bags or as bulk product.

ZEOLITES American Resource Corp. (formerly East West Minerals) processed clinoptilolite at a plant near Amargosa Valley in Nye County since 1985 when the facility was purchased from Anaconda Minerals. In 1998 American Resource was placed in receivership along with Rea Gold Corp., its parent company. In 1999, Badger Mining Corp., a Wisconsin-based industrial mineral company, acquired the operation, now known as Ash Meadow Zeolite, LLC. The clinoptilolite, used in water filtration, odor control, and nuclear cleanup, is mined from a nearby deposit in California. The new owner has plans for plant expansion and development of a separate deposit in Nevada.

American Colloid Inc. sold the Eastgate plant in Churchill County to Noland Industries, L.L.C. of California in 1998. The plant, acquired from American Resource Corp. in 1995, was originally constructed by East West Minerals in 1987 to process mordenite from Tertiary tuffaceous rocks into cat litter and absorbent products.

Geothermal Energy

by Ronald H. Hess

Seven geothermal well permits were issued during 1999 by the Nevada Division of Minerals: they include six gradient/observation wells and one domestic well (Nevada Division of Minerals, 2000).

During 1999 there were 72 federal geothermal noncompetitive leases covering 107,000 acres and 54 competitive federal leases covering 51,600 acres in Nevada. This is a decrease of 3,800 noncompetitive lease acres and a decrease of 7,300 competitive lease acres from 1998 totals. Lease rental fees for 1999 totaled \$199,800.

Total gross electrical production from geothermal resources on public lands was 1.21 million megawatt-hours (MWh); net production was about 1.01 million MWh. Gross electrical sales from federal lands was \$80.3 million. Production royalties on that amount equaled \$3,670,000.

By regulation, half of all Federal geothermal lease rental fees and production royalties are returned to the state. For 1999, \$1,835,000 in royalty production fees and \$99,900 in lease rental fees should be returned to Nevada (R. Hoops, personal commun., 2000, Bureau of Land Management).

Total Nevada geothermal electrical production from both federal and fee lands combined in 1999 was 1,599,040 MWh gross; net production was 1,288,649 MWh (Nevada Division of Minerals, 2000) with an approximate sales value of \$90,000,000. Production capacity from the currently developed geothermal resources at ten existing geothermal power production sites in Nevada is 211.5 megawatts. Nevada is second only to California in total installed geothermal generating capacity.

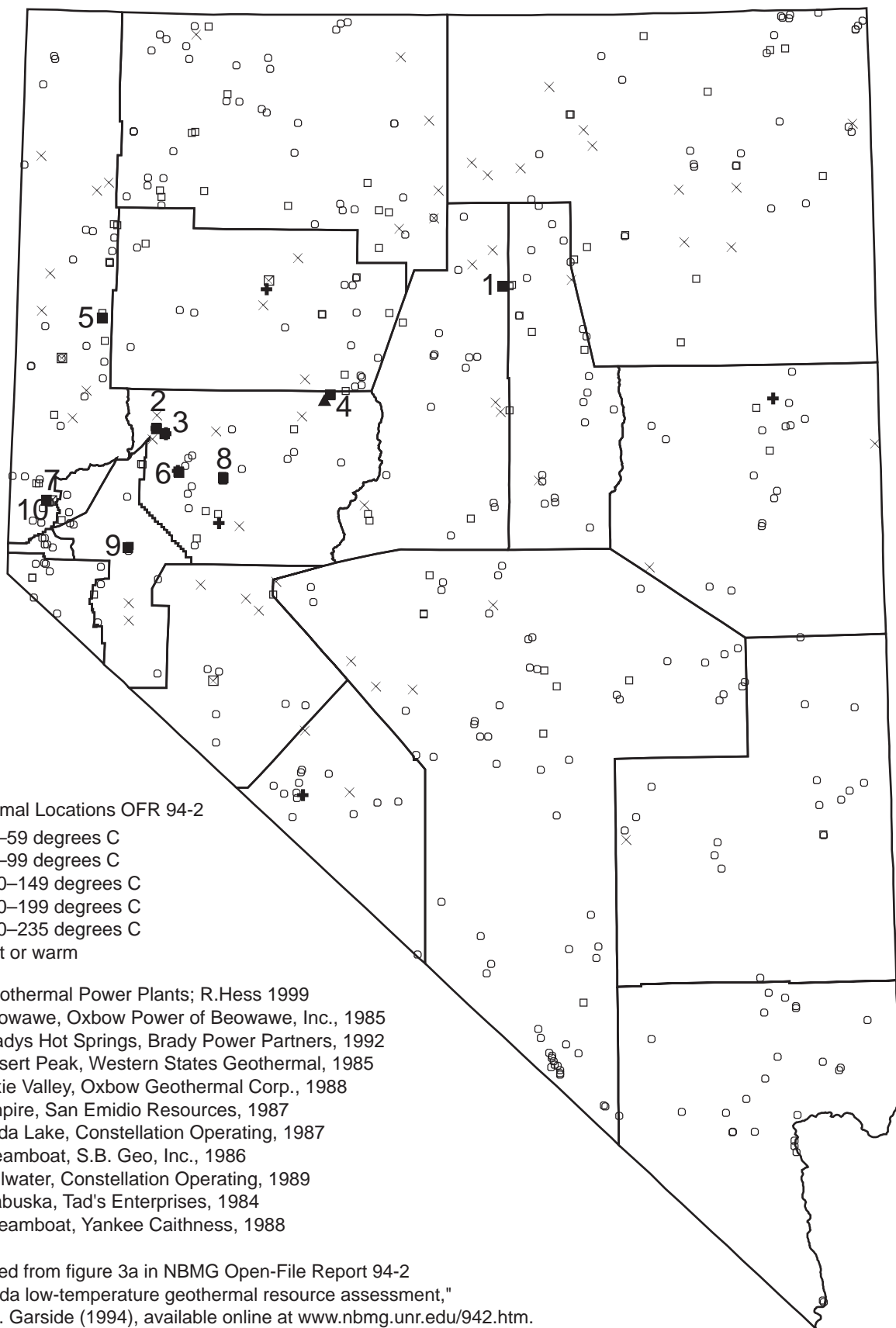
GeoPowering the West

A draft of a new initiative from the Department of Energy, entitled **GeoPowering the West**, has been released. The goals of the initiative are to have geothermal energy sources provide 10% of the electricity needs of Western States by 2020, provide the electrical or heat energy needs of at least 7 million U.S. homes by 2010, and double the number of states with geothermal electrical power production to eight by 2006. Implementation of this initiative will incorporate a broad education and outreach program, increased federal geothermal energy use, technology advancement and deployment initiatives, expanded exploration program, policy incentives, and institutional regulatory improvements. The draft document can be viewed on the web at <www.eren.doe.gov/geopoweringthewest>.

One of the first projects to develop out of this initiative is the "Geothermal Energy in Nevada and the West" conference held at the University of Nevada, Reno on July 6, 2000. This conference was co-hosted by U.S. Senator Harry Reid, U.S. Department of Energy, University of Nevada at Reno, and the Geothermal Energy Association. The Nevada Bureau of Mines and Geology released a new 1:1,000,000-scale geothermal resources map of Nevada at the conference; this map (NBMG Map 126) can be purchased from the NBMG publication sales office. Some of the digital data sets that went into the development of Map 126, including the no-longer-maintained U.S. Geological Survey geothermal database and the digital index to geothermal well files housed at NBMG, are available on the NBMG website at <www.nbmng.unr.edu/lists.htm>

NONDOMESTIC GEOTHERMAL WELLS REPORTED AS DRILLED OR COMPLETED IN NEVADA DURING 1999

Area	Company	Well name	Permit#	Location	Type
Churchill County					
Brady Hot Springs	Brady Power Partners	Industrial Injection Well 61-25	478	NE ¹ / ₄ , S25, T22N, R26E	Injection
	Brady Power Partners	Industrial Injection Well 73-25	479	NE ¹ / ₄ , S25, T22N, R26E	Injection
	Brady Power Partners	Industrial Injection Well 81-25	481	NE ¹ / ₄ , S25, T22N, R26E	Injection
Washoe County					
Steamboat Hot Springs	Diocese of Reno (Bishop Manogue H.S.)	Gradient Well M1	489	NE ¹ / ₄ SW ¹ / ₄ , S17, T18N, R20E	Gradient
	Yankee Caithness	Industrial Production Well 24-5	178	SW ¹ / ₄ NW ¹ / ₄ , S5, T17N, R20E	Production



Geothermal Locations OFR 94-2

- 18–59 degrees C
- 60–99 degrees C
- ⊠ 100–149 degrees C
- ⊕ 150–199 degrees C
- ▲ 200–235 degrees C
- × Hot or warm

- Geothermal Power Plants; R.Hess 1999
- 1. Beowawe, Oxbow Power of Beowawe, Inc., 1985
- 2. Bradys Hot Springs, Brady Power Partners, 1992
- 3. Desert Peak, Western States Geothermal, 1985
- 4. Dixie Valley, Oxbow Geothermal Corp., 1988
- 5. Empire, San Emidio Resources, 1987
- 6. Soda Lake, Constellation Operating, 1987
- 7. Steamboat, S.B. Geo, Inc., 1986
- 8. Stillwater, Constellation Operating, 1989
- 9. Wabuska, Tad's Enterprises, 1984
- 10. Steamboat, Yankee Caithness, 1988

Adapted from figure 3a in NBMG Open-File Report 94-2
 "Nevada low-temperature geothermal resource assessment,"
 by L.J. Garside (1994), available online at www.nbmgs.unr.edu/942.htm.

Nevada Geothermal Resource Occurrences

Bradys Hot Springs and Desert Peak

Brady Power Partners, operators of the **Brady Hot Springs** geothermal power plant have subleased the **Desert Peak** geothermal power plant from **Western States Geothermal Company**. This followed an earlier agreement that allowed the electrical production from the Desert Peak power plant to be used to offset the electric load used by support equipment and injection pumps at the Brady Hot Springs power plant. The use of electrical output from Desert Peak to offset the parasitic equipment load at Bradys insures that the Brady plant will be able to continue providing the minimum net electrical supply required by their existing power purchase agreement (R. Hoops, personal commun., 1999, and Nevada Division of Minerals, 2000).

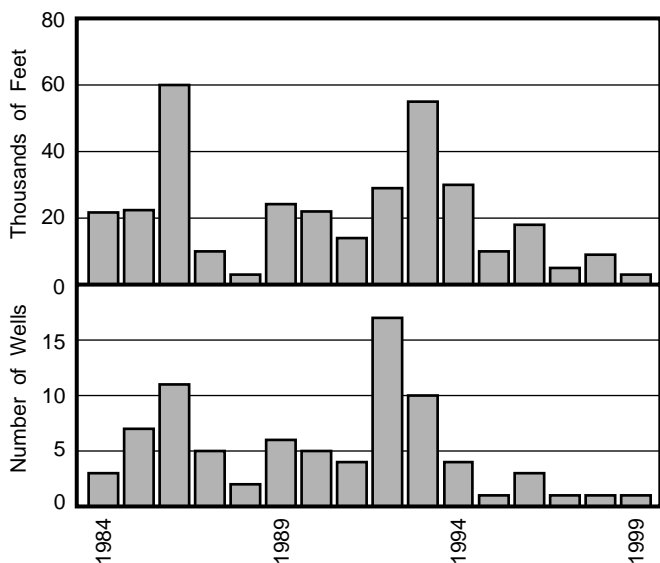
Brady Power Partners drilled several new injection wells during 1999 in development of a new injection field located 4 miles from the Brady Hot Springs Power plant. The injection wells were put online after completion of the pipe system to the new injection field. This new injection site was chosen in an effort to increase the time it takes for spent fluids to return to the production zone. The existing injection wells were returning fluids to the production zone so rapidly that it was lowering the temperature of the production fluids. The new injection field appears to have significantly less direct connectivity with the production reservoir than the older injection wells. Currently, fluid injection is split between the existing injection wells and the new injection wells based on the requirements to maintain the production reservoir water table level (J. Snow, personal commun., 2000, Nevada Division of Minerals).

During 1999 Brady Hot Springs Geothermal Power Plant produced a gross output of 141,444 MWh with a net production of 101,086 MWh. The Desert Peak Geothermal Power Plant produced a gross output of 62,604 MWh with a net production of 52,826 MWh (Nevada Division of Minerals, 2000).

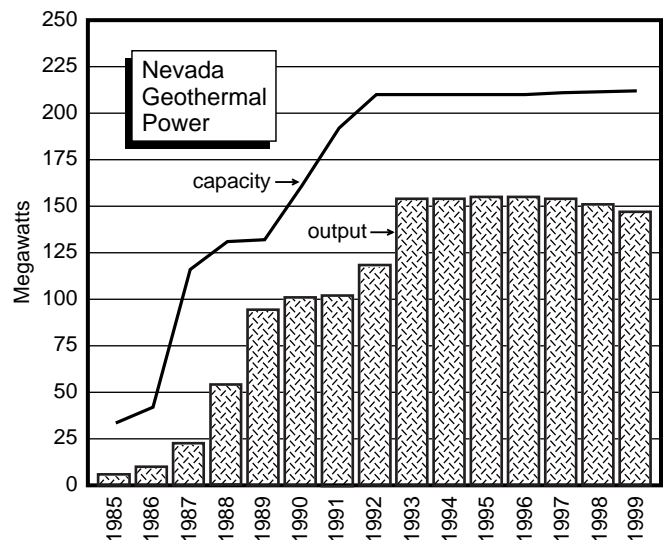
The Brady Hot Springs onion dehydration plant, operated by **Gilroy Foods** a subsidiary of **U.S.F.I.**, installed a second drying line, which has doubled their drying capacity. This plant was constructed in 1978 and originally designed to dry 25 to 30 million pounds of raw onions annually. The dehydration plant currently uses 1100 gallons per minute of geothermal fluids supplied directly from Brady Power Plant production wells. (L.J. Garside, 1980, The Nevada Mineral Industry 1979, NBMG Special Publication MI-1979; J. Snow, personal commun., 2000)

Dixie Valley

Negotiations pertaining to the potential sale of the **Oxbow Geothermal Corporation, Dixie Valley** power plant to **Caithness Power** are ongoing. More detailed information on the purchase is currently not available. The Dixie Valley power plant has been operated by Oxbow Geothermal Corporation since its startup in 1988. The Dixie Valley power plant utilizes 250°C geothermal fluids to generate about 66 megawatts. During 1999 it produced a gross output of 524,980 MWh with a net production of 469,769 MWh. The Dixie Valley geothermal plant is currently the single largest geothermal energy producer in Nevada.



Industrial-class (power generating) wells drilled in Nevada 1984–1999. Depth taken from original drilling permit.



Currently developed resource capacity and average net output of Nevada geothermal plants, 1985–1999. 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.

Empire

Empire Farms, a garlic and onion producer, operates a vegetable dehydration plant which uses geothermal fluids from the Empire geothermal area in northern Washoe County. Empire Farms received a \$1.4 million low interest loan from the U.S. Department of Agriculture, Rural Housing Program, for construction of additional housing units for employees. Empire Farms routinely employs about 200 people; during harvest time this number increases to 450. Rental housing in the immediate area is limited and many employees commute from Fernley. Upon completion of the 20 additional units funded under this project there will be a total of 56 houses at Empire Farms. (Reno Gazette-Journal, May 22, 2000)

Empire Farms recently installed a preheater to the dehydration production facility to increase plant production. The plant utilizes geothermal fluids from production wells in the Empire geothermal field. After the fluid has been used at the dehydration facility it is piped to the Empire Geothermal Power Plant where, along with

geothermal fluids produced directly from the geothermal field, it becomes the heat source for the binary generation plant (J. Snow, personal commun., 2000). The Empire Geothermal Power Plant came on-line in 1987 and has a rated binary generation capacity of 4.8 megawatts. During 1999 it produced a gross output of 36,622 MWh with a net production of 30,842 MWh.

Rye Patch

Rye Patch Energy Company and Mount Wheeler Power Company have completed negotiations that will allow more well field development for the Rye Patch geothermal plant. The first new well will be drilled in early 2000. This is an effort to better define the production field and secure adequate geothermal fluid so that the nearly complete Rye Patch geothermal plant can be brought on-line. When the plant is brought on-line it is anticipated that electrical production from the plant will be wheeled to the Mount Wheeler service area in eastern Nevada.

NEVADA GEOTHERMAL POWER PLANTS 1999

Plant name (year on line)	Production capacity ¹ (MW)	1999 Production (MWh)		Location	Operator
		Gross	Net (sales)		
Beowawe (1985)	16.7 (16.6)	129,301	105,769	S13,T31N,R47E	Oxbow Power of Beowawe, Inc. HC 66, Unit 1, Box 16 Beowawe, NV 89821
Bradys Hot Springs (1992)	21.1 (26.4)	141,444	101,086	S12,T22N,R26E	Brady Power Partners P.O. Box 649 Fernley, NV 89408
Desert Peak (1985)	9.9 (11.0)	62,604	52,826	S21,T22N,R27E	Western States Geothermal Co. c/o Brady Power Partners P.O. Box 649 Fernley, NV 89408
Dixie Valley ² (1988)	66.0 (62.0)	524,980	469,769	S7,T24N,R37E S33,T25N,R37E	Oxbow Geothermal Corp. 9790 Gateway Dr. Suite 220 Reno, NV 89511
Empire (1987)	4.6 (4.8)	36,622	30,842	S21,T29N,R23E	San Emidio Resources P.O. Box 40 Empire, NV 89405
Soda Lake No. 1 (1987) and Soda Lake No. 2 (1991)	16.6 (26.1)	125,660	91,944	S33,T20N,R28E	Constellation Operating Services 5500 Soda Lake Road Fallon, NV 89406
Steamboat I, I-A (1986) and Steamboat II, III (1992)	48.0 (53.7)	405,224	301,188	S29,T18N,R20E	S.B. Geo, Inc. P.O. Box 18199 1010 Power Plant Dr. Reno, NV 89511
Stillwater (1989)	13.0 (21.0)	94,822	65,194	S1,T19N,R30E S6,T19N,R31E	Constellation Operating Services 5500 Soda Lake Road Fallon, NV 89406
Wabuska (1984)	1.2 (1.45)	8,207	8,207	S15,16,T15N, R25E	Tad's Enterprises 3535 Southampton Dr. Reno, NV 89509
Yankee Caithness (1988)	14.4 (14.44)	70,176	61,824	S5,6,T17N,R20E	Yankee Caithness J.V.L.P. P.O. Box 18160 Reno, NV 89511
TOTAL	211.5 (237.5)	1,599,040	1,288,649		

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

2. Gross output of the Dixie Valley plant occasionally exceeds 66 MW.

Oil and Gas

by David A. Davis

Production

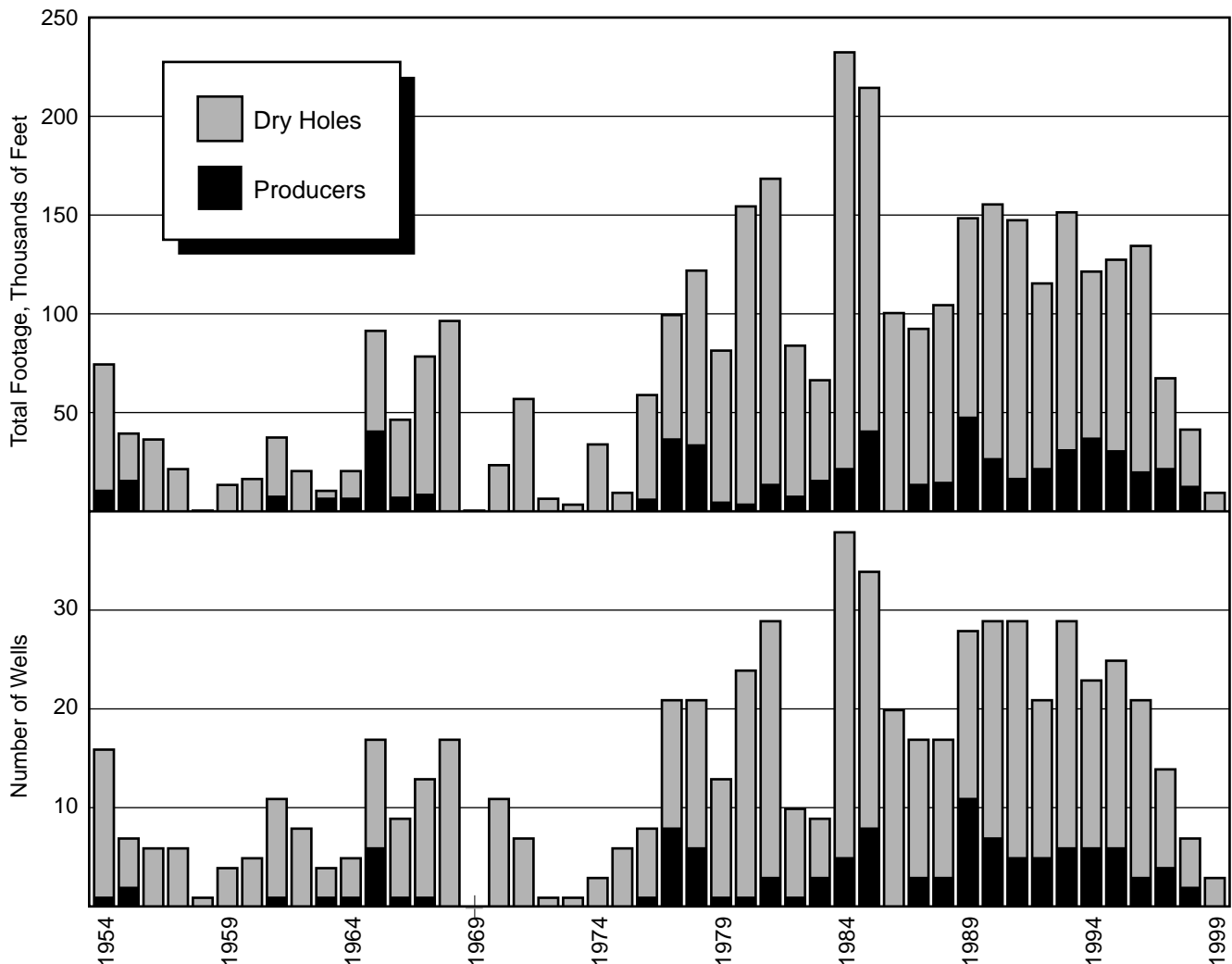
In 1999, Nevada produced oil from 13 of its 15 fields in Nye, Eureka, and Elko Counties. In 1999, 99 wells were listed as producers. No new producers came on line, and one was plugged and abandoned. Thirty-two were shut in for 6 months or more. Twenty-six of these were shut in for the entire year, of which by year's end seven had been shut in for 1 to 2 years, five had been shut in for 2 to 3 years, and 14 had been shut in for more than 3 years.

According to the Nevada Division of Minerals, the net oil production in 1999 was 705,980 barrels, which is 0.033% of the total U.S. production. The 11.6% decline in oil production from 1998 to 1999 is due to an overall drop of 19.1% in production in 13 fields that was only slightly offset by a 3.1% production increase in two fields. The average net wellhead price for Nevada crude oil in

1999 increased 34% to \$13.87 per barrel, and the sales volume was \$9,792,000.

Nevada's highest volume producer was Grant Canyon No. 9, which averaged 267 barrels of oil and 437 barrels of water per day during 1999. Grant Canyon No. 9 has held this ranking since 1996. Trap Spring No. 9 became Nevada's second highest volume producer in 1999 with 143 barrels of oil and 1,839 barrels of water per day, replacing Blackburn Unit No. 19, which averaged 140 barrels of oil and 1,240 barrels of water per day and had been Nevada's second highest volume producer since 1996.

Oil production from the Bacon Flat Field decreased 10.2% while water production decreased 88.2%. Only one of its three producers was in operation during 1999. One well has been shut-in for 6 years and the other for 11 years.



Number and total footage of Nevada oil wells completed as producers or plugged and abandoned, 1954–1999.

Oil production from the Blackburn Field decreased 20.2% while water production increased 0.02%. Oil production dropped in six wells, and increased in one. The decrease in two wells was due to them being shut in since the end of 1998. One well was shut-in for the first four months of 1999.

Oil production from the Eagle Springs Field decreased 26.4% while water production decreased 20.6%. Of the 21 wells listed as producers, seven were shut in throughout 1999, three wells were shut in for 1 to 6 months, and one was shut in for 7 to 12 months. Of the seven yearlong shut-ins, one last produced in January 1998, five have been shut in for 2 to 4 years, and one has been shut in for 13 years. Of the 14 wells actually producing, three had production increases, but 11 had production decreases.

Oil production from the Ghost Ranch Field decreased 24.5% while water production increased 17.9%. One well was completed as a producer in 1997 but has been shut in since then. Oil production decreased from the other three producers.

Oil production from the Grant Canyon Field decreased 10.6% while water production increased 5.3%. Oil production declined from two of the four producers. One producer has been shut-in for 6 years and the remaining one for 7 years.

Oil production from the Kate Spring Field decreased 6.4% while water production increased 1.5%. Of the six wells listed as producers, production decreased at three wells and increased at one. One well has been shut in for 2 years and another for 6 years. A total of 7,987 thousand cubic feet of gas was produced from the Kate Spring Field in 1999, a decrease of 7.8% from 1998. The gas is used to operate production and related equipment at the lease sites of Makoil, Inc. and Western General, Inc.

Oil production from the only producer in the Sand Dune Field increased 21.3% and water production increased 128%. Oil production from the Sans Spring Field decreased 49.1% while water production decreased 9.7%. Of the three producers listed, one was active, one

has been shut-in since March 1998, and one has been shut-in for 6 years and is now listed as temporarily abandoned.

Oil production from the Trap Spring Field increased 2.2% while water production increased 14.7%. Of Trap Spring's 43 wells listed as producers, seven were shut in throughout 1999, two were shut in for 1 to 6 months, and two were shut in for 7 to 12 months. Of the seven year-long shut-ins JN Federal 1 was plugged and abandoned in January 1999 after being shut-in since 1997, one has been shut-in since June 1998, two have been shut-in for 3 years, two have been shut-in for 7 years (one of these produced for 3 days in April 1998), one has been shut-in for 8 years, and one has been shut-in for 13 years. Of the 36 wells actually producing, 19 had production increases, and 17 had production decreases.

Of Nevada's minor fields, oil production from the Currant Field's only well decreased 87.8%. The Deadman Creek Field's only producer was plugged and abandoned in November 1998. Oil production from the Duckwater Field's only producer decreased 81.1% while water production decreased 81.8%. Oil production from the North Willow Creek Field decreased 91.8% while only 4 barrels of water were produced compared with none in 1998. Of North Willow's two producers, one produced only in May and the other has been shut-in for 2 years. Oil production from the Tomera Ranch Field's only producer decreased 30.7% while water production decreased 12.2%. Both of the producers in the Three Bar Field remained shut in throughout 1999; one for 5 years and the other for 7 years.

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 is transported by tank trucks to the Foreland Corp. (formerly: Petro Source Refining Corp.) 8,000 barrel per day capacity refinery and asphalt storage plant near Currant in Railroad Valley. The Foreland Corp. refinery and asphalt storage facility at Tonopah is used to process specialty hydrocarbons from California and other states.

OIL WELL DRILLING ACTIVITY IN NEVADA IN 1999

Company	Well	Permit No.	Location	Permit Date	Spud Date	Completion Date	Depth (Ft.)	Status
EUREKA COUNTY								
V.F. Neuhaus Properties	Tomera Ranch No. 33-1	826	SW ¹ / ₄ SW ¹ / ₄ S33 T31N R52E	Jul-99	Aug-99	Sep-99	3748	P&A
LINCOLN COUNTY								
Falcon Energy/Kriac Energy, Inc.	Hamlin Wash No. 18-1R	805	SE ¹ / ₄ SE ¹ / ₄ S18 T8N R70E	Aug-97	Aug-97	Sep-97		TA
Falcon Energy/Kriac Energy, Inc.	Kriac No. 3	810	SE ¹ / ₄ SE ¹ / ₄ S18 T8N R70E	Dec-97	Jan-98			Suspended
NYE COUNTY								
Makoil, Inc.	Munson Ranch No. 11-44	672	SE ¹ / ₄ SE ¹ / ₄ S11 T9N R56E	Apr-93	Jun-94	Jun-94	3660	TA
Big West Oil and Gas, Inc.	Federal No. 12-14	673	NW ¹ / ₄ SW ¹ / ₄ S14 T7N R56E	Apr-93	May-93	Jun-93	6106	TA
Makoil, Inc.	Trap Spring No. 27-32X	804	SW ¹ / ₄ NE ¹ / ₄ S27 T9N R56E	Aug-97	Sep-99			Drilled
Eagle Exploration, Inc.	Meteor Federal Well No. 1	822	SW ¹ / ₄ NW ¹ / ₄ S34 T10N R56E	Jul-98	Aug-98	Mar-99		TA
PERSHING COUNTY								
Evans-Barton, Ltd.	Kyle Spring No. 11-23	819	NE ¹ / ₄ SW ¹ / ₄ S11 T29N R36E	Jul-98	Dec-99	Dec-99	2020	P&A
Evans-Barton, Ltd.	Kyle Spring No. 11-43	821	NE ¹ / ₄ SE ¹ / ₄ S11 T29N R36E	Jul-98	Sep-98			Testing
WHITE PINE COUNTY								
Paleozoic Prospects, Inc.	PPI Bugs No. 1	809	NE ¹ / ₄ NW ¹ / ₄ S33 T33N R59E	Nov-97	Nov-97			Suspended

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

In May 1999, Foreland Corporation completed and started up a roofing asphalt plant with a capacity of 60,000 tons per year at Woods Cross, Utah. Nevada oil produces a premium asphalt for the manufacture of roofing materials. Foreland entered into a joint production and marketing agreement with the Trumbull Division of Owens Corning. Trumbull is the world's largest producer and marketer of roofing asphalt, and Foreland's new facility will market products under the Trumbull brand name in the Salt Lake area, northern California, and eight western states (www.foreland.com).

New Producers

No new wells were completed as producers in 1999.

Exploration

Three wells were spudded for oil and gas in 1999, down from ten spudded in 1998.

Drilling was completed on three wells during 1999. Drilling totaled 5,768 feet on two of those wells. The third well completed had a proposed depth of 5,000 feet. Drilling suspended on one well spudded in 1997 and another spudded in 1998 remained suspended throughout 1999 on both. One well spudded in 1998 was listed as being tested throughout 1999. One well spudded in 1998 was listed as temporarily abandoned in 1999. Also, one well completed in 1993, one completed in 1994, and one completed in 1997 and all subsequently listed as temporarily abandoned, remained so throughout 1999.

In 1999, only one drill rig operated, and that was for the period of July through December. No significant oil shows were reported for these wells.

Transfers

No transfers of wells occurred in 1999. However, in August 2000, Foreland Corp. transferred its wells being operated by Eagle Springs Production, LLC to the Deerfield Production Co.

1998 Update

The Foreland Corp.'s Dixie Flat Federal No. 1-4 (NE1/4, SE1/4, SW1/4, sec. 4, T32N,R54E) was spudded November 9, 1998, and completed to a depth of 2,007 feet on November 24, 1998. It was plugged and abandoned.

Other Developments

In February 1999, as part of an effort to preserve the nation's oil production capacity, U.S. Department of Energy Secretary Bill Richardson announced a program to provide technical assistance to small oil producers for innovative ways to keep their fields producing. Through the National Petroleum Technology Office, grants totaling \$1,139,500 had been given to 17 such companies by the end of 1999. In Nevada, Makoil, Inc., was selected for their proposed 12-month project to increase oil recovery through advanced reprocessing of 3-D seismic data for the Grant Canyon and Bacon Flat Fields. Makoil

FEDERAL OIL AND GAS LEASES IN EFFECT IN FISCAL YEARS 1998 AND 1999 ¹												
County	NUMBER OF LEASES						ACREAGE					
	Competitive		Noncompetitive		Simultaneous ²		Competitive		Noncompetitive		Simultaneous ²	
	FY98	FY99	FY98	FY99	FY98	FY99	FY98	FY99	FY98	FY99	FY98	FY99
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	1	2	1	0	0	0	640	5,761	640
Douglas	0	0	0	0	0	0	0	0	0	0	0	0
Elko	1	0	10	4	5	4	720	0	14,237	16,023	10,435	9,948
Esmeralda	0	0	0	0	0	0	0	0	47,810	0	0	0
Eureka	14	0	2	4	13	5	18,076	0	3,120	5,850	14,358	6,166
Humboldt	0	0	0	0	0	0	0	0	0	0	0	0
Lander	0	0	2	0	0	0	0	0	3,874	0	0	0
Lincoln	2	0	1	2	4	3	1,271	0	2,080	2,041	17,805	8,960
Lyon	0	0	0	0	0	0	0	0	0	0	0	0
Mineral	0	0	0	0	0	0	0	0	12,441	0	0	0
Nye	42	2	23	22	28	19	38,673	120	28,719	17,100	13,137	7,998
Pershing	0	0	0	0	0	0	0	0	0	0	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	6	0	10	1	6	3	5,634	0	17,703	3,840	22,331	7,040
TOTAL	65	2	46	34	60	37	64,374	120	65,859	45,494	89,106	46,030

¹Data from the U.S. Bureau of Land Management
²These 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.

FY98 = Oct. 1997-Sept. 1998; FY99 = Oct. 1998-Sept. 1999

PRODUCTION OF NEVADA'S OIL FIELDS (barrels)

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

Field (year discovered)	Thru 1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
Eagle Springs (1954)	4,029,244	49,767	7,075	66,565	162,296	171,638	137,278	111,562	82,067	4,817,492
Trap Spring (1976)	9,925,889	554,410	427,150	378,955	362,985	306,858	288,686	257,921	263,566	12,766,420
Currant (1979)	641	0	0	0	278	0	202	230	28	1,379
Bacon Flat (1981)	314,660	178,845	102,030	192,601	43,057	23,891	22,465	18,757	16,849	918,155
Blackburn (1982)	2,346,767	231,719	599,857	576,853	435,975	239,934	151,151	112,008	89,400	4,783,664
Grant Canyon (1983)	16,308,547	2,499,831	495,934	308,709	202,129	168,163	143,707	126,128	112,715	20,253,148
Kate Spring (1986)	1,044,807	203,274	150,309	122,436	104,574	87,789	76,280	69,768	65,315	1,924,552
Tomera Ranch (1987)	12,150	2,295	2,140	1,970	1,405	387	659	574	398	21,580
N. Willow Creek (1988)	19,027	4,491	3,928	3,736	6,419	3,619	1,478	1,502	123	44,323
Three Bar (1990)	21,285	362	1,961	229	0	0	0	0	0	23,837
Duckwater Creek (1990)	7,285	2,764	2,256	1,269	655	433	168	491	93	15,414
Sans Spring (1993)			69,478	44,279	22,174	17,228	45,000	21,759	10,956	230,874
Ghost Ranch (1996)						34,166	113,016	65,370	49,348	261,900
Deadman Creek (1996)							109	258	0	367
Sand Dune (1998)								12,465	15,122	27,587
TOTAL	34,030,302	3,727,758	1,862,118	1,697,602	1,341,947	1,059,106	980,199	798,793	705,980	46,203,805
Change from previous year		9%	-50%	-9%	-21%	-21%	-7%	-19%	-12%	

will provide cost sharing of \$74,000 and the DOE will provide matching funds (www.fe.doe.gov/techline/tl_indoil3.html).

Effective August 2, 1999, the amount of the administrative fee that a producer of oil or natural gas must pay is 10 cents (100 mills) per barrel of oil or 50,000 cubic feet of natural gas, as appropriate. However, in support of the industry's efforts to discover and produce new oil and gas reserves, the Commission on Mineral

Resources proposes to reduce the administrative fee to one half of one cent (5 mills) commencing January 1, 2000, for all new production as part of its Nevada Oil Exploration and Production Incentive Program. New production is defined as production from new wells or existing wells completed in new intervals as determined by the Commission on Mineral resources. Any qualifying well will receive a reduced administrative fee for one full year. Upon completion of a qualifying well, the producer

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	1995	1996	1997	1998	1999	Total
Eagle Springs (1954)	160,982	331,999	432,300	364,900	410,290	325,574	2,026,045
Trap Spring (1976)	3,066,458	3,079,669	2,870,437	3,046,366	2,444,444	2,802,716	17,310,090
Currant (1979)	0	0	0	0	0	0	0
Bacon Flat (1981)	341	127,111	107,164	100,708	14,929	1,756	352,009
Blackburn (1982)	2,035,611	2,041,599	1,788,791	1,777,941	1,937,981	1,938,408	11,520,331
Grant Canyon (1983)	153,794	260,390	284,006	335,603	377,934	397,888	1,809,615
Kate Spring (1986)	467,059	514,034	580,219	529,503	476,347	483,483	3,050,645
Tomera Ranch (1987)	27,676	36,645	15,013	31,948	35,441	31,121	177,844
N. Willow Creek (1988)	871	923	727	135	0	4	2,660
Three Bar (1990)	5,958	0	0	0	0	0	5,958
Duckwater (1990)	23,336	12,592	6,787	1,853	4,620	840	50,028
Sans Spring (1993)	252,190	263,659	273,928	233,046	363,845	328,544	1,715,212
Ghost Ranch (1996)			2,775	99,945	171,921	202,678	477,319
Deadman Creek (1996)				0	0	0	0
Sand Dune (1998)					23,335	53,115	76,450
Total	6,194,276	6,668,621	6,362,147	6,521,948	6,261,087	6,566,127	38,574,206
Change from previous year		10.8%	-4.5%	2.5%	-4.0%	4.9%	

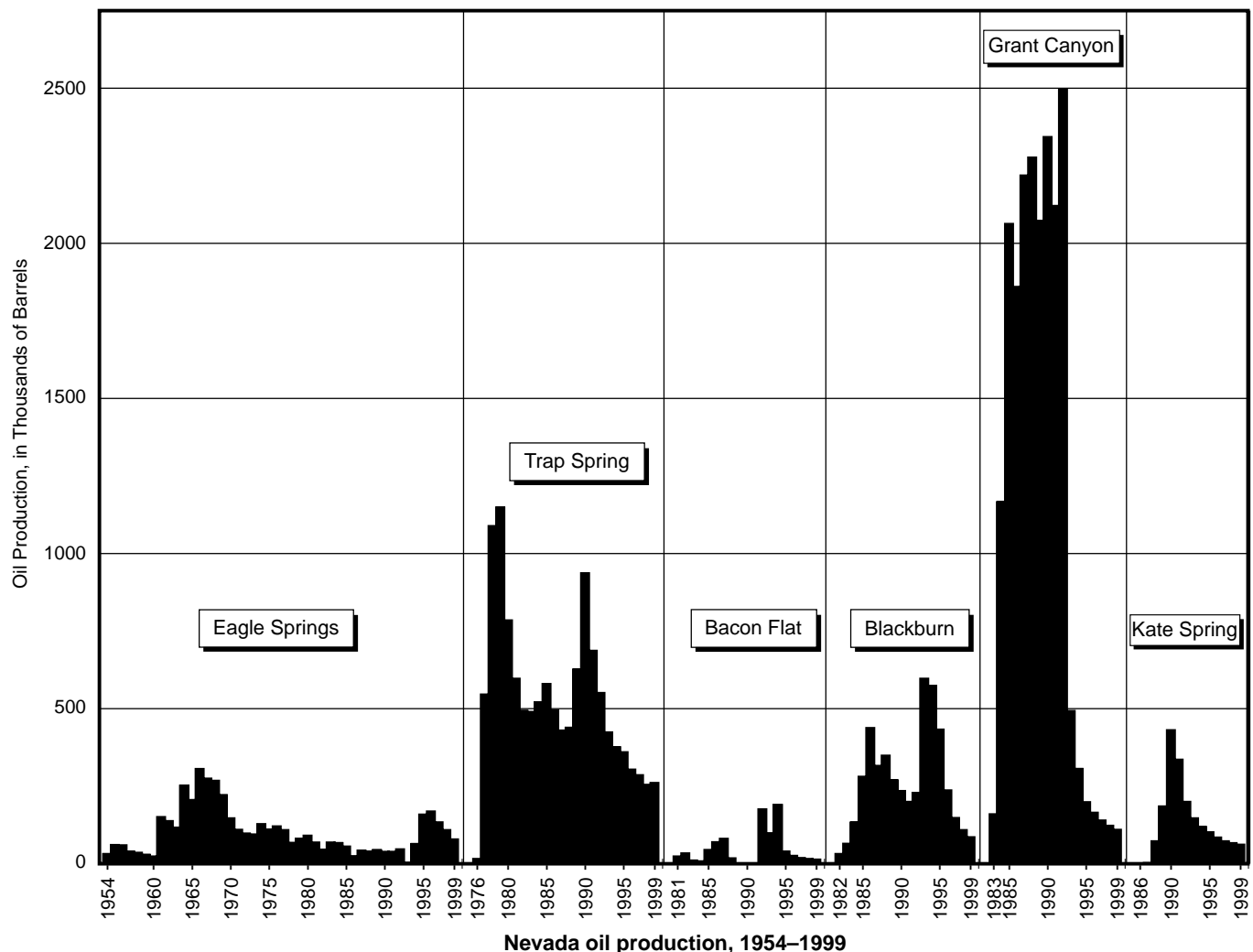
will submit a Form 5, "Well Completion Report." The put on production date as reported on Form 5 will be the effective date for the reduced fee. The Nevada Oil Exploration and Production Incentive Program will be evaluated on an annual basis for continuation, modification, or termination.

U.S. Oil Production and Consumption

According to the Energy Information Agency (EIA) of the Department of Energy (www.eia.doe.gov), crude oil imports accounted for 59.2% of U. S. consumption in 1999, which surpasses the previous annual peak of 58.2% set in 1998. Domestic crude oil production dropped to its lowest level since 1950, and dependence on imports reached a new high. U. S. crude oil production averaged 5.925 million barrels per day in 1999, 5.2% less than in 1998, and consumption increased by 2.5%. Oil provided about 40.8% of the nation's total energy supply in 1999, up slightly from 40.5% in 1998. This percentage has hovered near 40% since 1991. The use of oil for the production of electricity decreased 19.5% in 1999, after rising 42.7% in 1998. However, it only accounted for 3.0%

of electrical production in 1999, down from 3.8% in 1998, and 2.0% of oil consumption in 1999, down from 2.6% in 1998. The use of oil for gasoline production increased 1.5% and accounted for 43.2% of oil consumption in 1999, down from 43.6% in 1998. This percentage has hovered near 43% since 1982. The price of oil increased 53.0% from an average \$10.76 in 1998 to \$16.46 per barrel in 1999 for imported oil, and 43.1% from an average \$10.87 to \$15.56 per barrel for domestic oil. The increase was largely due to OPEC cutting production below demand to decrease the world stockpile and to raise historically low prices, which had cut deeply into their revenues, caused severe cutbacks in exploration, and shut-in a number of low production wells (www.eia.doe.gov).

In comparison to oil, natural gas consumption increased 0.005% to 21,382 billion cubic feet (bcf) in 1999, the first annual increase since 1996 when consumption peaked at 21,967 bcf. Production of electricity accounted for 14.6% of natural gas consumption in 1999, down from 15.3% in 1998. Natural gas provided 23.8% of the nation's total energy supply in 1999 compared to 24.0% in 1998 and a peak of 25.3% in



1995. The use of natural gas for the production of electricity decreased 0.04%. Industrial consumption also declined 0.004%, but commercial consumption increased 0.02%, and residential consumption increased 0.03%. The average wellhead price increased 6.7% from an average of \$1.94 per thousand cubic feet in 1998 to \$2.07 in 1999 (www.eia.doe.gov).

Coal consumption in 1999 was 1,038,512,000 tons, only slightly less than the record set in 1998, and the

fourth year in a row of consumption over 1 billion short tons. Production of electricity accounted for 87.3% of coal consumption in 1999, down from 89.5% in 1998. Coal provided 23.3% of the nation's total energy supply in 1999. This percentage has hovered near 23% since 1983. The price of coal delivered to electrical utilities declined 3.5% from an average \$25.81 in 1998 to \$24.91 per short ton in 1999 (www.eia.doe.gov).

NEVADA OIL PRODUCERS (minerals.state.nv.us/nvoilprod.htm)			
Company	Field	Contact	Address and Phone and FAX Numbers
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 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
Foreland Corp.	North Willow Creek Tomera Ranch	David T. Greene	143 Union Blvd., Suite 210 Lakewood, CO 80228 Phone (303) 988-3122 FAX (303) 988-3234
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
Western General	Kate Spring	Rick Taylor	4899 South Torrey Pines No. 201 Las Vegas, NV 89103 Phone (702) 220-7065 FAX (702) 220-7066

NEVADA OIL REFINERIES		
Company	Refinery	Address and Phone Number
Foreland Refining	Currant	66 Miles South of Ely Ely, NV 89301 Phone (775) 863-0229
Foreland Refining	Tonopah	105 Refinery Road Tonopah, NV 89049 Phone (775) 482-3555

Directory of Mining and Milling Operations

Compiled from information supplied by the Nevada Division of Minerals, Nevada Division of Mine Inspection, and U.S. Mine Safety and Health Administration. Sand and gravel operations with less than 300,000 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, PL = placer, UG = underground mine.

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
CHURCHILL COUNTY							
Huck Salt	Huck Salt Co.	S12,T16N,R31E	salt	OS	solar evaporation	4	5033 Austin Hwy. Fallon, NV 89406 775-423-2055 Fax: 423-0467
Moltan Mine and Plant	Moltan Co.	S28,32, T23N,R27E	diatomaceous earth	OP,ML	drying crushing screening	51	P.O. Box 860 Fernley, NV 89408-0860 775-423-6668 Fax: 423-6411
Popcorn Perlite Mine	Eagle-Picher Minerals, Inc.	S24,T16N,R28E S19,T16N,R29E	perlite	OP		1	P.O. Box 10480 Reno, NV 89510 775-824-7700 Fax: 284-7633
CLARK COUNTY							
Apex Quarry and Plant	Chemical Lime Co.	S14,22,23,26,27,34,35 T18S,R63E	lime	OP,ML	crushing calcining hydrating	60	P.O. Box 3609 North Las Vegas, NV 89036 702-643-7702 Fax: 643-9517
Apex Landfill Pit	Las Vegas Paving Corp.	S19,T18S,R64E	sand gravel	OP	crushing screening		4420 S. Decatur Boulevard Las Vegas, NV 89103 702-378-6102
Blue Diamond Mine and Mill	James Hardie Gypsum, Inc.	S20,29-31, T21S,R59E; S5-8,T22S,R59E S24-26,T21S,R58E	gypsum	OP,ML	grinding calcining	121	HCR 89033, Box 2900 Las Vegas, NV 89124 702-875-4111 Fax: 875-4213
Buffalo Road Pit and Mill	CSR West	S21,T21S,R60E	sand gravel	OP,ML	crushing screening	18	4511 S. Buffalo Road Las Vegas, NV 89117 702-876-2699 Fax: 871-8139
Eldorado Pit	Hanson Aggregates West	S11,T23S,R63E	crushed stone	OP	crushing screening	20	4905 Portraits Place Las Vegas, NV 89129 702-293-2083
Gornowich Plant	Gornowich Sand & Gravel, Inc.	S15,22,T23S, R63E	sand gravel	OP	screening	8	3450 S. Procyon Avenue Las Vegas, NV 89102 702-876-2777
Henderson Plant	Chemical Lime Co.	S18,T22S,R63E	dolomitic lime	ML	calcining	43	P.O. Box 127 Henderson, NV 89015 702-565-8991
Jones Pit	Blue Diamond Materials	S26,T22S,R60E	sand gravel	OP	crushing screening	17	89 Glen Carran Circle Sparks, NV 89431 775-263-2150
Lone Mountain Community Pit	various	S2,T20S,R59E	sand gravel	OP	crushing screening		Bureau of Land Management 4765 W. Vegas Drive Las Vegas, NV 89108 702-647-5000 Fax: 647-5023
Lone Mountain Mendenhall Pit	Las Vegas Paving Corp.	S35,T19S,R59E	sand gravel	OP	crushing screening	7	4420 S. Decatur Boulevard Las Vegas, NV 89103 702-378-6102
Lone Mountain Nevada Ready Mix Pit	Nevada Ready Mix Corp.	S36,T19S,R59E	sand gravel	OP,ML	crushing screening	32	P.O. Box 42755 Las Vegas, NV 89104 702-457-1115
Lone Mountain Stocks Pit	Southern Nevada Paving	S3,4,T20S,R59E; S34,35,T19S,R59E	sand gravel	OP	crushing screening	35	3555 Polaris Avenue Las Vegas, NV 89102 702-876-5226
Money Pit	Southern Nevada Liteweight, Inc.	S9,16,T25S,R61E	lightweight aggregate	OP	crushing screening	12	1101 E. Alexander Road Las Vegas, NV 89030 702-399-8621 Fax: 633-5830
Royal Cement Quarry and Plant	Royal Cement Co.	S4,T15S,R67E	limestone cement	OP	rotary kiln		5501 N. Moapa Valley Blvd. Logandale, NV 89021 702-398-3533

continued

DIRECTORY OF MINING AND MILLING OPERATIONS (continued)

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
CLARK COUNTY (continued)							
PABCO Gypsum Pit and Plant	Pacific Coast Building Products, Inc.	S7,T20S,R64E	gypsum	OP	crushing wash plant	83	1973 N. Nellis Boulevard #328 Las Vegas, NV 89115 702-643-1016 Fax: 643-6249
Simplot Silica Products Pit and Mill	Simplot Industries	S30,T16S,R68E	silica sand	OP,ML	flotation drying screening	44	P.O. Box 308 Overton, NV 89040 702-397-2667 Fax: 397-2798
Sloan rock pit	Frehner Construction Co.	S13,T23S,R60E	sand gravel	OS,ML	single bench crushing screening	11	124 West Brooks Avenue North Las Vegas, NV 89030 702-649-6250
Spring Mountain Pit and Mill	Wells Cargo, Inc.	S15,T21S,R60E	sand gravel	OS,ML	multiple bench crushing screening	8	P.O. Box 81170 Las Vegas, NV 89180 702-873-7440
ELKO COUNTY							
Dee Gold Mine	Rayrock Mines, Inc.	S33,34,T37N,R49E; S3,4,T36N,R49E	gold silver	OP,ML	milling HL	70	P.O. Box 160 Valmy, NV 89438 775-635-8810 Fax: 635-8858
Dunphy Mill	Baroid Drilling Fluids, Inc.	S26,T33N,R48E	barite	ML	crushing grinding	36	912 Dunphy Ranch Road Battle Mountain, NV 89820 775-468-0515 Fax: 468-2060
Jerritt Canyon Joint Venture	Independence Mining Co.	T39-41N,R52-54E	gold silver	OP,ML,UG	CIP, CIL HL	407	HC31, Box 78 Elko, NV 89801 775-758-9221 Fax: 758-5433
Ken Snyder Mine	Dynatec Mining Corp.	S21,22,27,28,33,34 T39N,R46E	gold silver	UG	milling	108	HC 66 Box 105 Midas, NV 89414 775-529-0611 Fax: 529-0612
Kinsley Mountain Mine	Alta Gold Co.	S4,5,6,T26N,R68E	gold	OP	HL	8	778 Great Basin Blvd. Ely, NV 89301 775-289-3007 Fax: 289-4138
Meikle Mine	Barrick Goldstrike Mines, Inc.	S13,T36N,R50E	gold	UG	CIL cyanide autoclaving	440	P.O. Box 29 Elko, NV 89803 775-778-8191 Fax: 738-6543
Pilot Peak Lime Plant	Continental Lime, Inc.	S14,15,22,23,26, T34N,R68E	lime	OP,ML	multiple bench roasting grinding rotary kiln	50	P.O. Box 2520 Wendover, NV 89883 775-483-5463 Fax: 483-5149
Rossi Mine	Baroid Drilling Fluids, Inc.	S14-16,21-23,26-28, 34-35; S15,21,22, T37N,R49E	barite	OP	multiple bench crushing	9	912 Dunphy Ranch Road Battle Mountain, NV 89820 775-468-0515 Fax: 468-2060
ESMERALDA COUNTY							
Basalt Mine and Mill	Grefco Minerals, Inc.	S29-32,T2N,R34E	diatomaceous earth	OP,ML	grinding	5	P.O. Box 288 Mina, NV 89422 Dicalite Toll Station #1 Fax: 760-872-6006
Blanco Mine	Vanderbilt Minerals Corp.	S22,T1N,R37E	clay	OP	single bench	6	2320 Viking Road Las Vegas, NV 89109 775-732-3174
Mineral Ridge Mine	Mineral Ridge Resources, Inc.	S1,2,12, T2S,R38E S6,T2S,R39E	gold silver	OP	HL	92	P.O. Box 67 Silver Peak, NV 89047 775-937-2266 Fax: 937-2201
Silver Peak Operations	Chemetall Foote Co.	S22,T2S,R39E	lithium carbonate	OS	solar evaporation precipitation	82	P.O. Box 98 Silver Peak, NV 89047 775-937-2266 Fax: 937-2202
EUREKA COUNTY							
Betze-Post Mine	Barrick Goldstrike Mines, Inc.	S12,20,29,30, T36N,R50E; S23-26,T36N,R49E	gold silver	OP,ML	CIL cyanide milling	1,592	P.O. Box 29 Elko, NV 89803 775-778-8191 Fax: 738-6543
Gold Bar Mine	Atlas Gold Mining, Inc.	S26,27,T22N,R49E	gold	OP,ML,HL	CIL,CIP	7	P.O. Box 282 Eureka, NV 89316 775-237-5621

DIRECTORY OF MINING AND MILLING OPERATIONS (continued)

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
EUREKA COUNTY (continued)							
Newmont Gold Operations	Newmont Mining Corp.	T31-36N, R49-53E	gold silver mercury	OP,ML, UG	bioleaching HL roasting	1,400	P.O. Box 669 Carlin, NV 89822-0669 775-778-4000 Fax: 778-4757
Ruby Hill Mine	Homestake Mining Co.	S9-11,14,15 T19N,R53E	gold silver	OP,ML	HL	98	P.O. Box 676 Eureka, NV 89316 775-237-6060 Fax: 237-5408
HUMBOLDT COUNTY							
Bonanza Opal Mine	Lloyd H. Olds	S13,T45N,R25E	precious opal	OP	single bench	3	P.O. Box 13 Denio, NV 89404
Crofoot/Lewis Mine (Hycroft)	Hycroft Resources & Development, Inc.	S35,T35N,R29E; S19,T35N,R30E	gold silver	OP	crushing HL	35	P.O. Box 3030 Winnemucca, NV 89446 775-623-5260 Fax: 623-0215
Disaster Peak Clay Mine	American Colloid Co.	S26,T47N,R34E	hectorite	OP	single bench		1500 West Shure Drive Arlington Heights, IL 60004 847-392-4600 Fax: 506-6199
Getchell Mine	Getchell Gold Corp.	S33,T39N,R42E	gold silver	UG	milling	314	P.O. Box 220 Golconda, NV 89414 775-529-5001 Fax: 529-0752
Kelley Mine	C. George Hewitt	S30,T45N,R26E	precious opal	OP		1	P.O. Box 33 Denio, NV 89404
Lone Tree Mine	Newmont Gold Corp.	S1,11,13,15,23, T34N,R42E	gold silver	OP,ML	HL oxide milling flotation	351	P.O. Box 388 Valmy, NV 89438 775-635-9000 Fax: 635-0111
Marigold Mine	Rayrock Mines, Inc.	S8,9,18-20, T33N,R43E	gold	OP,ML	HL	88	P.O. Box 9 Valmy, NV 89438 775-623-9571 Fax: 635-2551
MIN-AD Mine and Mill	MIN-AD, Inc.	S25,T36N,R37E; S28,T35N,R38E	dolomite	OP	grinding air separation screening	21	4210 W. Junco Road Winnemucca, NV 89445 775-623-5944 Fax: 623-9028
Pinson Mine	Pinson Mining Co.	S28,29,32,33, T38N,R42E	gold silver	OP,ML	HL, CIL	13	P.O. Box 129 Winnemucca, NV 89445 775-529-5026 Fax: 529-5030
Sexton Mill	Nutritional Additives Corp.	S20,T36N,R38E	dolomite	ML	crushing screening	4	1230 Bridge Street Winnemucca, NV 89445 775-623-1151 Fax: 623-1153
Trenton Canyon Mine	Newmont Gold Co.	S7,18,19, T32N,R43E	gold silver	OP			P.O. Box 69 Golconda, NV 89414 775-623-4300 Fax: 635-4602
Twin Creeks Mine	Newmont Gold Co.	S3-10,15-22,27-32 T39N,R43E	gold silver	OP	HL milling	781	P.O. Box 69 Golconda, NV 89414 775-623-4300 Fax: 635-4602
LANDER COUNTY							
Argenta Mine and Mill	Baker Hughes INTEQ	S13,14,T32N,R46E; S6,18,19,T32N,R47E	barite	OP	gravity grinding	18	P.O. Box 277 Battle Mountain, NV 89820 775-635-5441
Battle Mountain Complex	Battle Mountain Gold Co.	S22,27,33,34, T31N,R43E	gold silver	OP	HL	23	P.O. Box 1627 Battle Mountain, NV 89820 775-635-2465 Fax: 635-8677
Battle Mountain Grinding Plant	M-I LLC	S18,T32N,R45E	barite	ML	gravity grinding	20	P.O. Box 370 Battle Mountain, NV 89820 775-635-5135 Fax: 635-2191
Cortez Gold Mines	Placer Dome, North America	S33,34, T27N,R47E	gold silver	OP,ML	HL CIL	402	HC66-50 Beowawe, NV 89821 775-468-4400 Fax: 468-4496
Greystone Mine	M-I LLC	S35,T28N,R45E	barite	OP	gravity	40	P.O. Box 370 Battle Mountain, NV 89820 775-635-5135 Fax: 635-2191

continued

DIRECTORY OF MINING AND MILLING OPERATIONS (continued)

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
LANDER COUNTY (continued)							
McCoy/Cove Mine	Echo Bay Minerals Co.	S2-11,T28N,R42E; S36,T29N,R42E	gold silver	OP,ML	HL milling	280	P.O. Box 1658 Battle Mountain, NV 89820 775-635-5500 Fax: 635-5098
Mule Canyon Mine	Newmont Gold Co.	T31/32N,R47E	gold	OP			P.O. Box 388 Valmy, NV 89438 775-635-9000 Fax: 635-0111
LINCOLN COUNTY							
Delamar-Mackie Perlite Mine and Caliente Plant	Wilkin Mining & Trucking Co.	S34,T4S,R62E (mine); S5,T4S,R67E (plant)	perlite	UG,ML	room pillar crushing expansion	10	P.O. Box 829 Panaca, NV 89042 775-728-4463 Fax: 728-4456
LYON COUNTY							
Adams Claim	Art Wilson Co.	S25,T16N,R20E	gypsum/ anhydrite	OP,ML	crushing	7	P.O. Box 20160 Carson City, NV 89721 775-882-0700 Fax: 882-0790
Hazen Pit	Eagle-Picher Minerals, Inc.	S6,9,T19N,R26E	diatomite	OP	crushing drying calcining	2	P.O. Box 10408 Reno, NV 89510 775-824-7700 Fax: 824-7715
Nevada Cement Mine and Plant	Nevada Cement Co.	S3-6,9,T19N,R25E S36,T40N,R24E; S31-33,T20N,R25E S2,3,10,11, T20N,R25E	limestone cement	OP,ML	rotary kiln	130	P.O. Box 840 Fernley, NV 89408 775-575-2281 Fax: 575-4387
Section 8 Mine and Fernley Mill	CR Minerals Corp.	S8,17,T19N,R26E S11,T20N,R24E	diatomaceous earth	OP,ML	grinding drying milling	18	P.O. Box 858 Fernley, NV 89408 775-575-2536 Fax: 575-4857
MINERAL COUNTY							
Candelaria Mine	Kinross Candelaria Mining Co.	S32-34,T4N,R35E;	silver gold	OP	HL Merrill-Crowe	4	P.O. Box 1240 Hawthorne, NV 89415 775-573-2471 Fax: 573-2520
Denton-Rawhide Mine	Kennecott Rawhide Mining Co.	S4,5,8,16,17, T13N,R32E	silver gold	OP	HL	184	P.O. Box 2070 Fallon, NV 89407 775-945-1015 Fax: 945-1213
NYE COUNTY							
Ash Meadows Plant	Badger Mining	S25,T18S,R50E	zeolite	ML	screening drying bagging	4	State Route 15 P.O. Box 7006 Amargosa Valley, NV 89020 775-372-5524
Bullfrog Mine	Barrick Bullfrog, Inc.	S15-22 T12S,R46E	gold silver	OP,UG	milling	52	P.O. Box 519 Beatty, NV 89003 775-553-2900 Fax: 553-2963
Cinder Cone Pit	Cind-R-Lite Co.	S36,T14S,R48E; S1,T15S,R48E	cinder	OP	gravity	2	3333 Cinder Lane Las Vegas, NV 89103 702-876-1775
Crown Mine /lone Placer/ Primary Mill	lone Gold Mining Co.	S28,34, T13N,R39E	gold silver	ML,OP	screening washing	15	Route 1, Box 29A Austin (lone), NV 89310 775-964-2003
Daisy Gold Mine	Rayrock Mines, Inc.	S11-15,22,23, T12S,R47E; S7,8,18, T12S,R48E	gold	OP	HL	43	P.O. Box 190 Beatty, NV 89003 775-553-2234 Fax: 553-2295
Gabbs Mine and Mill	Premier Refractories International	S23,25-27,34-36, T12N,R36E	magnesite	OP,ML	calcining gravity grinding packaging	79	P.O. Box 177 Gabbs, NV 89409 775-285-2601 Fax: 285-4021
IMV Plant and Pits	Mud Camp Mining Co.	S28,29,T17S,R49E; S6,21,T17S,R51E	clay minerals	OP	screening grinding drying	31	Route Box 549 Amargosa Valley, NV 89020 775-372-5341 Fax: 372-5640

DIRECTORY OF MINING AND MILLING OPERATIONS (continued)

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
NYE COUNTY (continued)							
Lathrop Mill	American Borate Co.	S36,T17S,R49E	calcium borate	ML	flotation calcination	9	Star Route 15 Box 610 Amargosa Valley, NV 89020 775-372-5339
New Discovery Mine and Mill	Vanderbilt Minerals Corp.	S13,14,T12S,R46E; S18,19,T12S,R47E	clay	UG,ML	grinding bagging	6	2320 Viking Road Las Vegas, NV 89109 775-732-3174 Fax: 731-3621
P & S Mine	Standard Industrial Minerals	S11,14,15, T13N,R45E	barite	OP			P.O. Box 10477 Reno, NV 89509 775-358-8710
Round Mountain Mine	Round Mountain Gold Corp.	S19,20,29,30, T10N,R44E	gold silver	OP,ML	HL	673	P.O. Box 480 Round Mountain, NV 89045 775-377-2366 Fax: 377-3240
Sterling Mine	Imperial Minerals	S13,T13S,R48E	gold	UG,OP	HL	12	P.O. Box 549 Beatty, NV 89003 775-222-4844 Fax: 372-1720

PERSHING COUNTY

Buff Mine	Vanderbilt Minerals Corp.	S2,T27N,R32E	clay	OP	single bench	6	2320 Viking Road Las Vegas, NV 89109 702-732-3174
Coeur Rochester Mine	Coeur D'Alene Mines Corp.	S9,10,11,15,16, 21,22,27,28, T28N,R34E	silver gold	OP	HL Merrill-Crowe	238	P.O. Box 1057 Lovelock, NV 89419 775-273-7995 Fax: 273-7423
Colado Mine and Plant	Eagle-Picher Minerals, Inc.	S6,7,16,18,21,25, T28N,R29E; S33,T28N,R32E	diatomite perlite	OP,ML	drying classification grinding calcining	140	150 Coal Canyon Road Lovelock, NV 89419 775-824-7540 Fax: 824-7582
Empire Quarry	United States Gypsum Co.	S31,T31N,R24E	gypsum	OP	crushing calcining	10	P.O. Box 130 Empire, NV 89405 775-557-2341 Fax: 557-2212
Florida Canyon Mine	Florida Canyon Mining, Inc.	S1-4,9-15,T31N,R33E S37-39,T31 ¹ / ₂ N,R33E S33-35,T32N,R33E	gold silver	OP	HL	192	P.O. Box 330 Imlay, NV 89418 775-538-7300 Fax: 538-7324
Rosebud Mine	Hecla Mining Co.	S13,24,T34N,R29E S18,19,T34N,R30E	gold silver	UG		95	P.O. Box 2610 Winnemucca, NV 89446 775-623-6912 Fax: 623-6967
Section 8 Mine	American Colloid Co.	S8,T27N,R33E	clay	OP	single bench		1500 West Shure Drive Arlington Heights, IL 60004 847-392-4600 Fax: 506-6199
Sexton Mine and Mill	Nutritional Additives Corp.	S5,8,T34N,R38E	dolomite	OP	milling	4	415 Wellington Street Winnemucca, NV 89445 775-623-1151 Fax: 623-1153

STOREY COUNTY

Clark Mine and Mill	Eagle-Picher Minerals, Inc.	S27,33,34, T20N,R23E; S35,T20N,R22E	diatomite	OP,ML	grinding drying	74	P.O. Box 10408 Reno, NV 89510 775-824-7700 Fax: 824-7715
Lower Naturalite Pit and Plant	Naturalite Aggregate Corp.	S16,T17N,R22E	lightweight aggregate	OS,ML	multiple bench crushing screening	6	2600 Boeing Way Carson City, NV 89701

WASHOE COUNTY

Bella Vista Pit	A&K Earth Movers Inc.	S3,T18N,R20E	rock gravel	OP	single bench screening		P.O. Box 1059 Fallon, NV 89407 775-423-8898
Clay Mine	Art Wilson Co., contractor for Nevada Cement Co.	S13,T27N,R19E	clay	OP	single bench	5	P.O. Box 1160 Carson City, NV 89702 775-246-0282

continued

DIRECTORY OF MINING AND MILLING OPERATIONS (continued)

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
WASHOE COUNTY (continued)							
Empire Mill	United States Gypsum Co.	S11,13,T31N,R23E	gypsum	ML	grinding calcining	136	P.O. Box 130 Empire, NV 89405 775-557-2341
Lockwood Quarry	Granite Construction Co.	S17,T19N,R21E	aggregate	OP	single bench crushing screening	7	P.O. Box 2087 Sparks, NV 89432 775-358-8792
Olinghouse Mine	Alta Gold Co.	S20,29,T21N,R23E	gold silver	OP	HL	23	1525 E. Newlands Drive #1 Fernley, NV 89408 775-575-0583 Fax: 575-0617
Paiute Pit	Paiute Pit Aggregates, Inc.	S22,27,34, T21N,R24E	sand gravel	OP	single bench	7	1437 Furneaux Road Marysville, CA 950801 530-742-7124 Fax: 742-3707
Rilite Aggregate Pit	Rilite Aggregate Co.	S23,T18N,R20E	aggregate	OP	grinding crushing	8	P.O. Box 11767 Reno, NV 89511 775-853-1463
Sha-Neva Pits	Rocky Ridge Inc.	S24,T21N,R19E; S17,T19N,R21E	aggregate	OP	screening	6	11059 State Route 445 Sparks, NV 89436 775-425-4455 Fax: 425-5131
Sky Ranch Pit	Rocky Ridge, Inc.	S15,T21N,R20E	sand gravel	OS,ML	multiple bench crushing screening	15	11059 State Route 445 Sparks, NV 89436 775-425-4455 Fax: 425-5131
WHITE PINE COUNTY							
Bald Mountain Mine (Includes Alligator Ridge, Yankee Projects)	Placer Dome U.S. Inc.	S14,15,19,20 T24N,R57E	gold	OP	HL	158	P.O. Box 2706 Eiko, NV 89803 775-744-4227 Fax: 744-4216
Griffon Mine	Alta Gold Co.	S24,2S,T14N,R58E	gold silver	OP	HL	7	778 Great Basin Blvd. Ely, NV 89301 775-289-3007 Fax: 289-4138
Robinson Mine	BHP Nevada Mining Co.	S7-18,T16N,R62E	copper gold silver	OP,ML	milling	440	P.O. Box 382 Ruth, NV 89319 775-289-7214 Fax: 289-7103

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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)
- Oil and gas wells drilled in Nevada since 1907 (L-8)
- Nevada mining and you (SP8)
- Nevada ore and concentrate buyers, custom mills, and smelters available to mine operators (L-7)
- Major mines of Nevada 1999 (P-11)
- Outline of Nevada mining history (SP15)
- Mining districts of Nevada (R47)

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- mineral resources and reserves
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