

Nevada Bureau of Mines and Geology

Special Publication MI-1998

The Nevada Mineral Industry 1998

This report, twentieth of an annual series, describes 1998 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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OF NEVADA
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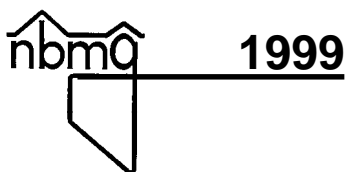
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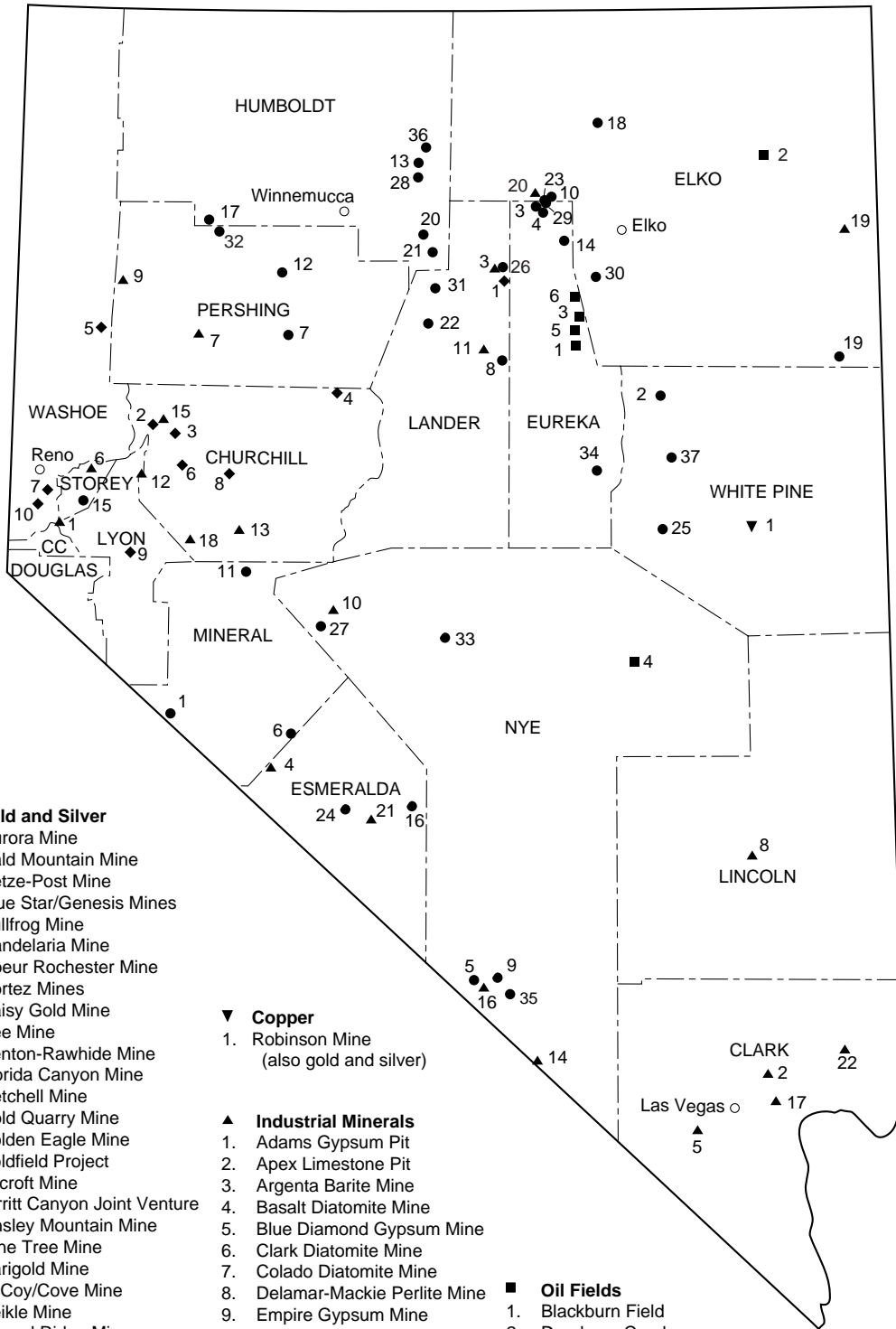
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1998

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7. Coeur Rochester Mine
8. Cortez Mines
9. Daisy Gold Mine
10. Dee Mine
11. Denton-Rawhide Mine
12. Florida Canyon Mine
13. Getchell Mine
14. Gold Quarry Mine
15. Golden Eagle Mine
16. Goldfield Project
17. Hycroft Mine
18. Jerritt Canyon Joint Venture
19. Kinsley Mountain Mine
20. Lone Tree Mine
21. Marigold Mine
22. McCoy/Cove Mine
23. Meikle Mine
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25. Mount Hamilton Mine
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- | | |
|-----------------------|---------------------------------|
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| 5. Empire | 10. Yankee Caithness |

Major mines, oil fields, and geothermal plants, 1998.

Overview

by Jonathan G. Price and Richard O. Meeuwig

Mineral and energy production in Nevada in 1998, valued at \$3.3 billion, continues to be a major factor in the state and national economies. Nevada ranks first in the nation in production of gold, silver, barite, lithium, and mercury, which are sold on both national and international markets. The quantity of Nevada gold production rose to a record high of nearly 8.9 million troy ounces (276 metric tons) in 1998, although lower prices (down from an average price of \$331 per ounce in 1997 to \$294 in 1998) prevented the overall value from changing substantially. Contributions to the Nevada and U.S. economies are significant in terms of jobs, commerce, taxes, improvements to the infrastructure, and lowering of the U.S. trade deficit. 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.

Nevada ranked first in the United States in terms of the value of nonfuel (excluding oil, gas, coal, and geothermal energy) mineral production in 1998. California, boosted by large demands for construction raw materials, was the second largest nonfuel mineral producer in 1998, and Arizona, which is a world leader in copper production, was third.

This report highlights activities through 1998 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 1998, the Nevada Division of Minerals collected data for Nevada Bureau of Mines and Geology Special Publication P-10, *Major Mines*

of Nevada 1998. This publication includes, in handbook form, location maps, names and telephone numbers of operators, numbers of employees, and preliminary, non-proprietary production figures for most mines in Nevada. The full contents of this publication are available on the World Wide Web (www.nbmj.unr.edu/mm98.htm). 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 \$2.6 billion and came from 33 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.

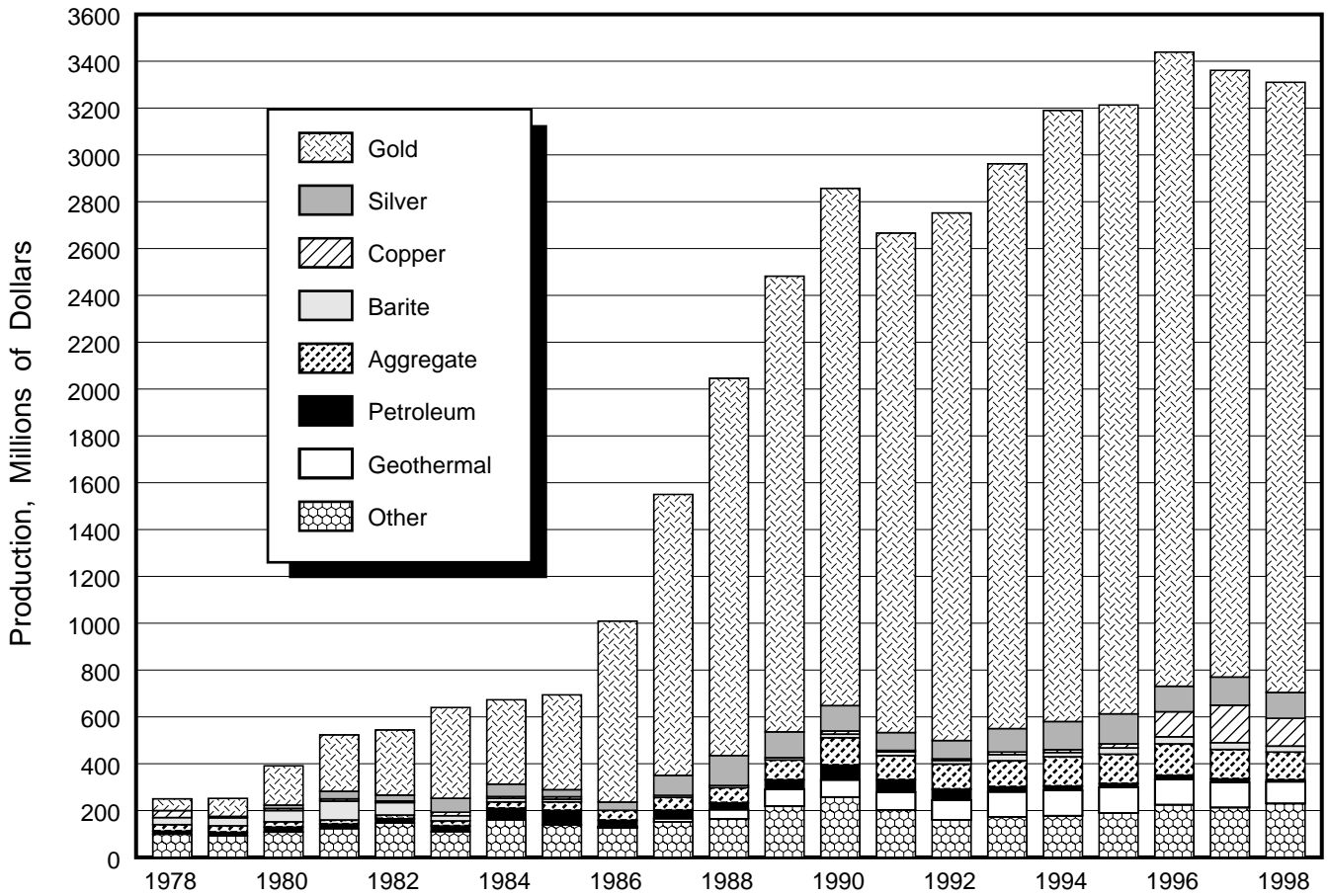
Barrick's Betze-Post Mine in Eureka County, which produced 1.50 million ounces in 1998, is the largest gold mine in the United States. Nearby in Elko County, Barrick's Meikle Mine, with production of 847,000 ounces in 1998, had the highest production among underground gold mines in the United States. Newmont's Carlin Trend operations produced 1.58 million ounces in 1998, and the Cortez Joint Venture in Crescent Valley increased output substantially to 1.14 million ounces in 1998.

MINERAL, GEOTHERMAL POWER, AND PETROLEUM PRODUCTION IN NEVADA¹

Minerals	1997		1998 preliminary		% change from 1997 to 1998	
	Quantity	Value (millions)	Quantity	Value (millions)	Quantity	Value
Gold (thousand troy ounces)	7,828	\$2,591.1	8,865	\$2,606.3	13	1
Silver (thousand troy ounces)	24,645	120.5	21,519	109.7	-13	-9
Copper (thousand pounds)	148,600	160.5	148,500	118.8	0	-26
Aggregate (thousand short tons)	28,000	126.0	26,500	119.2	-5	-5
Gypsum (thousand short tons)	1,578	25.2	1,819	29.1	15	15
Barite (thousand short tons)	586	29.3	490	24.5	-16	-16
Geothermal energy (thousand megawatt-hours)	1,348	101.0	1,327	93.0	-2	-8
Petroleum (thousand 42-gallon barrels)	980	15.0	779	8.1	-21	-46
Other minerals²	—	187.6	—	200.4	—	7
Total	—	\$3,356.2	—	\$3,309.1	—	-1

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.

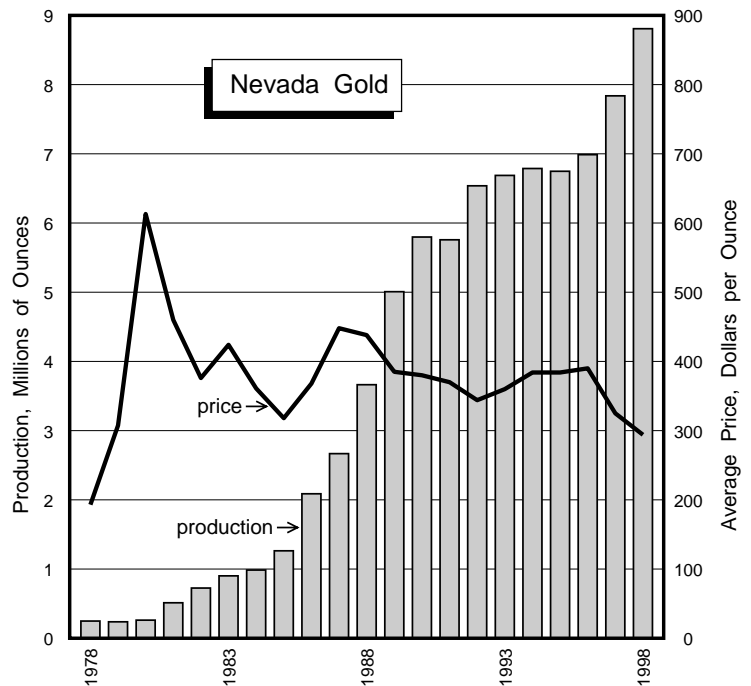


Nevada mineral, geothermal power, and petroleum production, 1978–1998.

Five new mines came into production in 1998: Midas Joint Venture's Ken Snyder Mine in Elko County, Independence Mining Company's SSX underground operation at Jerritt Canyon in Elko County, Gatchell Gold Corporation's (now Placer Dome) Turquoise Ridge Mine in Humboldt County, and Alta Gold Company's Olinghouse Mine in Washoe County and its Griffon Gold Property in White Pine County.

Nevada is a major force in the national and international gold markets, accounting for approximately 74% of U.S. production and 11% of world gold production. These numbers are calculated using statistics reported for areas outside Nevada by the U.S. Geological Survey. Nevada's production makes the United States a net exporter of gold and helps offset the trade deficit, which has averaged approximately \$10 billion per month in recent years. The United States is the second leading gold producer in the world, behind only South Africa. Nevada's 1998 production alone exceeded that of all other countries except South Africa and Australia.

Nevada is clearly one of the most productive and enriched areas in the world for gold. One way of measuring the relative production of different



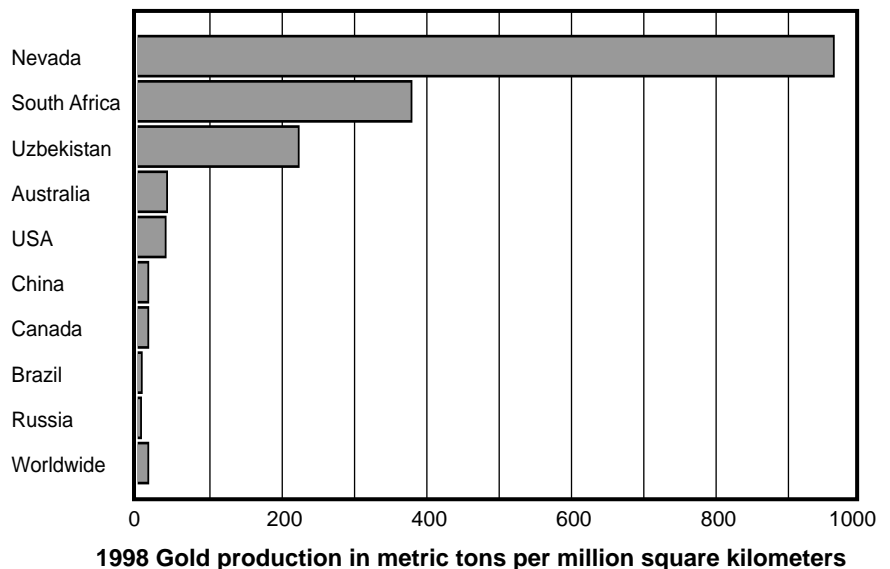
1998 WORLD PRODUCTION OF SELECTED MINERAL COMMODITIES (metric tons)*

Country/State	Area (10 ⁶ km ²)	Gold	Silver	Copper	Gypsum	Barite	Industrial Sand
WORLD	149.90	2,425	16,400	12,200,000	107,000,000	5,890,000	110,000,000
USA	9.37	375	2,060	1,860,000	19,000,000	476,000	28,200,000
Nevada	0.29	276	670	67,500	1,654,000	445,000	640,000
Arizona	0.30	2	211	1,190,000	—	—	307,000
Australia	7.68	312	1,469	600,000	2,100,000	15,000	2,500,000
Austria	0.84	—	—	—	1,000,000	—	6,000,000
Belgium	0.03	—	—	—	—	40,000	2,400,000
Brazil	8.51	60	—	40,000	1,400,000	52,000	2,700,000
Canada	9.96	166	1,179	710,000	8,095,000	80,000	1,700,000
Chile	0.76	45	1,340	3,690,000	781,000	1,400	300,000
China	9.57	178	1,400	480,000	9,000,000	3,000,000	NA
Egypt	1.00	—	—	—	2,000,000	—	750,000
France	0.57	4.5	2	—	4,500,000	75,000	6,500,000
Germany	0.36	—	—	—	3,000,000	120,000	6,000,000
India	3.28	2.4	34	37,000	2,400,000	430,000	1,400,000
Indonesia	1.90	105	190	750,000	1,000	—	300,000
Iran	1.65	0.6	60 ^e	128,000	9,000,000	180,000	1,000,000
Italy	0.30	—	10	—	2,000,000	30,000	3,000,000
Japan	0.38	8.6	94	—	5,300,000	—	3,043,000
Kazakhstan	2.72	12.5	470 ^e	340,000	—	9,000	NA
Mexico	1.97	25.4	2,700	385,000	7,045,000	162,000	1,600,000
Morocco	0.45	0.5	260	—	450,000	353,000	NA
Netherlands	0.04	—	—	—	—	—	5,000,000
Paraguay	0.41	—	—	—	5,000	—	10,000,000
Peru	1.28	89	1,900	520,000	35,000	63,000	1,600,000
Poland	0.31	0.6	1,000	415,000	1,000,000	25,000	1,300,000
Russia	17.07	105	350 ^e	515,000	500,000	60,000	NA
Spain	0.50	2	65	40,000	7,400,000	28,000	5,800,000
South Africa	1.22	474	140	163,000	360,000	—	3,000,000
Sweden	0.45	6	275	86,000	—	—	500,000
Thailand	0.51	—	—	—	9,000,000	111,000	400,000
Turkey	2.59	1	90 ^e	35,000	750,000	130,000	1,300,000
United Kingdom	2.44	—	—	—	2,000,000	75,000	4,800,000
Uzbekistan	0.45	80	70 ^e	73,000	—	—	NA
Zambia	0.75	0.7	—	320,000	11,000	—	NA

* All production data except for Nevada are from the U.S. Geological Survey (USGS) minerals information publications (<http://minerals.usgs.gov/minerals>), with revisions for some data from USGS mineral commodity specialists; data on areas are from The World Almanac and Book of Facts, 1992, Pharos Books, New York, 960 p.

^e Estimate

states or countries is to calculate the amount of gold produced per unit area. By this measure, Nevada's gold production was substantially higher in 1998 than that of major producing countries, including South Africa, Australia, Canada, Russia, China, Brazil, and Uzbekistan. Such high relative production is one of the reasons why Nevada continues to be an excellent place for gold exploration. It should be noted, however, that if only the most productive regions of South Africa, Australia, Canada, or other countries were compared, other provinces or states may surpass Nevada in this type of analysis. Nonetheless, Nevada is highly productive in terms of gold by nearly any measure.

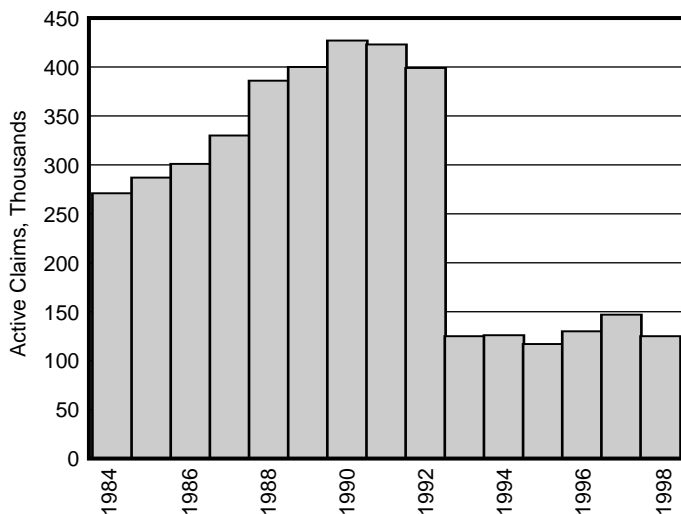


Exploration, including grass roots activity, work in known mining districts, and development of extensions to known deposits, added to the Nevada resource base in 1999. New mineable deposits continue to be discovered. Exploration activities are summarized in the section on Metals. In 1998, companies explored in or near at least 69 of Nevada's 526 mining districts, down significantly from the 106 districts reported for 1997.

Exploration for near-surface deposits that can be mined from open pits is becoming increasingly difficult, because exploration in Nevada for these types of deposits has been vigorous for nearly 20 years. Nonetheless, targets continue to be identified below the cover of alluvium and volcanic rocks that are younger than the ore deposits. In some areas, exciting discoveries of high-grade deposits are being made at depths requiring underground mining. These are commonly along veins or faults within districts with previous near-surface production. Underground mining continues to increase, with 1.97 million ounces of gold (22% of the total) coming from these operations in 1998.

At the end of 1998 the published gold resources in Nevada, including mineable reserves and perhaps some subeconomic resources, totaled approximately 100 million ounces of gold, enough to sustain gold production at substantial levels for 15 to 20 years, assuming stable prices. The term "reserve" has special meaning with regard to U.S. securities laws. To be called a reserve, the deposit must be rich enough 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.

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. The decrease in the number of claims from 1997 to 1998 reflected further downturns in exploration.



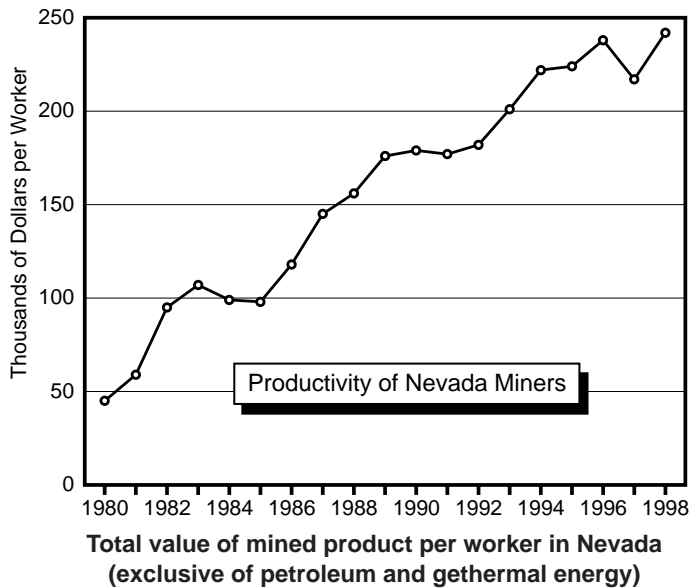
Number of active claims in Nevada as of October 1, 1984–1998.
Data from the Nevada State Office of the Bureau of Land Management.

The Nevada Division of Minerals recently completed its fifth annual survey of companies active in exploration in Nevada (D. Driesner, 1999, *Nevada Exploration Summary 1998*: Nevada Division of Minerals, Carson City). The 47 companies that responded to the questionnaire spent \$90.8 million on exploration in Nevada in 1998, a decrease of 35% from the \$138.8 million spent in 1997. These companies employed 214 geologists in Nevada in 1998, a decrease of 31% from the 309 geologists reported in 1997. The decrease in exploration in Nevada in 1998, which is the direct result of low gold prices combined with political risk, reflects cutbacks in worldwide and U.S. exploration as a whole. The 47 companies reported a 64% decrease in worldwide exploration (expenditures of \$389.6 million in 1998 compared to \$1.082 billion in 1997) and a 47% decrease in total U.S. exploration (with expenditures of \$119.3 million in 1998 compared with \$226.4 million in 1997).

The companies answered questions regarding the factors influencing their exploration activities in the United States. Chief among these are, in order of importance to the companies who are spending more than \$1 million each on Nevada exploration: existence of favorable geology (consistently a major attraction for Nevada), commodity prices (which was less of a concern last year), uncertainty in permitting timeframes, corporate demands, uncertainty over mining law reform, actual length of permitting timeframes, wilderness study areas, mining claim holding fees, announcements of new discoveries, land exchanges/withdrawals, changes in foreign mining laws, and mergers.

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 \$242,000 in mined products in 1998. In discussing the economic impacts of mining, the Division of Minerals (Nevada Bureau of Mines and Geology Special Publication P-10) reported that in 1998 Nevada mining operations employed 13,236 workers, with an average annual pay of \$52,824, the highest for any employment sector in the state. The 1998 direct payroll alone from the mining industry in Nevada was approximately \$699 million. The Division of Minerals further estimates, using U.S. Department of Commerce multipliers, that there are 43,000 additional jobs created in Nevada to provide goods and services needed by the mining industry and its workers.

Economic, safety, and environmental challenges face the precious metal mines in Nevada. These include fluctuating 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, and treatment and disposal of large volumes of water (some of which may



TAX ON NET PROCEEDS OF MINERALS

Fiscal year ¹	Net proceeds ² (thousands)	Tax (thousands)
1984	\$245,892	\$4,157
1985	185,123	3,224
1986	198,338	3,528
1987	374,664	6,091
1988	627,330	12,179
1989	778,253	13,568
1990	748,052	36,238
1991	887,035	42,734
1992	677,342	32,446
1993	727,396	34,718
1994	839,578	40,409
1995	994,416	48,205
1996	786,843	37,568
1997	613,167	29,198
1998	632,503	30,059

¹ July 1 through June 30

² Net proceeds are gross income minus direct costs incurred at the mine site.

Source: Nevada Department of Taxation

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 to these challenges.

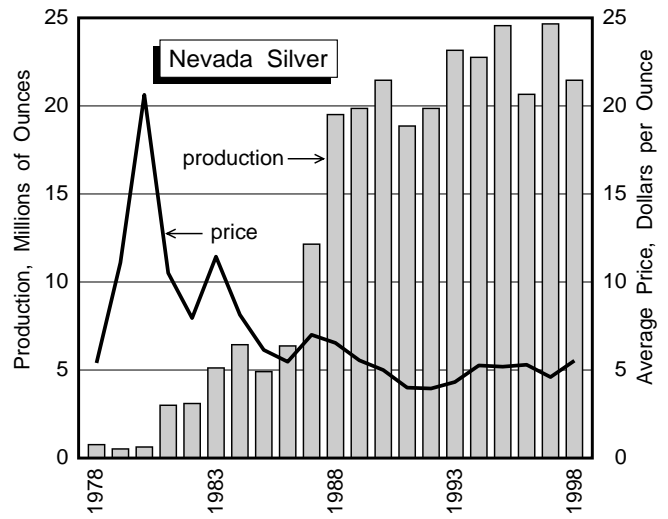
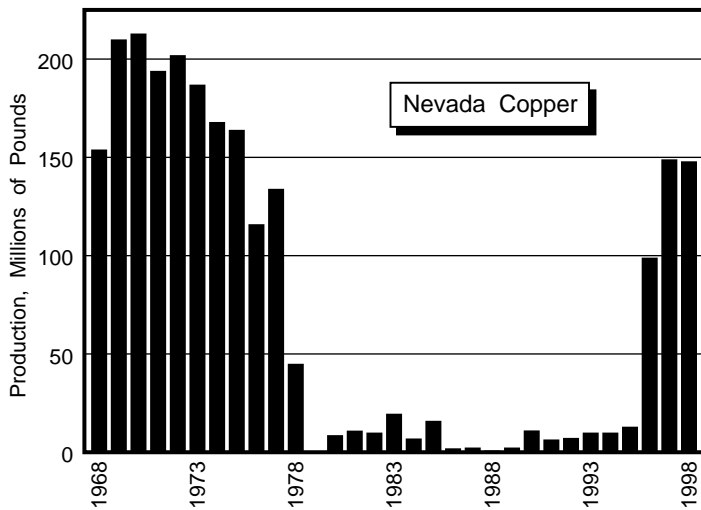
Perhaps the single largest impact on the gold mining industry in the last two years has been the remarkable decrease in price. The average sales price in 1998 was \$294 per ounce, down considerably from the average price of \$388 per ounce in 1996 and \$331 in 1997. By the summer of 1999, the price had dropped to slightly less than \$255, causing the closure of several mines.

Two primary reasons for the drop in price were weakened Asian economies and a trend of central banks' selling off their gold for paper money. The central banks collectively hold approximately 34,000 metric tons of gold (U.S. Geological Survey Mineral Commodity Summaries 1999 [USGS MCS 1999]). Of this, according to the World Gold Council, as of mid-1999, the U.S. held approximately 8,139 tons; Germany, 3,469; the International Monetary Fund, 3,217; France, 3,024; Switzerland, 2,590; Italy, 2,452; Netherlands, 1,012; Japan, 754; United Kingdom, 690; and Portugal, 622; collectively these ten entities hold 25,969 tons. In addition, the U.S. Geological Survey estimates that worldwide the public holds about 72,000 tons as coins, bullion, and jewelry (USGS MCS 1999).

The overall holdings of central banks and the public are, therefore, about 106,000 tons or 3.4 billion ounces. Given that the world population reached 6 billion people in 1999, and that people have prized gold as a commodity of real value for over 5,000 years, this total amount of more-or-less available gold is not excessive. A rebound in the world economy, particularly in Asia, where individuals have traditionally bought gold as a hedge against inflation and uncertainty, will undoubtedly increase demand for gold as an investment. In addition, gold has numerous applications in the high-tech electronics industry as well as in dentistry, jewelry, and the arts.

Silver production in Nevada dropped to 21.5 million troy ounces (670 metric tons) in 1998, down from the record year of 24.7 million troy ounces (777 metric tons) in 1997. Nonetheless, the U.S. ranks second, behind Mexico, slightly above Peru and well above Canada and Australia, in world silver production. Much of this silver was a by-product of gold mining. With a ratio of value (average price of gold to average price of silver) of 57:1 in 1998, only those deposits with more than 57 times as much silver as gold can be considered primary silver deposits. One such deposit operated in Nevada in 1998 — the Kinross-Candelaria Mine in Mineral County (with a silver to gold production ratio of 369:1 and total silver production of 1.1 million ounces). The largest silver producer in the United States, Echo Bay's McCoy-Cove Mine complex in Lander County, is primarily a co-product gold and silver mine; it yielded 9.4 million ounces of silver from ore with an average silver to gold ratio of 56:1. Similarly, the Coeur Rochester Mine in Pershing County (with a silver to gold production ratio of 47:1 and total silver production of 7.2 million ounces) is also a co-product gold-silver operation. These three operations produced 82% of Nevada's silver in 1998.

At the end of the year the published silver resources in Nevada, including mineable reserves and some subeconomic resources, totaled approximately 300 million ounces. Nevada's production in 1998 accounted for 35% 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 stayed nearly steady from 1997 to 1998, as BHP Copper produced at nearly full, planned capacity at its Robinson property near Ely in White Pine County. The company closed the operation in mid-1999 as a result of low commodity prices. Nevada's copper production represented 4% of total U.S. production in 1998.

The section on **Industrial Minerals** covers developments during 1998 and gives details on important commodities produced from Nevada, such as aggregate, barite, building stone, cement, clays, diatomite, dolomite, gypsum, lime, limestone, lithium, magnesia, perlite, salt, and silica. In terms of dollar value, the most significant industrial mineral commodity is aggregate (sand, gravel, and crushed stone), with a value of \$119 million, second in mineral value behind gold in 1998. Aggregate production remains high as a result of Nevada's expanding population with its demands for construction materials for homes, schools, streets, resort hotels and other businesses, airports, and highways. However, 1998 production was lower than in 1997, perhaps as a response to fewer large-scale construction projects.

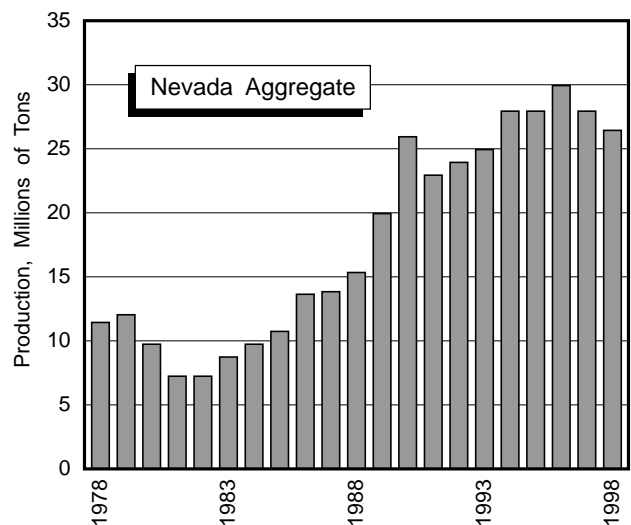
Demand for construction raw materials is likely to remain strong owing to Nevada's increasing population. The U.S. Census Bureau estimates that Nevada's population will rise to 1,871,000 in 2000, up from 1,202,000 in 1990. The Nevada State Demographer projects populations of 2.0 million in 2000 and 2.8 million in 2010.

The table on 1998 world production of selected mineral commodities demonstrates that Nevada is particularly enriched in barite and gypsum. These two commodities illustrate the wide difference in markets for industrial minerals. Barite, which is used primarily as a well-drilling additive to prevent blowouts during drilling for oil and gas, is traded chiefly on international markets. Nevada barite accounted for 67% of the U.S. total production and 7% of the total world production in 1998. Barite production decreased from 1997 to 1998 primarily as a result of lower prices for oil. Gypsum, which is used primarily in the manufacture of wallboard or sheetrock, is a relatively common mineral and rarely is transported long

distances. Nevada's deposits, which feed wallboard plants near the mines to meet not only demands in Nevada but also in neighboring states, accounted for 9% of total U.S. production and 2% of total world production in 1998.

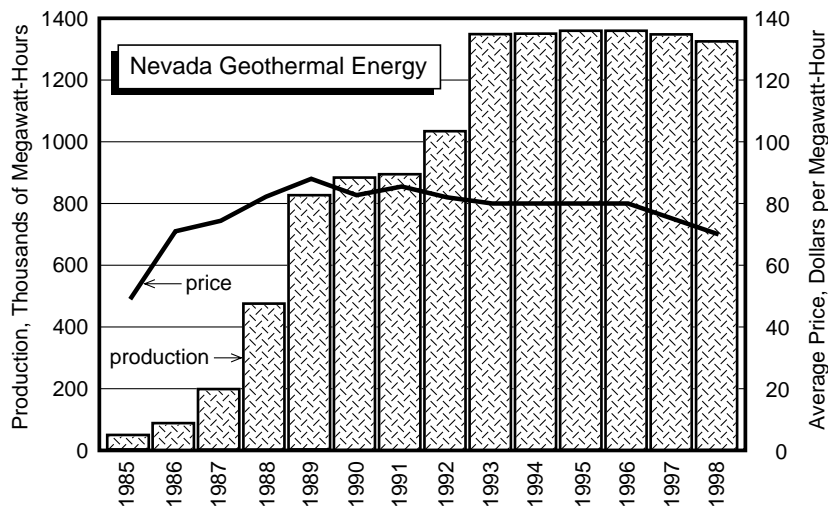
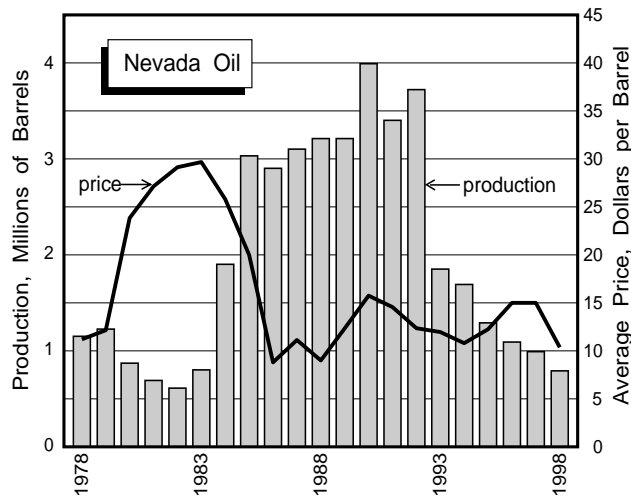
Developments in the geothermal industry are covered in the section on **Geothermal Energy**. Electric power production in 1998 was slightly less than in 1997. Fourteen power plants (operating at ten sites) sold \$93 million in electricity, far surpassing the value of petroleum production. Additionally, geothermal energy is used at numerous places in Nevada for space heating, warm water, recreation, and dehydrating vegetables. Relatively low prices for coal and an end of price subsidies have discouraged development of known geothermal resources and exploration for new resources.

Developments in the Nevada petroleum industry are covered in the section on **Oil and Gas**. Oil is produced primarily in two areas — Railroad Valley in Nye County and Pine Valley in Eureka County. The only producing well in the Deadman Creek Field in Elko County was plugged and abandoned in 1998 after disappointing cumulative production. Nonetheless, its existence proves wider



distribution of oil in Nevada than just in Railroad and Pine Valleys. Total annual oil production from Nevada decreased to 779,000 barrels (\$8.1 million) in 1998. Only ten wells were drilled, and only two wells came into production in 1998. Exploration for oil in Nevada is encouraged by the cumulative production from the two premier fields in Railroad Valley, Grant Canyon and Trap Spring (20.3 million and 12.5 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 online through the World Wide Web from the Nevada Bureau of Mines and Geology (www.nbmj.unr.edu) and the Nevada Division of Minerals (www.state.nv.us/minerals). Useful national and international data on nonfuel minerals can be obtained from the U.S. Geological Survey (<http://minerals.usgs.gov/minerals>) and the U.S. Energy Information Administration (www.eia.doe.gov/index.html) provides data on oil and gas, geothermal, and other energy sources.



Metals

by Joseph V. Tingley and Daphne D. LaPointe

The information in this section was compiled from news releases in The Mining Record (DMR), Mining Engineering (ME), International California Mining Journal (ICMJ), The Northern Miner (NM), Society of Economic Geologists Newsletter (SEG), Rocky Mountain Pay Dirt (RMPD), and Reno Gazette-Journal (RGJ). Information was also extracted from various company websites, annual reports, and news releases on file at the Nevada Bureau of Mines and Geology, from the Nevada Division of Minerals monthly newsletter, and from the Nevada Mining Association monthly newsletter.

Nevada produced 8.87 million oz (troy ounces) of gold and 21.52 million oz of silver in 1998. Nevada broke its own gold production record set in 1997, and for the first time exceeded the 8 million oz mark. Silver production, however, was down from the record set in 1997. Nevada remained the leading gold- and silver-producing state in the United States with 36 mines reporting gold production and 30 mines producing silver during 1998.

Newmont Mining Corp. continued as the largest gold-producing company in Nevada with 2,704,104 oz of gold produced in 1998 from its operations, which include Twin Creeks and the Lone Tree Complex as well as all of the company's Carlin Trend mines. Newmont's gold production was down slightly from the 1997 figure of 2,776,500 oz.

Barrick Gold was second in Nevada gold production, with 2,345,996 oz, and for the fourth consecutive year, Barrick's Betze-Post Mine was the largest individual Nevada gold producer with 1,498,683 oz. This figure was lower than the 1997 Betze-Post production of 1,605,836 oz, but Barrick Gold's Meikle Mine reported 1998 production of 847,313 oz, up from the 1997 figure of 574,308 oz. Other major gold producers in 1998 included Smoky Valley Common Operation's Round Mountain Mine with 510,502 oz, Placer Dome's Cortez Gold Mines (including Pipeline) with 1.14 million oz, Independence Mining Co.'s Jerritt Canyon Mine with 347,000 oz, Echo Bay Minerals with 167,494 oz from its McCoy/Cove operation, and Getchell Gold's Getchell Mine with 175,302 oz.

Echo Bay Minerals' McCoy/Cove operation was Nevada's largest silver producer in 1998, yielding 9.4 million oz. Coeur d'Alene Mines' Rochester Mine produced 7.2 million oz of silver, and Kinross' Candelaria Mine produced 1.1 million oz of silver. Other large silver-producing operations included Kennecott Rawhide Mining Co.'s Denton Rawhide Mine with 848,000 oz, Round Mountain Mine with 511,320 oz., and Hecla Mining's Rosebud Mine, which produced 477,956 oz.

BHP Copper continued to operate its Robinson Copper Mine during 1998, producing 148.4 million pounds of copper in concentrate, along with 86,000 oz of gold and 299,500 oz of silver. The Yerington and MacArthur copper mines in Lyon County did not produce in 1998.

EXPLORATION

Metals exploration continued in Nevada in 1998 although at a lower level than the previous year. As in the recent past, 1998 exploration activity was concentrated along the major trends in the northern part of the state, the Battle Mountain-Eureka, Carlin, Getchell, and Midas trends. Several projects were pursued in Mineral, Esmeralda, and western Nye Counties along the Walker Lane, but no new activity was reported in Lincoln or Clark Counties, or along the eastern borderlands of the state. Figure 1 shows the location of Nevada mining districts in which exploration activity was reported during 1998.

CHURCHILL COUNTY

Aspen district

MK Gold Co. drilled on its Lodi Project, located northwest of Burnt Cabin at the north end of Lodi Valley. Five holes drilled in June showed a significant increase in gold and previously unrecognized mineral zoning (MK Gold Co. news release, 10/23/98).

Holy Cross district

Pacific Rim Resorts entered into an agreement with Breckenridge Minerals Inc. to do about 10,000 feet of drilling on Breckenridge's Pyramid Mine property, where a resource of approximately 60,000 oz of gold and 3.5 million oz of silver was identified by previous work. The companies anticipate that the drilling program will upgrade the resource to mineable reserves, to be mined by underground methods (Breckenridge Minerals Inc. news release, 7/7/98).

Jessup district

Echo Bay Mines Ltd. terminated its joint venture with Americomm Resources Corp. on Americomm's Jessup Gold Property. Between 1996 and March of 1998, exploration by Echo Bay identified two new areas within the property containing potentially mineable gold and silver. Although Echo Bay stated it was encouraged by the results of its exploration, it elected to discontinue exploration of the Jessup Property to concentrate exploration resources on other projects (Americomm Resources Corp. news release, 6/1/98).

New Pass district

White Knight submitted a Plan of Operations to the Bureau of Land Management for a 12-hole drill program

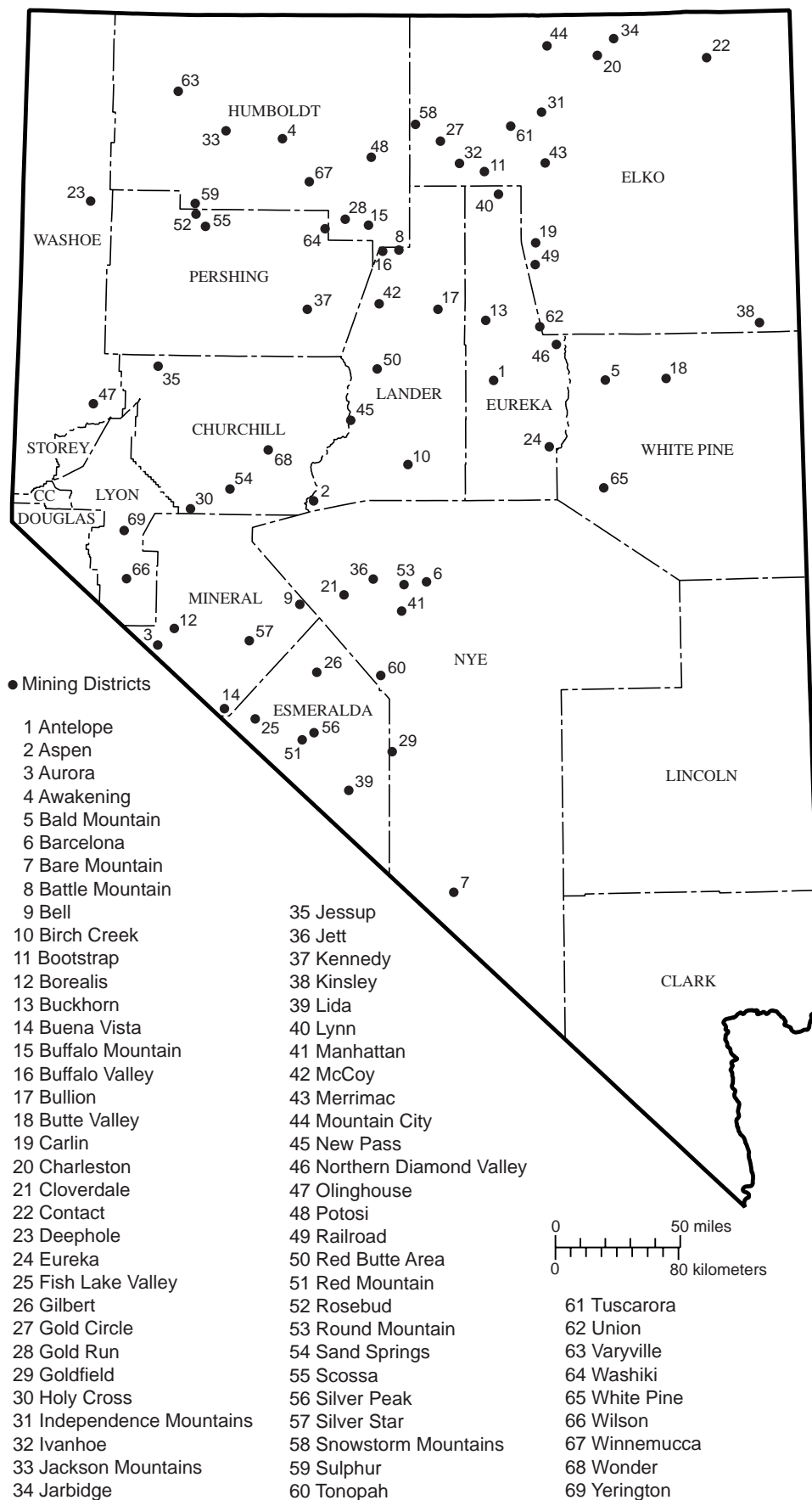


Figure 1. Nevada mining districts with reported 1998 precious metals exploration activity.

at its New Pass property located 27 miles west of Austin. The 2,520-acre project contains a gold resource of 3,100,000 tons grading 0.055 opt (ounces per ton) gold developed in jasperoids in calcareous siltstones of the Triassic Augusta Mountain Formation (White Knight news release, 7/29/98).

Sand Springs district

Explore Technologies, Inc. under terms of a joint venture agreement signed by the two companies in 1998, will conduct exploration at Miranda's Sand Springs project east of Fallon. Earlier drilling by a previous operator identified a gold-copper zone associated with skarn mineralization. The prospective area remains open to the west and southwest (Miranda news release, 12/29/98).

Wonder district

Grand Central Silver Mines Inc. signed an option to joint venture on Arizuma Resources' holdings in the Wonder district. The joint venture will explore for and develop deep (>500 feet) ore mineable by underground methods on its 2,200-acre property in the heart of the district. Surface exploration will be followed by drilling to test both the strike and depth potential of the Wonder vein system (Denver Mining Record, 4/29/98).

ELKO COUNTY

Bootstrap district

Rayrock Resources Inc. reported a 1998 increase in reserves at the Dee Mine with the addition of 155,000 oz of gold from underground high-grade zones and another 125,000 oz from the extension of open pit mineable zones. Barrick Gold Exploration Inc. is continuing a drilling program at Dee that has identified sub-economic gold values at depths of about 1,200 feet in the eastern part of the property within the favorable Popovich-Bootstrap units (Rayrock Resources Inc. news release, 11/13/98, Denver Mining Record, 1/20/99). In the same district, Barrick Gold Corp. completed a joint venture agreement on Meridian Gold Inc.'s Rossi property, which contains the Storm resource, a high-grade, deep geologic resource of 3.1 million tons grading 0.371 opt gold. In order to earn a 60% interest in the property, Barrick will spend \$15 million on exploration and development. This work will include a 7,000-foot-long exploration decline collared in the high wall of the Dee Mine pit and designed to explore and define the Storm resource (Meridian Gold Inc. news release, 9/14/98; Elko Daily Free Press, 12/19/98).

Carlin district

White Knight Resources Ltd. and International Pursuit Corp. announced the start of an 8,500-foot drilling program designed to test four target areas on the Tonka property, which is located between the town of Carlin and the Rain

Mine. In the same area, Nevada Pacific Gold completed mapping, soil and rock sampling, and geophysical surveying on its Woodruff Creek Property and planned initial drill testing for the 1999 field season. The lithology and structural setting of both the Tonka and Woodruff Creek prospects closely resembles that of the nearby Rain deposit. Gold mineralization is hosted in the basal Mississippian Webb Formation rocks at the contact with the underlying Devonian Devils Gate Limestone. Mineralization at Tonka occurs in elongate zones along high angle structures (White Knight Resources Ltd. and International Pursuit Corp. news release, 5/5/98; Nevada Pacific Gold Ltd. news release, 2/23/99).

Charleston district

In August 1998, an induced polarization survey was underway on Golden Hope Mines Ltd.'s Golden Creek (Gold Creek) property. The focus of this survey was to delineate structural features associated with the St. Elmo Mine (contained within the Gold Creek property) and to define possible extensions of the St. Elmo mineralization as targets for a drilling program (Golden Hope Mines Limited news release, 8/26/98).

Contact district

Golden Phoenix Minerals, Inc. completed an evaluation of the Banner Fissure zone on its Contact project. This work included 9,400 feet of new drilling that expanded the known mineral inventory defined by drilling in the 1960s and 1970s. The deposit is now estimated to contain a mineral resource of 39.5 million tons grading 0.952% copper (using a manual cross-sectional inventory based on composite samples) or 51.4 million tons grading 0.703% copper (using a block model mineral inventory). The deposit is still open on three sides, and considerable potential exists to increase the estimated size of the overall deposit (Golden Phoenix Minerals, Inc. news release, 10/20/98; Denver Mining Record, 10/28/98).

Gold Circle district

Several projects surrounding the town of Midas were underway in 1998. At the Midas Joint Venture Ken Snyder Mine, (Franco-Nevada Mining Corp., Limited and Euro-Nevada Mining Corp.), \$5.9 million was spent on surface exploration during 1998. This resulted in the increase of mineable reserves to 2.73 million tons grading 1.12 opt gold and 12.82 opt silver by year's end (a total of 3.04 million oz of gold plus 35 million oz of silver), representing a 36% increase over year end 1997 mineable reserves. The Ken Snyder 500-ton-per-day mill came on line on November 21, underground development was completed, and the first doré was poured on December 9, weighing in at over 3,000 oz (Midas Joint Venture news release, 1/26/99). In addition to its development work at the mine, the Midas Joint Venture acquired 350 acres of patented

and unpatented land from Romarco Minerals Inc. The Romarco ground includes the Belnap Claims, adjacent to proven reserves at the Ken Snyder Mine, and covers the extension of the Gold Crown vein. Reserve estimates for the Belnap property are 589,300 tons grading 0.61 opt gold and 6.9 opt silver (The Northern Miner, 10/12/98; Denver Mining Record, 10/14/98).

In a nearby part of the district, Romarco Minerals Inc. announced that it has entered into an exploration agreement on the South Midas property with Blue Desert Mining Inc. and Golden Glacier Resources. The South Midas property comprises 60 unpatented mining claims located 7 miles southwest of Midas. Romarco is targeting a high-grade gold vein structure exposed at the surface, which returned assays of up to 1.5 opt gold (Blue Desert Mining Inc. news release, 3/31/98; Romarco Minerals Inc. news release, 7/28/98).

Ten miles west-southwest of Midas, Romarco Minerals Inc. announced the results of its Phase Two Drill Program on the Jake Creek Project. Through its exploration efforts, Romarco is entering into a joint venture on Jake Creek with Echo Bay Mines Ltd. High-grade gold mineralization was encountered in two of the Phase Two holes. Romarco was to review all of the Jake Creek data in preparation for renewed drilling in the spring of 1999 (Romarco Minerals Inc. news release, 1/19/99).

Between Midas and the Ivanhoe districts, White Knight Resources Ltd. and Chapleau Resources Ltd. completed 5,488 feet of reverse circulation and diamond drilling at their Squaw Creek property located 42 miles due north of Battle Mountain. Drill holes encountered weakly anomalous gold as well as anomalous mercury and arsenic values. The property was staked to cover an inferred window of Lower Plate Paleozoic rocks underlying volcanic and alluvial cover (White Knight Resources Ltd. and Chapleau Resources Ltd. news release, 7/29/98).

Independence Mountains district

In the Jerritt Canyon Mine area, Independence Mining Co.'s new SSX underground mine was dedicated on October 15 and commenced commercial production. The portal of the SSX Mine, which stands for Saval-Steer Extension, is at the bottom of the mined-out Pattani open-pit mine. Mine reserves are 460,000 oz of gold at a grade of 0.384 opt gold (Elko Daily Free Press, 10/16/98). At the end of 1998, it was announced that South Africa-based Anglo Gold, the world's largest gold producer, was purchasing Minorco's 70% interest in Independence Mining Co. The remaining 30% is held by Meridian Gold (Meridian Gold Inc. news release; Elko Daily Free Press, 12/10/98).

Ivanhoe district

Drilling in 1998 by Great Basin Gold Ltd. on the Hollister property encountered at least 17 intercepts of greater than 0.5 opt gold (many greater than 1 opt gold) along

northwest- and northeast-trending structures below the shallower, bulk tonnage, Hollister deposit. The high-grade gold and silver drill-hole intercepts are interpreted to be feeder veins to the overlying 2.8 million ounce Hollister deposit. Great Basin started additional drilling to determine the size and continuity of the high-grade vein system (Great Basin Gold Ltd. news release, 7/14/98).

Jarbidge district

San Antonios Resources acquired the Pick and Shovel patented claims and carried out reconnaissance geological mapping and sampling on the claims and the surrounding area. The claims cover outcrops of the undeveloped Pick and Shovel vein, located south of Bonanza Gulch about 2 miles south of the town of Jarbidge (San Antonios Resources, NBMG files, 9/26/98).

Kinsley district

Mining was completed at the Kinsley Mine in March, partially due to the diminution of the size and metallurgical characteristics of the two remaining orebodies at Kinsley (Alta Gold Co. news release, 4/23/98).

Merrimac district

Homestake Mining Co. drilled gold-bearing jasperoid targets on the Lone Mountain project to test anomalies identified through earlier detailed surface work. The Lone Mountain property is held under a joint venture agreement between Tri Origin (40%) and Homestake Mining Co. (60%). Homestake is funding the current drill program to earn additional interest in the property from Tri Origin (Tri Origin news release, 9/2/98).

Mountain City district

Cordex Exploration continued exploration drilling on its Mountain City Project (Humboldt-Toiyabe National Forests plan of operations supplement, 1/29/98).

Railroad district

Several companies were active in the Railroad district during 1998. At year's end, Kinross Gold Corp. was continuing a drilling program at the Railroad Project, thereby earning a 60% joint venture interest in the project with Exploration Mirador Inc. (Denver Mining Record, 8/5/98). The Railroad project consists of over 600 patented and unpatented claims plus 15 square miles of fee land located adjacent to Newmont Gold Inc.'s producing Rain Mine and their new Emigrant Springs Mine as well as the South Bullion and Trout Creek deposits. Mirador drilling on the property in 1997 resulted in three new gold and polymetallic discoveries: LT East, EHR, and Bunker Hill. Drilling also expanded the potential of the POD gold deposit (Exploration Mirador Inc. news release, 2/23/98; Elko Daily Free

Press, 8/15/98; Brex Inc. news release, 12/11/98). In November, Exploration Brex Inc. completed its acquisition of the POD group of claims by signing an agreement that purchases all its advance production royalties. Brex owns 50% of the POD group allocated by Exploration Mirador Inc. (Exploration Brex Inc. news release, 11/17/98). The geological resource of the POD deposit is 1.4 million tons grading 0.085 opt gold hosted in altered lower plate Devonian rocks. The POD claims are subject to the earlier Kinross joint venture agreement (Exploration Brex Inc. news release, 11/17/98). Not far away, International Calneva Gold Corp. conducted surface sampling and mapping on the Pine Mountain property, located 7 miles southwest of the Rain Mine (Denver Mining Record, 8/5/98).

Snowstorm Mountains district

Northwest of Midas, Blue Desert Mining Inc. carried out mapping and sampling on its Snowstorm property. The mapping indicates that the property is underlain by the same package of volcanic rocks that hosts gold veins at the nearby camp of Midas. Blue Desert Mining considers that there is an excellent possibility for steeply dipping, high-grade veins similar to those found at Midas to occur in association with the Winter's Creek fault or parallel structures. Adjacent to the Winter's Creek fault, the volcanic rocks are brecciated, pervasively argillized and silicified over a strike length of 4,000 feet and a width of approximately 500 feet. Further work including detailed mapping, sampling, and bulldozer trenching is planned to delineate the structure (Blue Desert Mining Inc. news release, 3/31/98).

Tuscarora district

International Calneva Gold Corp. has completed ten drill holes on its Castile Mountain Project located on Beard Hill. In addition to the drilling, 20 claims have been staked west of Beard Hill and north of the Berry Creek Mercury mine to cover an area of silicified andesite that yielded anomalous gold, silver, arsenic, and mercury values in surface samples (Elko Daily Free Press, 6/27/98; Denver Mining Record, 8/5/98). Newcrest Resources is also active in the district and is planning a drilling project south and east of the old town of Tuscarora (Elko Daily Free Press, 6/20/98).

Union district

MK Gold conducted geologic mapping, sampling, geophysical surveys, and drilling on its 100%-owned Red Rock Project located 25 miles southeast of Carlin, near the Eureka County line. The property consists of 913 unpatented lode claims covering approximately 21,000 acres in an area where 1997 drilling produced encouraging results (MK Gold Co. news release, 10/23/98).

ESMERALDA COUNTY

Buena Vista district

Big Sky Resources is in the process of acquiring all the outstanding shares of Dos Amigos Inc., which owns 100% of the Tip Top Gold Project. Dos Amigos is in the final stages of permitting for an open-pit heap-leach gold mine on the project, which has an indicated resource of 109,000 tons grading 0.103 opt gold and 0.88 opt silver (11,227 oz of gold and 95,920 oz of silver). The inferred geologic resource is 168,000 tons grading 0.088 opt gold (14,784 oz of gold). The mineralized zone is open both along strike and at depth with good potential for definition of additional resources. Big Sky planned further exploration to investigate the southwestern extension of the 50- to 100-foot-wide fault zone that hosts both the Tip Top Gold vein system and the Brownie gold-silver property some 5,000 feet southwest of the Tip Top underground workings (Denver Mining Record, 6/17/98).

Fish Lake Valley district

Romarco Minerals Inc. completed the first phase of drilling on the Red Rock property located about 70 miles southwest of Tonopah. Romarco acquired the property in early 1998 and commenced drilling in late April to test a blind, high-grade, epithermal quartz-adularia vein system discovered by Phelps Dodge in the late 1980s under several hundred feet of post-mineral gravels.

Ten of Romarco's 19 holes encountered significant high-grade intercepts of at least 5 feet assaying greater than 0.10 opt gold and one hole contained an intercept of 115 feet grading 1.61 opt gold and 8.04 opt silver. Romarco's drilling has confirmed the presence of several high-grade gold veins and substantially extended the strike length of the mineralization (Romarco Minerals Inc. news release, 7/28/98; The Northern Miner, 8/16/98).

Gilbert district

Rayrock Yellowknife Resources Inc. acquired an option to earn a 75% interest in the Castle Gold deposit, where previous exploration had outlined a resource of 10 million tons of ore grading 0.03 opt gold. Rayrock's 1998 drilling confirmed the resource, and a preliminary valuation study indicated that the west half of this deposit, which is under shallow overburden, could be mined at a \$300 per ounce gold price (Rayrock Resources Inc. news releases, 5/27/98, 11/13/98).

Goldfield district

Romarco Minerals Inc. was active at Goldfield in 1998 and spent the year consolidating 100% interest in a landholding covering more than 21 square miles along a strike length of more than 6 miles of prospective ground in the gold district. Since 1996, Romarco has been compiling geologic and geochemical data at Goldfield and

is currently mapping and sampling throughout the district. High-grade samples have come from Romarco's Black Butte and Tognoni Springs areas, where a sample from the dump of the Bull Dog Fraction returned 18.7 opt gold and 14.8 opt silver. Select samples from the Excelsior patent at the north end of the Nevada Gold and Casino lease returned 5.3 opt gold, 17.2 opt silver and 10.4 opt gold and 54.3 opt silver respectively. These workings pass through the barren, near surface, acid-leached alteration layer and encounter high-grade mineralization at depth (Romarco Minerals Inc. news release, 8/12/98).

Lida district

Cascade Metals Inc. announced the results of 1998 exploration on its 100%-owned Texas and Florida-Wisconsin Projects. The Texas Project covers about 1.2 square miles including 120 workings dating from the early 1900s in the heart of the district. Surface samples widely distributed over a 0.8 square mile area have averaged 0.02 opt gold and 1.4 opt silver. Cascade's geophysical work indicates that mineralization is associated with three discrete structural trends and is concentrated at the intersection of the northeast and northwest trends. Extensive gold soil anomalies and alteration zones coincide markedly with known structural trends and VLF-EM anomalies. A geophysical survey on the Florida-Wisconsin Project confirmed known silver-gold bearing structures, and defined previously unrecognized mineralized structures. Extensive historical workings were sampled and returned up to 0.08 opt gold and 1.3 opt silver. The Florida-Wisconsin project has potential for expansion both along strike and down dip and represents the most advanced stage target in the Lida district. Cascade's Mozart project adjoins the Texas and Florida-Wisconsin project areas in the northeast portion of the Lida district. It features a silver-rich zone in a west-trending fault contact between a felsic dyke and altered limestone. An open stope approximately 430 feet long has exposed the mineralized fault horizon where a quartz-carbonate vein hosts silver-chloride mineralization. Grab samples from the area have assayed up to 93 opt silver (Cascade Metals Inc. news release, 11/4/98).

Red Mountain district

Camnor Resources Ltd. and Twin Star Minerals Ltd. planned additional exploration on the Argentite property located west of Silver Peak, after an earlier nine-hole drilling program encountered significant gold mineralization in the Adit zone. This drilling demonstrated that the zone is up to 200 feet wide and extends more than 600 feet along strike with gold values as high as 0.025 opt gold over 270 feet. Geologic mapping indicates that the Adit zone is open in both directions, extending well beyond the drilled areas. Mapping and sampling elsewhere on the property have identified zones similar to the Adit zone. The most significant of these, the

Baseline, is located 300 feet to the north of the Adit zone and has been traced for 700 feet. Within the Baseline zone, anomalous gold values occur within a 200-foot wide zone of argillic alteration. The 1998 exploration program was designed to define the potential of the Baseline zone and other targets located on the property (Camnor Resources Ltd. news release, 5/1/98).

Silver Peak district

Vista Gold Corp. acquired the Mineral Ridge Mine from Cornucopia Resources Ltd. in October 1998. The mine is located near the town of Silver Peak about 35 miles southwest of Tonopah and began producing in mid-1997 but was shut down at the end of the year after it failed to meet production expectations. Vista Gold restarted the mining operation in November 1998 and implemented modifications to the processing facility designed to improve the rate of gold recovery. Vista also began a short-hole drilling program to test for additional gold reserves. By year's end, assay results indicated that 13 of 19 holes had encountered economic mineralization. Following evaluation of these results, drilling was to continue on the 50-to 60-hole program. Vista now estimates the proven and probable reserves to be 4 million tons at a grade of 0.06 opt containing 243,000 oz of gold (Vista Gold Corp. news release, 10/22/98, 1/18/99, 4/1/99).

Tonopah district

Eastfield Resources Ltd. and Prism Resources Inc granted an option to Royal Silver Mines, Inc. to explore part of the Three Hills property in the Esmeralda County portion of the Tonopah district. Eastfield and Prism will retain ownership of the existing bulk tonnage gold resources of the Three Hills deposit. Royal planned a minimum 6,000-foot drill program on the property to complete its due diligence. The focus of Royal's exploration will be in the largely unexplored northern portion of the property. Past work in this area by Eastfield and Prism has shown good potential for extensions of the high-grade silver-gold vein/lode systems which characterized the historic Tonopah district (Eastfield Resources Ltd. and Prism Resources Inc. news release, 7/8/98).

EUREKA COUNTY

Antelope district

White Knight Resources Ltd. and Chappleau Resources Ltd. announced results from the 1998 exploration program at the Indian Ranch property about 15 miles southeast of Gold Acres-Cortez. A 12-hole, 17,000-foot drill program was initiated on the 607-claim property in October of 1998. Drill holes identified pervasive gold mineralization in altered silty limestones of the Roberts Mountains

Formation over an area measuring 2,800 feet by 3,500 feet in a fault block. Mineralization and alteration remain open in several directions. Gravity and CSAMT surveys were to be conducted to better define the edges of the uplifted lower plate rocks and structures within them.

Initial attention was drawn to the Indian Ranch property because of the discovery of an extensive zone of jasperoid float assaying up to 0.40 opt gold. White Knight's and Chapleau's 1998 work, combined with their 1997 results and pre-1997 drilling by other parties combine to indicate an area of gold mineralization 1,200 feet wide which can be traced for over 2,000 feet in strike length with thicknesses of 10 to 520 feet. Grades are typically 0.015 opt gold, with higher grades up to 0.22 opt gold over 10-foot intervals (White Knight Resources Ltd. news release, 2/22/99).

At the Tonkin Springs Mine, Globex Mining Enterprises Inc. did wide-spaced drilling in the planned open-pit area (TSP1), with the objective of upgrading previously drilled gold intersections into either proven or probable minable resource categories in the TSP1 Main Zone and to explore deeper gold zones in specific areas. The Tonkin Springs Mine is a bio-oxidation-heap-leach project with processing infrastructure already in place. Final ore column tests were underway with production anticipated by mid to late 1999. The project's present drill-defined gold reserves and resources stand at 1,365,000 contained oz. (Globex Mining Enterprises Inc. news release, 5/11/98).

Buckhorn district

Independence Mining Co. Inc. (IMC, since acquired by AngloGold) exercised its option to acquire Royal Gold's working interest in the Buckhorn South property, consisting of 265 unpatented mining claims located at the north end of the Simpson Park Mountains. Royal Gold had been conducting exploration work on the property since its acquisition in 1994. The Zeke deposit, located within the Buckhorn South property, has known reserves of 2.4 million tons grading 0.0465 opt (about 100,000 oz of gold). IMC's 1998 drilling program at Buckhorn South focused on possible high-grade and disseminated gold mineralization in some previously unknown 'windows' of lower plate carbonaceous limestone of the Roberts Mountains Formation. IMC designed a program to test these new targets at Buckhorn South, and also to achieve further delineation of the existing Zeke deposit. IMC exceeded the exploration work requirements on Buckhorn South in order to gain Royal's interest in the property in exchange for various net profits and net smelter return royalties to Royal on IMC properties in Elko and Lander Counties (Royal Gold news releases, 8/10/98; 11/11/98).

Eureka district

Homestake Mining Co.'s new Ruby Hill Mine near Eureka achieved commercial production in January and produced 116,500 oz of gold at a cash cost of \$122 per ounce during

1998. The operation is now Homestake's lowest cost gold producer (Homestake Mining Co. news release, 2/7/99).

Alta Gold Co. acquired the Lookout Mountain gold property from Echo Bay Exploration Co. in 1998. The property consists of 4,500 acres of unpatented mining claims 8 miles south of Eureka. Ore grade gold was intersected in drill holes over a strike length exceeding 2 miles, and mineralized intercepts were encountered from the surface to a depth of nearly 700 feet. Six separate deposits have been defined on the property: Lookout Mountain, South Lookout Mountain, Pinnacle Peak, Triple Junction, South Ridge, and South Adit (Elko Daily Free Press, 1/24/98).

In the same district, White Knight Resources entered into a four-year exploration agreement with Inmet Mining (U.S.) Inc. to explore the Yahoo Property comprising 259 unpatented lode mining claims covering mineralized rock in the Yahoo Canyon. White Knight's earlier mapping and surface sampling of jasperoid outcrops had identified several targets containing up to 0.046 opt gold and strongly anomalous pathfinder elements along the Yahoo Canyon fault system. Inmet's initial three-hole drill program on the property identified a 50-foot interval of hydrothermally altered, brecciated Devonian limestone containing anomalous arsenic, antimony, and mercury. White Knight and Inmet are evaluating the results of the drilling program and additional untested targets to the east, which lie along a prominent west-northwest structural zone (White Knight Resources Ltd. news release, 10/16/98).

Lynn district

Newmont Gold Co. is planning a new underground mine on the Carlin Trend, called Goldbug/Deep Post, and shaft sinking could begin next year. Goldbug will be just north of the Betze-Post open-pit mine, and the shaft will be sunk between the Betze-Post pit and Barrick's new Rodeo underground mine, still under development. Goldbug is expected to produce more than 400,000 oz of gold annually and be similar in size to the proposed Leeville underground mine (Elko Daily Free Press, 2/6/98).

Northern Diamond Valley

MK Gold Co. finalized a joint venture with Phelps Dodge Exploration Co. to explore the Diamond Valley property located on the northwest flank of the Diamond Mountains along the Elko-Eureka County line. The property contains Carlin-type sediment-hosted gold deposit targets in Paleozoic limestones and marine black shales. Gold assays up to 0.064 opt have been obtained from jasperoid outcrops along a major north-south fault zone on the property. MK Gold plans a 1999 exploration program consisting of rock chip and soil sampling, geophysics, and drilling on the property in order to earn up to an 80% interest in the venture (MK Gold Co. news release, 12/23/98).

HUMBOLDT COUNTY

Awakening district

X-Cal contracted Mineral Resources Development Inc. (MRDI) to complete a resource estimate of lower grade disseminated mineralization in the Silica Cap, Saddle, Wood and West Wood portions of the Sleeper Mine, adjacent to the present pit. Based in part on this study and on their own data, X-Cal estimates an in-ground mineral inventory of 182 million tons of 0.042 opt gold (7.6 million oz) remaining adjacent to and under the Sleeper Pit. Calculations were based upon unconstrained geostatistical parameters, kriged blocks, models, and variograms, with no consideration given to continuity, economics or mine modeling, as the study was intended only as a calculation of the potential size of the system. (X-Cal Resources news release, 6/17/98).

Battle Mountain district (Humboldt County portion)

At the Marigold Mine, the discovery of the Terry Zone and additional drilling on the Ridge and Top Zones in 1998 added 170,000 oz of gold to the property reserves. Continued drilling was expected to add 100,000 to 200,000 oz to these reserves in 1999 (Denver Mining Record, 1/20/99; Rayrock Resources Inc. press release, 2/19/99).

Gold Run district

White Knight Resources began compiling and evaluating previous work on the Rock Creek Ranch property under an exploration agreement with North Mining Inc. The property is located between Kramer Hill and the Adelaide Crown Mine and contains large areas of silicification and jasperoid development.

Drilling is planned for 1999 in hopes of discovering a deeper sediment-hosted deposit (Denver Mining Record, 3/4/98; White Knight Resources news release, 2/19/99).

Jackson Mountains district

Meridian Minerals Corp. terminated its option agreement with Gerle Gold (U.S.) Inc. on the Happy Creek property. Meridian performed over \$200,000 of work on the property in 1997 and 1998 including new aerial photography, surface mapping, and data compilation. Geochemical sampling returned anomalous gold and silver values in a quartz carbonate zone, but 5,400 feet of reverse circulation drilling failed to penetrate into a postulated underlying epithermal bonanza gold zone (Gerle Gold Ltd. news release, 9/18/98).

Potosi district

Placer Dome Inc. and Getchell Gold Corp. announced a merger plan whereby Placer Dome will acquire a 100% interest in Getchell Gold Corp., which operates the adjoining Getchell and Turquoise Ridge gold mines.

The Getchell property contains two operating underground mines and a mill facility that includes a pressure oxidation plant. The mines are expected to produce more than 400,000 oz per year from 1999 to 2002 at a cash production cost below \$230/oz (Placer Dome Inc. and Getchell Gold Corp. news release, 12/13/98).

Development continued at Turquoise Ridge in 1998 with the primary focus on waste development ramping, drifting, and stope access. The Turquoise Ridge Mine's ventilation and production shafts as well as all hoisting infrastructure were completed in 1998. The production shaft was excavated to the 1,850-foot level in 1998 and was commissioned into production service in January 1999 with a hoisting capacity of about 8,000 tons per day. Total proven and probable gold reserves on the Getchell property at year end were 6.6 million oz of mainly underground ore averaging 0.381 opt. In 1998, 0.2 million contained oz were mined, 0.5 million contained oz were removed from reserves due to low gold price, and 1.1 million contained oz were added through development drilling and exploration. Geologic resources total an additional 9.4 million contained oz of gold (Getchell Gold Corp. news release, 2/15/99).

Sulphur district

Sustained low gold prices caused mining activity to be reduced and then suspended in December 1998 at Vista Gold's Hycroft Mine. Production of gold from ore stockpiles will continue in 1999 and 2000 with 1999 production expected to be approximately 25,000 oz. Vista intends to maintain the plant and facilities in stand-by condition while investigating the potential for additional or higher grade oxide ore which will permit an early restart of the operation (Vista Gold Corp. news release, 1/18/99).

Varyville district

Mustang Gold Corp. drilled 24 holes totaling 7,905 feet on its Pearl Canyon property. The program was designed to test the R-1 Zone where the company's previous drill programs intersected significant oxide copper and silver values over a strike length of 1,050 feet at depths up to 300 feet. Drilling results extended the copper-silver values for an additional 1,275 feet of strike length and the R-1 Zone remains open along strike and at depth. Additional step-out drill holes tested the covered stratigraphy up to 3,000 feet along strike from the main copper-silver area and intersected a new zone up to 100 feet thick adjacent to a porphyry intrusion. The zone of strongly argillized, bleached, iron-oxide- and quartz-rich, weakly pyritized rock represents a new copper-gold exploration target at Pearl Camp (Mustang Gold Corp. news release, 8/13/98).

Winnemucca district

Pallaum Minerals began a preliminary exploration program on the W property near Winnemucca preparatory to planned drilling in the latter part of the year. The work

centered on an area of gold mineralization that graded 0.04 opt gold over 100 feet. Pallaum Minerals is evaluating potential joint venture opportunities (Pallaum Minerals news release, 8/24/98).

Buffalo Mountain district

Drilling in 1998 on the Converse project, located 9 miles south of Newmont Gold's Lone Tree Mine, has focused on the North Redline deposit. This deposit, discovered in 1997, is less than 0.5 miles north of the Redline deposit. High-grade mineralization was intersected in one hole (45 feet grading 0.293 opt), demonstrating the presence of a structurally controlled high-grade quartz vein stockwork. Previous drilling by Romarco Minerals and joint venture partners, Uranerz USA and Newmont Gold outlined a drill indicated gold resource on the property of 49.9 million tons grading 0.021 opt for a total of 1,038,000 oz of gold (Denver Mining Record, 8/5/98). More drilling was planned on the North Redline deposit, the Redline deposit, and other selected targets on the property with the objective of adding to the current gold resource. Newmont Gold has indicated that it will take over operating the project on completion of the earn-in by the Nike Joint Venture (Romarco/Uranerz) which was expected to occur by the end of 1998. Uranerz is currently the operator of the project and is in the process of being acquired by Cameco (Romarco Minerals Inc. news release, 7/20/98).

LANDER COUNTY

Battle Mountain district

At Battle Mountain Gold Co.'s Battle Mountain Complex, work on the Phoenix project progressed significantly in 1998 where more than 145,000 feet of drilling added approximately 1 million oz of gold to the reserve base. Drill results from West Midas, mid-Midas and Fortitude pits were very encouraging. It now appears that the footprint of the new mine model is going to be much larger than originally anticipated, spanning from the old Fortitude pit to the north, to the Midas deposits in the south, a distance of about 3 miles. Drilling at West Midas intersected appreciable gold mineralization, which remains open to the south. Targets beneath the eastern part of Fortitude pit in the middle Battle Formation and the Virgin fault zone also returned encouraging results. In 1999, 150,000 feet of development, metallurgical, and exploration drilling is planned with the emphasis on reserve development.

At the nearby Copper Basin project, 1998 drilling identified high-grade gold-copper-silver mineralization beneath the east highwall of the old Surprise pit. Continued work in 1999 is planned to confirm the viability of the high-grade East Surprise target as well as to develop other targets in the area (Battle Mountain Gold Co. news releases, 4/23/98, 7/30/98, 10/27/98, 2/2/99).

Great Basin Gold Ltd. announced positive results from the first two core holes on its Wilson Independence gold property located west of Copper Canyon. The two successful drill holes targeted favorable calcareous host rocks of the Antler sequence below the Golconda thrust. Both drill holes encountered geologically significant gold values in the lower member of the Battle Conglomerate and also in the Harmony Formation, the latter previously unrecognized as a favorable host unit (Great Basin Gold Ltd. news release, 7/7/98).

Oro Nevada Resources Inc. dropped its lease on the DeWitt property, west of Copper Basin, following discouraging results from an eight-hole drilling program designed to test replacement and skarn targets near a copper-rich intrusive (Elko Daily Free Press, 9/26/98).

Birch Creek district

White Knight Resources Ltd. is earning a 100% interest in the Quito project, south of Austin, from Meridian Minerals Corp. for \$2 million in exploration expenditures over a 4-year period. White Knight's work in 1997 and 1998 identified three separate areas of significant gold mineralization on the property: the Russ' Zone, the Spires area, and the "Newly Discovered Zone." Drilling, rock-chip sampling, and geological mapping at the Russ' Zone defined 9,000 feet of strike length containing erratic gold mineralization in upper plate rocks, which may represent leakage above a disseminated gold deposit in lower plate carbonate rocks. Additional drilling to test the model and extend mineralized areas along strike is planned for next season. The Spires target is located about 8,000 feet northeast of the old Main and Satellite Pits, which produced 180,000 oz of gold during 1986-88. Prospecting and geological mapping in this area defined an anomalous gold zone associated with altered dikes along a fault zone separating upper plate cherts from lower plate Roberts Mountains Formation. In 1998, rock chip sampling and geologic mapping defined a 4,000-foot-long "Newly Discovered Zone" of decalcification and scattered jasperoid development in thin-bedded carbonates cut by altered dikes on the northern part of the Quito property (White Knight Resources Ltd. news release, 2/19/99).

Buffalo Valley district

Fairmile Gold Corp. drilled eight holes at its Buffalo Valley property in 1998: seven holes were drilled at Target L and one hole was drilled at Section 3 on ground leased from Santa Fe/Newmont. Continuity of gold mineralization between the Water Well Pod (Target L) and one of the pods along the Front fault (Target B) was established by the program. The Section 3 hole did not encounter gold mineralization and the lease on this ground was terminated (Fairmile Gold Corp. news release, 2/1/99).

Bullion district

Cortez Joint Venture poured its one-millionth ounce of gold from the Pipeline Mine on January 31, 1998, one month ahead of earlier predictions. The mine went into production in June 1997, and 1998 was the first full year of production (Elko Daily Free Press, 1/30/98). At the South Pipeline deposit, Placer Dome U.S. Inc., the operator of the Cortez Joint Venture, revised its reserve estimate of the South Pipeline deposit, as of December 31, 1998, to 122,340,000 tons proven and probable ore at an average grade of 0.037 opt gold. This is an increase of more than 1.4 million contained oz of gold, representing a growth of some 45% in the size of the reserves since June 30, 1998. All required permits for the full-scale mining and processing of South Pipeline ore are expected to be issued by mid-year 1999, pre-stripping operations will begin in 2001, and significant production from the deposit will commence in 2002. The South Pipeline project involves approximately 4,000 acres of mining claims located about 500 feet south of the Pipeline deposit that is currently being mined by Cortez (Royal Gold news releases, 8/6/98, 11/11/98, 12/22/98, 2/16/99).

Oro Nevada Resources Inc. reported the sale of surface rights of the Dean Ranch, also in Crescent Valley, to the Cortez Joint Venture for \$4,750,000. Oro Nevada retained the mineral rights on 96% of the 48,437-acre ranch (Elko Daily Free Press, 11/21/98). Farther north, Coral Gold Corp. completed an option agreement with Placer Dome on Coral Gold's Robertson project (Coral Gold Corp. news release, 10/8/98).

McCoy district

At the McCoy/Cove Mine, exploration work in 1998 identified a small pod of higher-grade mineralization located off to the side of the Cove pit. An engineering study has been completed that confirms the economics of using underground methods to mine the 10–15,000 oz of contained gold and 0.5–1.0 million oz of contained silver within this pod.

In order to compensate for lower grade ore encountered in 1998, McCoy/Cove increased the number of tons milled, exceeding the mill's rated capacity by over 15%, thus increasing total production. McCoy/Cove continues a waste rock removal program that will allow access to approximately 400,000 oz of contained gold and 22 million oz of contained silver located directly below the waste rock area. The material to be mined from this portion of the deposit will progress from low-grade heap-leach material in the second half of 1999 to higher grade material starting in early 2000 (Echo Bay Minerals news release, 2/11/99).

Red Butte area

MK Gold Co. conducted rock chip and soil sampling and a geophysical survey on the RBX project, located about

50 miles southwest of Battle Mountain. Drilling on targets generated from this work began in August 1998. MK Gold Co. owns 100% of this gold property consisting of 88 unpatented lode claims on approximately 1,760 acres (MK Gold Co. news release, 10/23/98).

LYON COUNTY

Wilson district

Inmet Mining has submitted an amendment to their approved mining plan of operations to drill 43 reverse circulation holes in sections 9, 10, 15, 16, and 17 of T9N, R26E, near the old camp of Rockland (Humboldt-Toiyabe National Forests amendment to mining plan, 5/28/98).

Yerington district

International Taurus Resources acquired the Lyon copper-magnetite property from Cyprus Metals Exploration. A due diligence field program will test gold content of the copper mineralization as well as determine the engineering parameters required for an underground mining operation at the Lyon site. Mineralization at the Lyon deposit is in six zones: the North and South porphyries, and the Northwest, East, E-2, and Southwest skarns. Preliminary resource estimates, based on 358 holes drilled by Cyprus are: 138 million tons grading 0.71% copper, 27% magnetite, and 0.001 opt gold in the North Porphyry; 203 million tons grading 0.36% copper, 31% magnetite, and 0.001 opt gold in the South Porphyry; 3 million tons grading 3.35% copper in the Northwest Zone skarn; 7.1 million tons grading 3.35% copper, 23.6% magnetite, and 0.01 opt gold in the East skarn; 2 million tons grading 3.6% copper, 27.9% magnetite, and 0.02 opt gold in the E-2 skarn (Denver Mining Record, 6/15/98).

Arimetco Inc. was forced by the Nevada Division of Environmental Protection to cease mining at the Yerington and MacArthur mine sites due to failure to obtain a \$945,000 reclamation bond and violation of other state regulations. Arimetco had filed for bankruptcy protection in January 1997 (Humboldt Sun, 12/28/98).

MINERAL COUNTY

Aurora district

After producing 1,911 oz of gold in the first quarter of 1998, the Aurora Mine was placed on care and maintenance in March because of low gold price and needed capital improvements. Real Del Monte Mining Corp., (formerly Consolidated Nevada Goldfields Corp.) is seeking joint-venture partners to continue exploration on its large land holdings in the historical Aurora gold district (Real Del Monte Mining Corp., news releases, 3/23/98, 5/29/98).

Bell district

Prism Resources (U.S.) Inc. entered into a joint venture agreement with Teck Resources Inc. on Prism's 570-acre CMA property in the Cedar Mountains. The CMA Property is a sulfide-rich gold-copper-silver occurrence exhibiting the characteristics of the peripheral portions of a high temperature gold-bearing porphyry copper system. The sedimentary and intrusive rocks that host mineralization are covered to the north by post-mineral volcanics. Earlier drilling by Standard Slag Co., Elmwood Resources, Battle Mountain Gold Co. and USMX Inc. confirmed the presence of gold mineralization under these cover rocks to the northeast. Historical mines on the current CMA property produced 10,000 tons of gold, silver, and copper ore (Prism Resources Inc. news release, 10/19/98).

In the same district, Royal Silver Mines Inc. secured a lease-option on the Simon Silver-Lead Mine. Royal Silver plans surface geologic, geochemical, and geophysical surveys, followed by combination core and reverse-circulation drilling. Royal's staff is studying the possibility of rehabilitating a 1,100-foot exploration shaft and other infrastructure dating from the 1960s on the property (Royal Silver Mines Inc. news release, 3/31/98).

MK Gold Co. is also working in the Bell district where it has located 54 claims on the Dawn property. The 1998 exploration program consisted of geologic mapping, rock and soil sampling, and geophysics intended to identify drilling targets (MK Gold Co. news release, 10/23/98).

Borealis district

In late July, Cambior Exploration USA completed a ten-hole drill program on the Borealis Joint Venture to test portions of five different targets. Cambior is the operating partner of a joint venture with Golden Phoenix Minerals, Inc. on the project. Drilling in the Graben area was successful in extending the strike length of the known mineralization. The Graben/Freedom Flats sulfide resource area is reported to contain an estimated inferred 205,000 oz of gold at an average grade of 0.22 opt. Three holes drilled in the Sunset Wash area substantiate Cambior's interpretation that the alteration and a strong IP anomaly indicate significant potential for gold mineralization similar to the Freedom Flats and Graben deposits (Golden Phoenix Minerals, Inc. news release, 9/1/98).

Silver Star district

Under the terms of an exploration agreement with Cimarron Minerals Ltd., Hecla Mining Co. began a 5,000-foot reverse-circulation drilling program at Cimarron's Sunset Gold Property. Three to four angle holes are planned to test a surface rock geochemical gold anomaly coincident with an induced polarization (IP) anomaly along the north-trending Maryann Basin structures. Epithermal gold-silver mineralization is hosted by intermediate to felsic Tertiary volcanic rocks at the Sunset Property (Cimarron Minerals Ltd. news release, 12/15/98).

NYE COUNTY

Barcelona district

Royal Standard Minerals Inc. announced results from exploration completed on its Antone Canyon property located 8 miles east of the Round Mountain Mine. Limited drilling, trenching, and soil geochemistry indicate that a 4,000-foot-long structural zone has the potential to host a near surface bulk mineable resource of 1 million oz of gold. An extensive diamond drilling program is planned to prove the resource and establish a reserve (Royal Standard Minerals Inc. news release, 11/4/98).

Bare Mountain district

Rayrock Resources Inc. completed the purchase of the remaining 65% interest in the Daisy Gold Mine. Exploration and reserve definition drilling on the Reward property, located approximately 6 miles southwest of the Daisy Mine, established a mineable open-pit reserve containing 77,500 oz of gold. Ore will be hauled to the Daisy Mine for processing. This addition to the existing Daisy reserve extends the life of the Daisy operations to at least 2002. Rayrock plans to continue its exploration program on the Reward property, which it acquired from Barrick Bullfrog in early 1998 (Rayrock Resources Inc. news releases, 9/30/98, 11/13/98).

Cloverdale district

Rayrock Resources Inc. was active at the Golden Wash Prospect in the Cloverdale district, where drilling was planned to test for extensions of a prospective gold-bearing epithermal vein and stockwork system under shallow cover (Rayrock Resources Inc. news release, 5/27/98).

Jett district

Pittston Nevada Gold Co. proposes to continue exploration drilling of 100 drill holes on the Boyd Canyon project in the southern Toiyabe Range (Humboldt-Toiyabe National Forests Plan of Operation, 6/5/98)

Manhattan district

Royal Gold, Inc. entered into a joint venture with a subsidiary of Battle Mountain Gold Co. on Battle Mountain's Black Mammoth project area, located about 2 miles due west of the town of Manhattan. Royal Gold may earn a 50% interest in the Black Mammoth property through a 4-year exploration program on the property. Royal had a 10,000-foot reverse circulation drilling program under way on the prospect in 1998. The agreement with Battle Mountain further consolidates Royal Gold's holdings in the district, and provides a number of highly prospective drilling targets (Royal Gold, Inc. news release, 8/19/98).

Golconda Resources Ltd. decided to expand its exploration program at the Ralston Valley project by

drilling deep holes to test for a potential high-grade Carlin-type gold deposit at depth. The prospect is located south of Baxter Spring in the south part of the Manhattan district and includes two altered, gold-bearing jasperoid zones (250 feet and 450 feet wide) in a Paleozoic limestone-shale sequence (Golconda Resources Ltd. news release, 7/13/98).

Round Mountain district

The Round Mountain Mine had an excellent year with record gold production of 510,504 oz at a cash operating cost of \$198 per ounce. This is the highest production level ever reached at Round Mountain and is partially attributable to production from the site's new mill. The lower cost per ounce was a result of the higher production level and the benefit of a full year of operation under a new mining plan, introduced in 1997. At year end 1998, Round Mountain's gold reserves stood at 6.4 million oz, down from 1997 due to mining. Mine life is currently estimated to be about 12 more years even if no new gold reserves are discovered, which is highly unlikely. In 1998, over \$1.2 million was spent on exploration in a surrounding region defined by the partners (Echo Bay Minerals; Homestake Mining Co.; and Case, Pomeroy and Co.) This work identified a number of targets, three of which were drilled during the year in order to gain a better understanding of the underlying geological structures of these targets and their ability to support gold mineralization. A million-dollar exploration program planned for 1999 includes additional drilling (Echo Bay Minerals news release, 2/11/99).

Also in the Round Mountain district, Boreal Exploration has an agreement with HagelAugen, a private company, to acquire the Gold Hill property consisting of 168 mining claims located about 4½ miles north of the Round Mountain Mine. Based on a 1995 study done for the previous owners, Gold Hill contains a potential resource of 306,622 oz of gold and 4,871,890 oz of silver. Boreal plans a drilling program to confirm known lateral and deep extensions of the mineralization and to upgrade the quality of the already identified resources. The Gold Hill property produced about 41,200 oz of gold and 248,000 oz of silver in the 1930s, mainly from the Gold Hill vein (Boreal Exploration news release, 3/16/98).

PERSHING COUNTY

Kennedy district

Oro Nevada Resources Inc. completed a four-hole reverse circulation drill program totaling 1,809 feet on its Kennedy property, with reportedly encouraging results. Oro Nevada will continue to evaluate the gold project and has renegotiated the lease on the Cobb claims to hold the property another year (Elko Daily Free Press, 9/26/98).

Rosebud district

At the Rosebud underground gold mine, ore reserves were reestimated based on a higher cutoff grade. As of December 31, 1998, Rosebud's proven and probable reserves stood at 242,000 tons grading 0.392 opt gold and 1.80 opt silver (Hecla Mining Co. news release, 2/11/99).

Scossa district

BWI Industries reached an agreement with Romios Gold Resources to acquire a 50% interest in the Scossa gold property, consisting of 16 unpatented mining claims totaling 320 acres. The Scossa property contains a number of gold-bearing quartz breccia veins and fault breccias. During July 1998, Romios carried out a preliminary sampling program on the property (BWI Industries news release, 12/9/98).

Washiki district

Following a successful 1997 drilling program on its Clear Property, Minefinders Corp. Ltd. has secured its land position around the drilled area and is performing an extensive surface mapping and sampling effort in order to define mineralized trends and geologic anomalies (Denver Mining Record, 4/29/98).

WASHOE COUNTY

Deephole district

Breckenridge Minerals Inc. is purchasing the Mountain View Gold property from Canyon Resources for a total of \$3 million in cash and shares to be paid over three years. The property consists of 8,700 acres of primarily unpatented mining claims located about 90 miles north of Reno. Drilling in the Buffalo Hills and Severence areas of the property has defined a mostly oxidized gold resource of 589,000 oz at an average grade of 0.055 opt under a few hundred feet of gravel. Additional drilling is required to define an open-pit, heap-leach reserve, and there is potential for a higher grade (+0.25 opt) underground-mineable reserve in the area (Breckenridge Minerals Inc. news release, 11/23/98).

Olinghouse district

Production began at the Alta Gold Co.'s Olinghouse Mine with first production from the gravity mill followed by leach-pad production in October (Denver Mining Record, 9/23/98).

WHITE PINE COUNTY

Bald Mountain district

Royal Gold has reached an agreement with Placer Dome U.S. Inc. on the Alligator Ridge property whereby Royal Gold will spend approximately \$4 million in exploration over the next six years. Depending upon exploration results, Royal Gold can either acquire ownership of up to 1,638 unpatented claims (subject to a 5% NPI [net profit interest] royalty to Placer Dome) or else Placer Dome will reimburse Royal Gold for 200% of its cumulative investment and grant Royal Gold a 22% NPI royalty in any future production. Basic geologic and geochemical studies have been conducted to define both near-surface and deeper targets. These data will be used to lay out a 1999 drilling program (Royal Gold, Inc. news release, 11/11/98).

From 1980 through 1992, Alligator Ridge produced approximately 700,000 oz of gold. Since Placer Dome acquired the property in 1993, it has produced approximately 160,000 oz, primarily from heap leach operations in the Yankee and Vantage Basins.

As of December 31, 1998, Placer Dome US revised its reserve estimate at the Bald Mountain Gold Mine to 10,800,000 tons proven and probable gold reserves grading an average of 0.075 opt, containing approximately 811,000 oz of gold. This compares with the previous

estimate, as of June 30, 1998, when proven and probable reserves on the property were 12,594,000 tons, with an average grade of 0.061 opt, containing approximately 771,000 oz of gold. Royal Gold holds a 1.75% net smelter return royalty on approximately 81% of the Bald Mountain Mine.

Butte Valley district

Detailed mapping and soil/rock sampling are currently underway at the Limousine Butte property where Nevada Pacific Gold Ltd. is exploring for disseminated and skarn-hosted gold deposits related to a large mineralized porphyry complex located beneath the valley floor. Copper exploration carried out on the property between 1960 and 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. A 1999 drilling program is planned for the property (Nevada Pacific Gold Ltd. news release 2/23/99).

White Pine district

The Griffon Mine of Alta Gold Co. poured its first gold in January 1998. Gold production for 1998 totaled 37,921 oz at an average grade of 0.0309 opt (Elko Daily Free Press, 1/17/98; Alta Gold Co. news releases, 4/23/98, 3/21/99).

Major Precious-Metal Deposits

by Joseph V. Tingley and Harold F. Bonham, Jr.

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 91, 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)	1989: reserves—30,000 oz Au, 125,000 oz Ag 1997: 2.5 million tons, 0.059 opt Au equiv. oz	1997: exploration	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	1989: development 1990–93: exploration	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 1993: idle	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)	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: 28,315 oz Au, 2,597 oz Ag 1995: 1,780 oz Au, 280 oz Ag	Mississippian to Permian overlap assemblage clastic and carbonate rocks	Cretaceous or Tertiary
Bootstrap/Capstone (Bootstrap district)	1989: <i>geologic resource</i> —25.1 million tons, 0.039 opt Au 1990: 18.3 million tons, 0.044 opt Au 1994: 169,000 oz Au, <i>geologic resource</i> — 1 million oz Au	1988–90: see "Newmont Gold Production" on page 38	dacitic dikes, Paleozoic siltstone and laminated limestone/chert	~37 Ma
Bootstrap/Capstone/ Tara (Bootstrap district)	1996: 20.2 million tons, 0.046 opt Au proven and probable reserves; 1 million tons, 0.086 opt Au mineralized material	1996: 19,800 oz Au	dacitic dikes, Paleozoic siltstone and laminated limestone/chert	~37 Ma
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 1992: 6.0 million tons, 0.03 opt Au 1994: 350,000 oz Au in 3 deposits		Webb Formation Devils Gate Formation Tomera Formation Diamond Peak Formation	

continued

MAJOR PRECIOUS METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
ELKO COUNTY (continued)				
Dee (Bootstrap district)	1990: 4.5 million tons, 0.059 opt Au 1992: 5.2 million tons, 0.049 opt Au 1994: <i>geologic resource</i> —958,000 oz Au 1995: 550,000 oz Au 1996: 579,000 oz Au 1997: 400,000 oz Au 1998: 1.8 million tons, 0.155 opt Au proven and probable reserves	1987–88: ~97,000 oz Au 1989–92: 135,000 oz Au, 142,000 oz Ag 1993: 25,860 oz Au 1994: 24,219 oz Au 1995: 45,000 oz Au 1996: 45,070 oz Au, 50,322 oz Ag 1997: 35,000 oz Au 1998: 33,156 oz Au	Vinini Formation Devonian carbonates, dacitic dikes	Cretaceous or Tertiary
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	Popovich Formation	
Doby George (Aura district)	1995: 3.7 million tons, 0.060 opt Au 1997: 250,000 oz Au		Schoonover Formation	
Gnome (Carlin district)	1988: 2.7 million tons, 0.048 opt Au		Paleozoic sedimentary rocks	Cretaceous or early Tertiary
Jerritt Canyon (includes Saval Canyon and Burns Basin) (Independence Mountains district)	1989: 21.6 million tons, 0.143 opt Au mill ore; 6.5 million tons, 0.043 opt Au leachable 1990: new discovery south of current mine has a geologic resource of 3.2 million tons, 0.284 opt Au 1991: <i>geologic resource</i> —4.7 million oz Au 1997: 2.1 million tons, 0.269 opt Au 1998: 1.6 million oz Au proven and probable reserves, 4.2 million oz Au other mineralized material	1981–90: ~2.6 million oz Au 1991–94: 1,380,000 oz Au, 25,000 oz Ag 1995: 328,000 oz Au 1996: 309,477 oz Au 1997: 312,015 oz Au 1998: 347,000 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 1997: 2.17 million tons, 1.04 opt Au, 11.65 opt Ag	1998: 4,357 oz Au, 55,329 oz Ag	Tertiary volcanic rocks	15.3 Ma
Kinsley Mountain (Kinsley district)	1988: 2.1 million tons, 0.048 opt Au 1993: 2.6 million tons, 0.047 opt Au 1994: 3.5 million tons, 0.044 opt Au 1995: 3.5 million tons, 0.045 opt Au 1996: 3.4 million tons, 0.032 opt Au	1993: evaluation 1995: 44,040 oz Au, 8,050 oz Ag 1996: 44,553 oz Au, 10,930 oz Ag 1997: 38,472 oz Au, 5,472 oz Ag 1998: 9,543 oz Au	upper Paleozoic carbonate rocks	Oligocene?
Meikle (Lynn district)	1992: <i>geologic resource</i> —7.9 million tons, 0.613 opt Au 1993: <i>geologic resource</i> —6.6 million oz Au 1996: 8.5 million tons, 0.716 opt Au proven and probable reserves; 1.4 million tons, 0.717 opt Au mineralized material 1998: 6.6 million tons, 0.713 opt Au proven and probable reserves; 5.0 million tons, 0.455 opt Au mineralized material	1996: 78,442 oz Au 1997: 574,308 oz Au, 194,030 oz Ag 1998: 847,313 oz Au, 232,000 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			
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 Emigrant Springs (Carlin district)	1989: 30.3 million tons, 0.021 opt Au 1995: 169,000 oz Au 1996: 16 million tons, 0.028 opt Au proven and probable reserves; 10.4 million tons, 0.021 opt Au mineralized material	1994: 79,000 oz Au 1995: 32,100 oz Au 1996: 48,900 oz Au	Webb Formation	36–37 Ma
Rossi Mine (Storm resource) (Bootstrap district)	1998: 3.1 million tons, 0.371 opt Au resource			
SMZ (Carlin district)	1989: <i>geologic resource</i> —1.6 million tons, 0.019 opt Au			

MAJOR PRECIOUS METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
ELKO COUNTY (continued)				
Trout Creek (Carlin district)	1988: 1.5 million tons, 0.04 opt Au	1988: exploration	lower Paleozoic rocks	Cretaceous or Tertiary
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 1987–89: 33,000 oz Au, 143,000 oz Ag 1990: 1,163 oz Au, 41,865 oz Ag 1992–93: idle	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	Cretaceous or Tertiary
Wright Window (Independence Mountains district)	1986: 1.3 million tons, 0.095 opt Au	1992: 3,500 oz Au	lower Paleozoic carbonate rocks	Cretaceous or Tertiary
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		Palmetto Formation	
Gemfield	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 1991: 1.2 million tons, 0.05 opt Au 1993: 2.3 million tons, 0.073 opt Au 1994: 3.48 million tons, 0.071 opt Au	1903–45: 4.19 million oz Au, 1.45 million oz Ag 1989: 1,987 oz Au, 200 oz Ag 1993: 11,350 oz Au 1995: 9,850 oz Au 1996: 3,810 oz Au, 1,349 oz Ag 1997: 1,376 oz Au, 435 oz Ag	andesite, rhyodacite, rhyolite	21 Ma
Hasbrouck (Divide district)	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 1993: idle	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 1995: <i>geologic resource</i> —100,000 oz Au, including reserves of 20,000 oz at 0.036 opt Au 1996: 1.6 million tons, 0.026 opt Au	1991–93: idle	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	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 1988–90: idle	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		Webb Formation	
Betze, Post (Lynn district)	1988: 128.4 million tons, 0.095 opt Au 1990: <i>geologic resource</i> —18.4 million oz Au 1992: 112.1 million tons, 0.180 opt Au, <i>geologic resource</i> —21 million oz Au 1993: <i>geologic resource</i> —29.1 million oz Au 1994: <i>reserves</i> —29.6 million oz Au 1995: 23 million oz Au 1996: 122.7 million tons, 0.192 opt Au proven and probable reserves: 55.8 million tons, 0.189 opt Au mineralized material 1998: 123.1 million tons, 0.172 opt Au proven and probable reserves: 30.2 million tons, 0.080 opt Au mineralized material	1980–88: 440,000 oz Au 1989: 207,264 oz Au, 15,500 oz Ag 1990: 352,880 oz Au, 20,112 oz Ag 1991: 546,146 oz Au, 22,000 oz Ag 1992: 1,108,218 oz Au, 34,735 oz Ag 1993: 1,439,929 oz Au 1994: 1,849,503 oz Au, 107,330 oz Ag 1995: 2,031,883 oz Au, 68,217 oz Ag 1996: 1,934,966 oz Au, 73,140 oz Ag 1997: 1,605,836 oz Au, 65,716 oz Ag 1998: 1,498,683 oz Au, 58,000 oz Ag	Ordovician to Devonian chert, shale, siltstone, and impure carbonates; in part, Vinini Formation	Cretaceous or early Tertiary
Blue Star (Lynn district)	1989: <i>geologic resource</i> —22.2 million tons, 0.030 opt Au	1974–84: intermittent 1988–97: see "Newmont Gold Production" on page 38	lower Paleozoic sandy siltstone and carbonate rocks, granodiorite	Cretaceous or early Tertiary
Bobcat (Lynn district)	1988: <i>geologic resource</i> —17.7 million tons, 0.029 opt Au		lower Paleozoic rocks	Cretaceous or Eocene
Buckhorn property (Buckhorn district)	1990: 700,000 tons, 0.05 opt Au; <i>geologic resource</i> —200,350 oz Au 1991: 409,000 tons, 0.062 opt Au 1992: open-pit ore mined out 1993: <i>geologic resource</i> —1.1 million tons, 0.11 opt Au	1988–91: 97,922 oz Au, 376,487 oz Ag 1992: 7,700 oz Au, 28,800 oz Ag 1993: 3,800 oz Au, 4,600 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 1996: 2 million tons, 0.056 opt Au 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	Tertiary or Mesozoic
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: 27,700 oz Au 1995: 9,300 oz Au 1996: 31,700 oz Au	Roberts Mountains Formation	Cretaceous or early Tertiary
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 1988–93: see "Newmont Gold Production" on page 38	Ordovician-Devonian limestone, argillite chert	Cretaceous or early Tertiary
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: 417,200 oz Au 1995: 267,400 oz Au 1996: 245 oz Au	Ordovician-Devonian limestone, argillite chert	Cretaceous or early Tertiary
Gold Bar (Antelope district)	1988: 2.75 million tons, 0.10 opt Au 1989: <i>geologic resource</i> —1.45 million oz Au 1990: mined out in December 1994: 240,000 oz Au 1995: 190,000 oz Au	1987–88: 91,000 oz Au 1989: 66,000 oz Au 1990: 81,263 oz Au 1991: 80,727 oz Au, 3,000 oz Ag 1992: 80,000 oz Au 1993: 55,080 oz Au 1994: 20,000 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		Paleozoic sedimentary rocks	Eocene?
Gold Pick (Antelope district)	1988: 10 million tons, 0.06 opt Au 1990: 9.7 million tons, 0.057 opt Au includes Gold Ridge and Goldstone 1991: 4.5 million tons, 0.055 opt Au 1992: <i>geologic resource</i> —329,700 oz Au, includes eastern deposit 1993: 1.4 million tons, 0.079 opt Au		Paleozoic sedimentary rocks	Eocene?

MAJOR PRECIOUS METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
EUREKA COUNTY (continued)				
Gold Quarry (Maggie Creek district)	1987: 197.8 million tons, 0.042 opt Au 1988: <i>geologic resource</i> —503 million tons, 0.04 opt Au 1990: 212.6 million tons, 0.042 opt Au, <i>geologic resource</i> —534.3 million tons, 0.037 opt Au 1991: <i>reserves</i> —9.3 million oz Au	1985 170,000 oz Au 1988-93: <i>see</i> "Newmont Gold Production" on page 38	Ordovician to Devonian chert, shale, siltstone, and impure carbonates; in part, Vinini Formation	Cretaceous or early Tertiary
Gold Quarry/Mac/Tusc (Maggie Creek district)	1996: 174.8 million tons, 0.046 opt Au proven and probable reserves; 51.9 million tons, 0.058 opt Au mineralized material	1994: 967,700 oz Au; 1995: 1,094,000 oz Au; 1996: 916,300 oz Au		
Gold Ridge (Antelope district)	1988: 4 million tons, 0.06 opt Au 1990: <i>see</i> Gold Pick 1991: 2.9 million tons, 0.04 opt Au 1992: 1.4 million tons, 0.038 opt Au 1993: 426,000 tons, 0.059 opt Au		Paleozoic sedimentary rocks	Eocene?
Goldstone (Antelope district)	1988: 1.7 million tons, 0.08 opt Au 1990: <i>see</i> Gold Pick 1991: 845,000 tons, 0.063 opt Au 1992: 878,000 tons, 0.061 opt Au 1993: 130,928 tons, 0.104 opt Au		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	34 Ma?
Maggie Creek (Maggie Creek district)	1988: <i>geologic resource</i> —303,000 tons, 0.092 opt Au	1984: 1,250,000 tons 1986: intermittent production 1988: no production reported	Ordovician to Devonian siltstone, chert, sandstone, impure limestone	Cretaceous or early Tertiary
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	lower Paleozoic sedimentary rocks	Cretaceous or early Tertiary
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			
Ratto Canyon (Eureka district)	1984: ~200,000 oz Au	1995: idle	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/Griffin Projects (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			
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 1997: 7.028 million tons, 0.098 opt Au proven and probable, plus 7.173 million tons, 0.073 opt Au mineralized material	1997: 16,600 oz Au, 250 oz Ag 1998: 116,500 oz Au, 8,436 oz Ag	Goodwin Limestone	Cretaceous?
Tonkin Springs (Antelope district)	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 1995: proven and probable reserves—956,000 oz Au 1996: 9.8 million tons, 0.056 opt Au 1998: 1,365,000 oz Au drill-defined reserves and resources	1987: ~9,700 oz Au 1988: 565 oz Au 1989: 1,753 oz Au, 1,402 oz Ag 1990: 2,068 oz Au, 470 oz Ag 1992: idle, exploration, metallurgical testing	Vinini Formation, dacitic dikes	Oligocene?
Turf (Lynn district)	1996: 2.5 million tons, 0.367 opt Au mineralized material		Roberts Mountains Formation	
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	1995: in production	lower Paleozoic sedimentary rocks	Cretaceous or early Tertiary

continued

MAJOR PRECIOUS METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
EUREKA COUNTY (continued)				
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: 99,800 oz Au 1996: 173,000 oz Au	Roberts Mountains Formation	
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	
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: 3,068 oz Au, 37,537 oz Ag 1991: 1,849 oz Au, 15,937 oz Ag 1992: idle	Preble Formation	Tertiary
Ashdown (Vicksburg district)	1988: 1 million tons, 0.11 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 1989: <i>geologic resource</i> —4.6 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: 228,065 oz Au, 100,000 oz Ag 1992: 247,969 oz Au, 113,463 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 1991: 6.5 million tons, 0.192 opt Au sulfide and 1.8 million tons, 0.039 opt Au oxide. 1992: <i>sulfide</i> —7.0 million tons, 0.194 opt Au; <i>oxide</i> —2.5 million tons, 0.031 opt Au 1993: <i>geologic resource</i> —1.3 million oz Au 1994: <i>reserves</i> —1.59 million oz Au 1995: <i>resource</i> —6.2 million tons, 0.354 opt Au, <i>reserves</i> —1.25 million oz Au (Turquoise Ridge only) 1996: 15 million tons, 0.304 opt Au (underground and surface, includes Turquoise Ridge) 1997: 6.2 million oz Au, proven and probable reserves 1998: 6.6 million oz Au, proven and probable reserves 9.4 million oz Au, additional resources	1938–50, 1962-67: 788,875 oz Au 1987–88: ~35,000 oz Au 1989: 120,730 oz Au, 9,407 oz Ag 1990: 172,029 oz Au 1991: 200,958 oz Au 1992: 230,600 oz Au, 78,700 oz Ag 1993: 210,000 oz Au, 51,000 oz Ag 1994: 230,000 oz Au, 57,000 oz Ag 1995: 120,000 oz Au, 72,000 oz Ag 1996: 171,286 oz Au 1997: 177,231 oz Au 1998: 175,302 oz Au, 52,490 oz Ag	Comus and Preble Formations, granodiorite dikes, granodiorite	90 Ma?
Hycroft (formerly Crofoot/Lewis) (Sulphur district)	1988: 25 million tons, 0.025 opt Au 1990: 12 million tons, 0.020 opt Au 1991: 13.9 million tons, 0.019 opt Au 1992: 29.8 million tons, 0.024 opt Au, <i>geologic resource</i> —45 million tons, 0.021 opt Au 1993: 29.8 million tons, 0.024 opt Au 1994: <i>geologic resource</i> —56.7 million tons, 0.018 opt Au 1994: <i>geologic resource</i> —58.1 million tons, 0.019 opt Au 1995: 66.5 million tons, 0.019 opt Au 1997: 25.2 million tons, 0.02 opt Au, estimated proven and probable	1988: 75,800 oz Au 1989: 82,000 oz Au, 123,000 oz Ag 1990: 92,000 oz Au, 110,000 oz Ag 1991: 94,340 oz Au, 151,553 oz Ag 1992: 100,000 oz Au, 280,000 oz Ag 1993: 86,516 oz Au, 310,559 oz Ag 1994: 94,500 oz Au, 297,000 oz Ag 1995: 101,128 oz Au, 417,823 oz Ag 1996: 89,381 oz Au, 321,315 oz Ag 1997: 117,379 oz Au, 479,920 oz Ag 1998: 11,300 oz Au, 226,000 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 1991: <i>reserves</i> —1 million oz Au 1992: 3.14 million oz Au 1993: 3.8 million oz Au 1994: 4 million oz Au	1991: 36,424 oz Au 1992: 128,000 oz Au 1993: 155,000 oz Au 1994: 226,911 oz Au 1995: 240,000 oz Au, 11,000 oz Ag 1996: 205,738 oz Au 1997: 331,082 oz Au 1998: 257,702 oz Au, 27,484 oz Ag	Havallah Formation and dacite porphyry	38 Ma

MAJOR PRECIOUS METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
HUMBOLDT COUNTY (continued)				
Marigold (Battle Mountain district)	1990: 4.3 million tons, 0.105 opt Au mill ore, 7.6 million tons, 0.026 opt Au heap-leach ore 1992: 10 million tons, 0.055 opt Au 1996: 648,000 oz Au 1998: 19.8 million tons, 0.032 opt Au	1989: 16,000 oz Au, 484 oz Ag 1990: 60,750 oz Au, 1,600 oz Ag 1991: 65,469 oz Au, 2,000 oz Ag 1992: 90,000 oz Au, 4,000 oz Ag 1993: 90,000 oz Au, 1,700 oz Ag 1994: 84,895 oz Au 1995: 59,800 oz Au 1996: 73,500 oz Au 1997: 73,640 oz Au 1998: 71,936 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)	1989: 480,000 oz Au 1992: 4.98 million tons, 0.064 opt 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: 56,382 oz Au 1991: 55,640 oz Au 1992: 50,340 oz Au, 5,730 oz Ag 1993: 50,870 oz Au, 3,470 oz Ag 1994: 44,000 oz Au, 3,500 oz Ag 1995: 44,854 oz Au 1996: 42,431 oz Au, 2,850 oz Ag 1997: 51,600 oz Au, 4,500 oz Ag 1998: 34,904 oz Au, 640 oz Ag	Comus Formation	90 Ma?
Preble (Potosi district)	1989: 15,110 oz Au 1992: idle, mined out	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	90 Ma?
Rabbit Creek (Potosi district)	1989: 4.1 million oz Au; additional geologic resource—1 million Au in refractory material 1990: reserves—2.5 million oz Au; geologic resource—5.1 million oz Au 1992: reserves—3.26 million oz Au 1993: see Twin Creeks	1990: 25,000 oz Au 1991: 115,500 oz Au 1992: 156,000 oz Au 1993: see Twin Creeks	Ordovician	Eocene?
Sleeper (Awakening district)	1989: 1,975,000 oz Au 1990: 44.1 million tons, 0.038 opt Au, 0.152 opt Ag 1991: 1.7 million oz Au, 6.7 million oz Ag 1993: 751,000 oz Au 1997: 2.27 million oz Au measured, indicated, inferred geologic resource 1998: 182 million tons, 0.042 opt Au, (7.6 million oz Au) estimated in-ground inventory	1986: 128,000 oz Au, 94,000 oz Ag 1987: 158,696 oz Au 1988: 230,410 oz Au 1989: 256,000 oz Au, 339,650 oz Ag 1990: 250,131 oz Au, 391,886 oz Ag 1991: 183,346 oz Au, 289,463 oz Ag 1992: 132,383 oz Au, 285,011 oz Ag 1993: 100,020 oz Au, 254,690 oz Ag 1994: 106,912 oz Au, 142,597 oz Ag 1995: 82,062 oz Au, 98,694 oz Ag 1996: 38,200 oz Au, 36,800 oz Ag 1997: exploration	Miocene "latite" flows and dikes, silicic ash-flow tuff, Triassic slate and phyllite	16.1 Ma
Trenton Canyon (Buffalo Valley district)	1994: oxide resource—14.6 million tons, 0.035 opt Au, (517,000 oz Au) 1996: 20 million tons, 0.029 opt Au (590,000 oz Au)		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 1994: geologic resource—8.5 million oz Au 1996: 10.5 million oz Au	1993: 482,600 oz Au, 206,200 oz Ag 1994: 501,897 oz Au, 244,710 oz Ag 1995: 451,285 oz Au, 265,462 oz Ag 1996: 459,083 oz Au, 137,914 oz Ag 1997: 572,150 oz Au, 210,493 oz Ag 1998: 871,011 oz Au, 252,677 oz Ag	Paleozoic	Eocene?
Winnemucca Gold property (Winnemucca district)	1998: 130,000 to 140,000 oz Au proven, 300,000 oz Au indicated			

MAJOR PRECIOUS METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
LANDER COUNTY				
Austin Gold Venture (Birch Creek district)	1989: mined out	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 1993: <i>geologic resource</i> —900,000 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 1996: 52.9 million tons, 0.038 opt Au 1998 (Phoenix): 3,515,000 oz Au proven and probable reserves; 1,000,000 oz Au additional mineralization	1994: 12,000 oz Au, 15,000 oz Ag 1995: 74,958 oz Au, 206,807 oz Ag 1996: 73,100 oz Au, 201,460 oz Ag 1997: 77,896 oz Au, 129,147 oz Ag 1998: 36,787 oz Au, 80,325 oz Ag		Eocene
Buffalo Valley Gold Project (Buffalo Valley district)	1988: 1.5 million tons, 0.05 opt Au 1991: idle 1994: 4.8 million tons, 0.07 opt Au 1995: 511,000 oz Au 1996: 301,000 oz Au 1997: 600,106 oz Au resource; 100,797 oz Au, other mineralized material	1988: 9,238 oz Au 1989: 14,660 oz Au 1990: 15,770 oz Au 1997: exploration		Eocene?
Cortez Joint Venture (Bullion district) CJV includes original Cortez Mine, Pipeline, and South Pipeline	1987: 4.8 million tons, 0.105 opt Au 1988: 5.4 million tons, 0.093 opt Au 1992: <i>reserves</i> —3.1 million tons, 0.05 opt Au, 0.4 opt Ag 1997: 107.7 million tons, 0.089 opt Au proven and probable; 156.5 million tons, 0.046 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: 53,945 oz Au, 10,150 oz Ag 1991: 53,500 oz Au, 6,600 oz Ag 1992: 75,000 oz Au 1993: 66,850 oz Au 1995: 111,215 oz Au, 6,804 oz Ag 1996: 160,782 oz Au, 6,800 oz Ag 1997: 406,551 oz Au, 10,868 oz Ag 1998: 1,138,725 oz Au, 6,860 oz Ag	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: 17,400 oz Au 1991: 2,702 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
Fortitude Extension (Battle Mountain district)	1992: 500,000 oz Au 1993: <i>geologic resource</i> —900,000 oz Au 1996: <i>see</i> Battle Mountain Complex			
Hilltop (Hilltop district)	1984: 10.5 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			

MAJOR PRECIOUS METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
LANDER COUNTY (continued)				
McCoy/Cove (McCoy district)	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 1990: <i>reserves</i> —58.7 million tons, 0.045 opt Au, 2.32 opt Ag 1993: <i>reserves</i> —63.3 million tons, 0.037 opt Au, 1.66 opt Ag, <i>geologic resource</i> —2.43 million oz Au, 107 million oz Ag 1998: 699,000 oz Au, 38,809,000 oz Ag	1986: 50,000 oz Au 1987: 200,000 oz Au, 5 million oz Ag 1988: 100,000 oz Au, 700,000 oz Ag 1989: 214,566 oz Au, 2.26 million oz Ag 1990: 255,044 oz Au, 1.98 million oz Ag 1991: 284,327 oz Au, 5.62 million oz Ag 1992: 301,512 oz Au, 7.92 million oz Ag 1993: 395,610 oz Au, 12.45 million oz Ag 1994: 359,360 oz Au, 10.44 million oz Ag 1995: 310,016 oz Au, 11.91 million oz Ag 1996: 271,731 oz Au, 7.10 million oz Ag 1997: 187,000 oz Au, 11.00 million oz Ag 1998: 167,494 oz Au, 9.41 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 1995: <i>reserves</i> —oxide 4.222 million tons, 0.058 opt Au; sulfide 5.780 million tons, 0.145 opt Au 1996: 9 million tons, 0.112 opt Au	1992: exploration 1996: 6,743 oz Au	basalt and basaltic andesite	15–16 Ma
Pipeline (Bullion district)	1991: <i>geologic resource</i> —11.3 million tons, 0.237 opt Au 1993: 35.3 million tons, 0.120 opt Au 1994: <i>reserves</i> —21.2 million tons, 0.145 oz Au/ton; <i>plus other resources</i> —8.3 million tons, 0.035 opt Au 1995: 4.3 million oz Au 1996: 136.7 million tons, 8.7 million oz Au measured resource, includes South Pipeline 1997: included in Cortez Joint Venture		Roberts Mountains Formation	Cretaceous or early Tertiary
Robertson (Bullion district)	1988: 11 million tons, 0.04 opt Au 1993: <i>geologic resource</i> —20 million tons, 0.036 opt Au 1996: <i>geologic resource</i> —1 million oz Au	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 1993: <i>geologic resource</i> —31.4 million tons, 0.106 opt Au 1994: <i>geologic resource</i> —76.5 million tons, 0.048 opt Au 1996: <i>see</i> Pipeline 1997: included in Cortez Joint Venture		Roberts Mountains Formation	Cretaceous or early Tertiary
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: 11,700 oz Au, 9,100 oz Ag 1991: 8,780 oz Au, 6,025 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 1987–89: idle 1990–93: idle	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> 1989: <i>additional resources delineated</i> - 2.7 million tons, 0.054 opt Au, 0.654 opt Ag 1991: <i>geologic resource</i> - 19.6 million tons, 0.045 opt Au, 0.61 opt Ag 1992: <i>geologic resource</i> —18 million tons, 0.044 opt Au, 0.61 opt Ag 1994: <i>geologic resource</i> —50 million tons, 0.026 opt Au, 0.35 opt Ag 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 1990: 433,000 tons, 0.21 opt Au 1992: 493,000 tons, 0.15 opt Au 1993: 537,400 tons, 0.123 opt Au, <i>geologic resource</i> —100,000 oz Au 1994: 316,000 tons, 0.120 opt Au 1995: 1.54 million tons, 0.055 opt Au 1996: 900,000 tons, 0.1 opt Au	1989: 12,683 oz Au, 16,400 oz Au 1990: 12,973 oz Au, 18,162 oz Ag 1991: 15,000 oz Au 1992: 15,000 oz Au, 35,000 oz Ag 1993: 8,600 oz Au, 17,200 oz Ag 1995: 15,000 oz Au, 35,000 oz Ag 1996: 10,374 oz Au 1997: 13,284 oz Au, 37,327 oz Ag 1998: 2,130 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 1990: 816,880 tons, 0.103 opt Au 1992: 790,000 tons, 0.13 opt Au <i>geologic resource</i> —267,640 oz Au 1994: 1.5 million tons, 0.1 opt Au (underground) 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: 36,000 oz Au, 68,000 oz Ag 1992: 39,100 oz Au, 79,200 oz Ag 1993: 30,120 oz Au, 59,880 oz Ag 1994: 30,000 oz Au, 57,000 oz Ag 1995: 15,048 oz Au, 39,853 oz Ag 1996: 7,528 oz Au, 15,000 oz Ag	andesite, rhyolite	10 Ma

MAJOR PRECIOUS METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
MINERAL COUNTY (continued)				
Borealis (Borealis district)	1988: 1.792 million tons, 0.046 oz Au/ton 1991: known reserves mined out 1997: 960,000 tons, 0.24 opt Au sulfide resource	1981–84: 170,000 oz Au 1986–88: 116,256 oz Au 1989: 89,060 oz Au, 37,032 oz Ag 1990: 18,435 oz Au, 15,396 oz Ag, production ceased 1992: exploration 1997: exploration	rhyolite flow dome, andesite flows, breccias, volcaniclastic rocks	5 Ma
Candelaria Mine (Candelaria district)	1988: 24 million tons, 1.267 opt Ag, 0.011 opt Au 1992: mine idle, heap-leaching continuing 1993: <i>geologic resource</i> —20,000 oz Au, 5.8 million oz Ag 1994: <i>surface-mineable reserve</i> —15 million oz Ag, 42,000 oz Au <i>underground reserve</i> —45 million oz Ag, 46,000 oz Au 1995: <i>geologic resource</i> —44 million oz Ag, 45,000 oz Au, including reserves of 6.663 million tons, 0.005 opt Au and 1.68 opt Ag 1996: 1.4 million tons, 1.76 opt Ag and 0.005 opt Au proven ore; 10.8 million tons, 4.21 opt Ag and 0.0045 opt Au drill indicated resources	1982: 1.7 million oz Ag, 9,000 oz Au 1987: total production was 10 million oz Ag as of June 1987 1988: 3.8 million oz Ag, 11,000 oz Au 1989: 4.36 million oz Ag, 13,800 oz Au 1990: 4.89 million oz Ag, 11,796 oz Au, 1991: 1.68 million oz Ag, 2,870 oz Au 1992: 1.06 million oz Ag, 2,431 oz Au 1993: 904,810 oz Ag, 1,810 oz Au 1994: 3.19 million oz Ag, 12,800 oz Au 1995: 2.87 million oz Ag, 10,720 oz Au 1996: 3.86 million oz Ag, 15,030 oz Au 1997: 2.95 million oz Ag, 9,955 oz Au 1998: 1.11 million oz Ag, 3,006 oz Au	Candelaria Formation serpentinite, granitic dikes	Cretaceous
Denton-Rawhide (Rawhide district)	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 1991: 29.4 million tons, 0.040 opt Au, 0.368 opt Ag; <i>geologic resource</i> —59.3 million tons, 0.0274 oz Au and 0.298 opt Ag 1992: <i>geologic resource</i> —54 million tons, 0.026 opt Au with 29.4 million tons, 0.04 opt Au, 0.39 opt Ag and 29.9 million tons, 0.015 opt Au, 0.23 opt Ag 1993: 1.3 million oz Au, 15 million oz Ag 1995: 470,000 oz Au, 6 million oz Ag 1996: 535,000 oz Au, 7.3 million oz Ag proven ore 1997: 447,000 oz Au, 3.9 million oz Ag	1990: 39,000 oz Au, 170,000 oz Ag 1991: 76,000 oz Au, 500,000 oz Ag 1992: 92,000 oz Au, 804,000 oz Ag 1993: 105,000 oz Au, 1 million oz Ag 1994: 118,000 oz Au, 952,000 oz Ag 1995: 117,000 oz Au, 960,000 oz Ag 1996: 126,000 oz Au, 1,073,000 oz Ag 1997: 120,000 oz Au, 1,131,000 oz Ag 1998: 123,800 oz Au, 848,000 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)	1990: 6.8 million tons, 0.035 opt Au and 0.241 opt Ag	1989: 60,000 oz Au, 150,000 oz Ag 1990: 64,336 oz Au, 177,244 oz Ag 1991: 67,102 oz Au, 149,168 oz Ag 1992: 61,000 oz Au, 100,000 oz Ag 1993: 54,030 oz Au, 64,950 oz Ag 1994: 22,361 oz Au, 28,267 oz Ag 1995: 16,670 oz Au, 41,000 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 1992: 8.8 million tons, 0.14 opt Au plus an additional <i>geologic resource</i> —1.8 million tons, 0.102 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: 50,011 oz Au, 40,905 oz Ag 1990: 220,000 oz Au, 229,000 oz Ag 1991: 205,000 oz Au, 189,000 oz Ag 1992: 323,800 oz Au, 313,000 oz Ag 1993: 340,000 oz Au, 400,000 oz Ag 1994: 301,000 oz Au, 410,000 oz Ag 1995: 177,631 oz Au, 413,587 oz Ag 1996: 205,348 oz Au, 288,700 oz Ag 1997: 206,571 oz Au, 351,348 oz Ag 1998: 208,123 oz Au, 299,944 oz Ag	rhyolitic ash-flow tuff	9.5 Ma

continued

MAJOR PRECIOUS METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
NYE COUNTY (continued)				
Daisy (Bare Mountain district)	1993: 4.7 million tons, 0.024 opt Au <i>geologic resource</i> —430,000 oz Au 1994: <i>geologic resource</i> —18 million tons, 425,000 oz Au 1995: 12 million tons, 0.018 opt Au, <i>geologic resource</i> —51.1 million tons, 0.026 opt Au (includes five orebodies listed below) 1997: 17.3 million tons, 0.024 opt Au mineable reserves 1998: 4.2 million tons, 0.033 opt Au proven and probable reserves	1997: 32,000 oz Au 1998: 32,504 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	1997: exploration	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 1996: <i>geologic resource</i> —161,000 oz Au 1997: 1.7 million tons, 0.13 opt Au proven and probable	1997: exploration	Cambrian Gold Hill Formation	
Midway (Rye Patch district)	1997: 270,000 oz Au preliminary resource	1997: exploration	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	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 1990-93: idle	Roberts Mountains and Hanson Creek Formations, granodiorite, tonalite, quartz porphyry dikes	85 Ma
Paradise Peak/ Ketchup Flats pit (Fairplay district)	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 1991: ~ 2 year mine life 1992: <i>reserves</i> —197,000 oz Au, 4.3 million oz Ag 1993: mining ceased, remaining resource refractory sulfides, heap-leaching continued 1996: 5 million tons, 0.022 opt Au, 0.2 opt Ag (Ketchup Flats pit)	1986–88: 560,000 oz Au, 8.5 million oz Ag 1989: 228,000 oz Au, 5.17 million oz Ag 1990: 198,800 oz Au, 5.42 million oz Ag 1991: 182,000 oz Au, 2.26 million oz Ag 1992: 251,000 oz Au, 1.85 million oz Ag 1993: 156,000 oz Au, 795,000 oz Ag 1994: 39,084 oz Au, 130,086 oz Ag	rhyolite and andesite flows, ash-flow and air-fall tuffs	Miocene
Reward property (Bare Mountain district)	1998: 77,500 oz Au		Cambrian Wood Canyon Formation	
Round Mountain (Smoky Valley) (Round Mountain district)	1989: <i>geologic resource</i> —271 million tons, 0.032 opt Au 1990: 256.8 million tons, 0.033 opt Au 1993: 151.2 million tons, 0.024 opt Au, <i>geologic resource</i> —3,876,000 oz Au 1995: 10 million oz Au 1996: 9 million oz Au 1997: 401.3 million tons, 0.018 opt Au proven and probable plus 142.2 million tons, 0.016 opt Au mineralized material 1998: 6.4 million oz Au proven and probable reserves	1977–84: 313,480 oz Au, 160,419 oz Ag 1984: 70,000 oz Au 1987: 190,600 oz Au 1988: 233,700 oz Au 1989: 386,227 oz Au, 211,297 oz Ag 1990: 483,192 oz Au, 236,600 oz Ag (includes Manhattan) 1991: 339,000 oz Au, 260,000 oz Ag 1992: 370,600 oz Au, 316,700 oz Ag 1993: 370,000 oz Au, 300,000 oz Ag 1994: 423,000 oz Au, 268,000 oz Ag 1995: 344,437 oz Au, 250,529 oz Ag 1996: 410,977 oz Au, 345,258 oz Ag 1997: 480,430 oz Au, 356,085 oz Ag 1998: 510,502 oz Au, 511,320 oz Ag	rhyolite ash-flow tuff	26 Ma

MAJOR PRECIOUS METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
NYE COUNTY (continued)				
Sterling (Bare Mountain district)	1989: 469,000 tons, 0.21 opt Au 1990: 519,000 tons, 0.209 opt Au 1992: 403,000 tons, 0.24 opt Au <i>geologic resource</i> —765,000 tons, 0.178 opt Au 1995: 483,000 tons, 0.19 opt Au 1996: 129,000 tons, 0.245 opt Au	1983–88: 75,900 oz Au 1990: 12,626 oz Au 1991: 12,215 oz Au 1995: 14,000 oz Au 1996: 14,000 oz Au 1997: 4,841 oz Au 1998: 3,970 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 1988: <i>proven</i> —10.8 million tons, <i>probable</i> - 2.7 million tons, 0.025 opt Au 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	
Colorado Gold (Willard district)	1997: 15 million tons, 0.022 opt Au resource	1997: exploration	Triassic-Jurassic metasedimentary rocks	
Florida Canyon (Imlay district)	1988: 37 million tons, 0.023 opt Au 1991: 48.3 million tons, 0.018 opt Au 1995: <i>reserves</i> —72.4 million tons, 0.019 opt Au, <i>additional geologic resource</i> —8 million tons, 0.061 opt Au, sulfide 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: 81,484 oz Au, 24,721 oz Ag 1990: 83,200 oz Au, 19,300 oz Ag 1991: 80,586 oz Au, 20,951 oz Ag 1992: 89,954 oz Au, 37,775 oz Ag 1993: 109,190 oz Au, 37,550 oz Ag 1994: 92,000 oz Au, 25,000 oz Ag 1995: 111,157 oz Au, 62,624 oz Ag 1996: 183,176 oz Au, 104,684 oz Ag 1997: 163,321 oz Au, 146,568 oz Ag 1998: 152,080 oz Au, 131,153 oz Ag	Grass Valley Formation	Cretaceous or Tertiary
Goldbanks Project (Goldbanks district)	1994: 900,000 oz Au 1995: <i>reserves</i> —45.6 million tons, 0.019 opt Au, 0.044 opt Ag, <i>plus geologic resource</i> — 60 million tons, 0.017 opt Au, 0.071 opt Ag 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)	1988: ~ 1.3 million tons, 0.03 opt Au 1991: mined out 1994: 1.5 million tons, 0.035 opt Au 1996: 8.6 million tons, 0.022 opt Au	1984: 24,500 oz Au 1987–88: 82,000 oz Au 1989: 30,266 oz Au, 32,835 oz Ag 1990: 4,000 oz Au, 6,400 oz Ag	Natchez Pass Limestone, Grass Valley Formation	Cretaceous?
Rochester (Rochester district)	1989: <i>geologic resource</i> —94.5 million tons, 0.012 opt Au, 1.40 opt Ag 1993: 75 million tons, 1.32 opt Ag, 0.0113 opt Au 1996: <i>reserves</i> —81 million oz Ag, 696,000 oz Au 1997: 74.2 million oz Ag, 603,000 oz Au	1986–88: 122,400 oz Au, 13 million oz Ag 1989: 76,032 oz Au, 4.63 million oz Ag 1990: 59,000 oz Au, 4.8 million oz Ag 1991: 61,000 oz Au, 5.8 million oz Ag 1992: 57,000 oz Au, 5.6 million oz Ag 1993: 66,412 oz Au, 5.9 million oz Ag 1994: 56,000 oz Au, 5.9 million oz Ag 1995: 59,226 oz Au, 6.5 million oz Ag 1996: 74,293 oz Au, 6.3 million oz Ag 1997: 90,351 oz Au, 6.7 million oz Ag 1998: 88,615 oz Au, 7.2 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) 1994: 512,000 oz Au 1995: 1.6 million tons, 0.36 opt Au, 2.3 opt Ag 1996: 1.2 million tons, 0.45 opt Au, 2.75 opt Ag 1997: 500,000 oz Au, 3.4 million oz Ag 1998: 484,000 tons, 0.392 opt Au, 1.80 opt Ag	1997: 93,948 oz Au, 337,167 oz Ag 1998: 131,703 oz Au, 477,956 oz Ag	Tertiary volcanic rocks	Miocene

continued

MAJOR PRECIOUS METAL DEPOSITS (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
PERSHING COUNTY (continued)				
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	1989: exploration	Tertiary volcanic rocks	Miocene
STOREY COUNTY				
Comstock heap leach project (Comstock district)	1992: 475,000 tons, 0.072 opt Au, 0.60 opt Ag 1993: <i>geologic resource</i> —3.2 million tons, 0.05 opt Au, 0.5 opt Ag 1996: 100,000 oz Au, 1.2 million oz Ag			
Flowersy (Golden Eagle) (Comstock district)	1989: 1 million tons, 0.037 opt Au 1990: 6.3 million tons, 0.043 opt Au <i>geologic resource</i> —1.16 million oz Au 1991: <i>geologic resource</i> —29.3 million tons, 0.04 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: 2,253 oz Au, 34,572 oz Ag 1993: 2,200 oz Au, 30,000 oz Ag 1994: 5,000 oz Au, 41,000 oz Ag 1995: 5,300 oz Au, 58,000 oz Ag 1996: 2,080 oz Au, 31,500 oz Ag 1997: 116 oz Au, 629 oz Ag	Alta Formation	12 Ma
Oliver Hills (Comstock district)	1990: 3.37 million tons, 0.054 opt Au, 1.2 opt Ag 1991: <i>geologic resource</i> —8.5 million tons, 0.060 opt Au, 0.60 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 1995: <i>geologic resource</i> —775,000 oz Au, <i>proven and probable reserves</i> —9,655,000 tons, 0.036 opt Au 1997: 512,800 oz Au <i>proven and probable reserves</i> , 0.042 opt Au	1998: 2,912 oz Au, 1,879 oz Au	Miocene andesite	Miocene
WHITE PINE COUNTY				
Alligator Ridge (Bald Mountain district)	1989: 1 million tons, 0.064 opt Au 1990: 624,000 tons, 0.059 opt Au, <i>geologic resource</i> —2.1 million tons, 0.043 opt Au 1992: 11.5 million tons, 0.046 opt Au; <i>geologic resource</i> —661,888 oz Au, includes Casino/Winrock	1981–88: 560,000 oz Au, 70,000 oz Ag 1989: 54,057 oz Au, 10,188 oz Ag 1990: 18,000 oz Au, 4,000 oz Ag 1991: 17,000 oz Au 1992: 10,450 oz Au 1993: <i>see</i> Bald Mountain 1994: 40,000 oz Au 1995: idle 1996: <i>see</i> Bald Mountain	Pilot Shale	Mesozoic or early Tertiary
Bald Mountain (Top) (Bald Mountain district)	1989: 6.7 million tons, 0.069 opt Au 1990: 8.7 million tons, 0.062 opt Au 1992: <i>geologic resource</i> —600,000 oz Au 1996: 30 million tons, 0.033 opt Au <i>proven and probable reserves</i> ; 21 million tons, 0.05 opt Au <i>other resources</i> 1997: 921,000 oz Au 1998: 10,800,000 tons, 0.075 opt Au <i>proven and probable reserves</i>	1986: 50,000 oz Au 1988: 48,619 oz Au 1989: 55,112 oz Au 1990: 60,000 oz Au, 5,000 oz Ag 1991: 55,000 oz Au, 12,000 oz Ag 1992: 81,500 oz Au, 33,600 oz Ag 1993: 90,610 oz Au, 26,145 oz Ag (includes Alligator Ridge and Yankee Projects) 1994: 80,000 oz Au 1995: 114,200 oz Au, 11,800 oz Ag 1996: 107,708 oz Au, 50,660 oz Ag (includes Alligator Ridge) 1997: 113,500 oz Au, 61,416 oz Ag 1998: 130,000 oz Au, 2,000 oz Ag	quartz porphyry, Cambrian shale and limestone	Jurassic?

MAJOR PRECIOUS METAL DEPOSITS (continued)

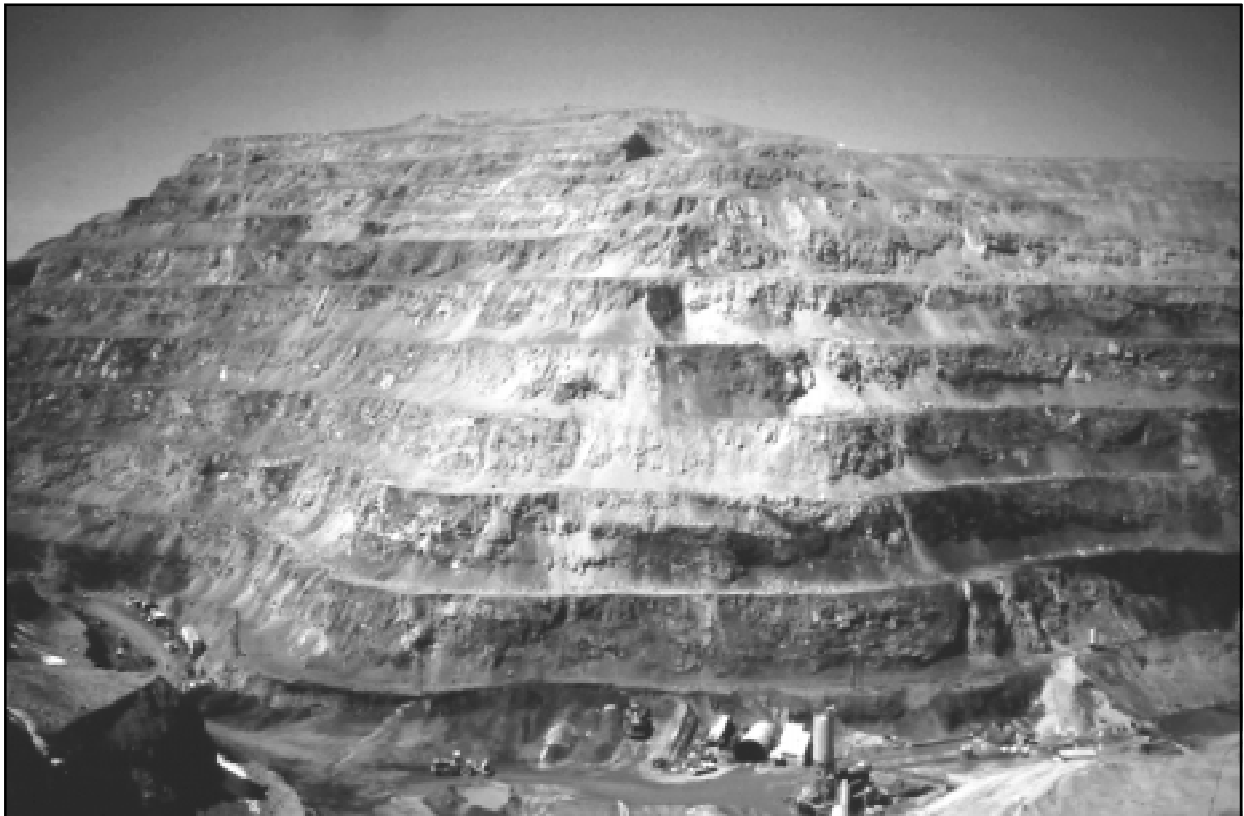
Deposit name	Reserves/resources	Production	Host rock	Mineralization age
WHITE PINE COUNTY (continued)				
Bellview (White Pine district)	1988: 277,000 tons, 0.04 opt Au, <i>geologic resource</i> —1 million tons, 0.036 opt Au			
Casino/Winrock (Bald Mountain district)	1989: Casino - 804,000 tons, 0.054 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: 7,000 oz Au 1991: 20,000 oz Au 1992: 19,800 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: 12,187 oz Au, 1,448 oz Ag 1990: 22,362 oz Au, 7,700 oz Ag 1991: 8,970 oz Au, 7,763 oz Ag	Chainman Shale	Cretaceous or Eocene
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	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)	1988: mined out	1987: ~25,000 oz Au/year 1988: 25,324 oz Au, mining ended 1989: 3,874 oz Au, heap-leached 1996: exploration	Paleozoic sedimentary rocks	Eocene?
Little Bald Mtn. (Bald Mountain district)	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	1988: preproduction 1993: idle 1995: 52,000 oz Au, 100,000 oz Ag 1996: 35,000 oz Au, 71,500 oz Ag 1997: 12,500 oz Au, 36,000 oz Ag (data revised after NBMG Special Publication P-9 was published)	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 1992: 1.2 million oz Au, <i>geologic resource</i> — 2.21 million oz Au 1994: <i>geologic resource</i> —252 million tons, 0.553% Cu, 0.0102 opt Au	1986: 48,000 oz Au, 96,000 oz Ag 1987: 50,207 oz Au 1988: 38,750 oz Au 1989: 78,828 oz Au, 66,340 oz Ag 1990: 75,000 oz Au, 55,000 oz Ag 1991: 21,674 oz Au 1992: 35,581 oz Au, 55,000 oz Ag 1993: 13,432 oz Au 1996: 39,000 oz Au, 170,000 oz Ag, and 84 million pounds of Cu 1997: 71,000 oz Au, 314,000 oz Ag and 138 million pounds of Cu 1998: 86,000 oz Au, 299,500 oz Ag and 148 million pounds of Cu	Rib Hill Sandstone Riepe Spring Limestone intrusions	Cretaceous
Taylor (Taylor district)	1980: 10 million tons, 3 opt Ag	1980: 1,200 tons/day 1995: idle	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: <i>see</i> Bald Mountain	Pilot Shale	36–38 Ma?

Newmont Gold Production

Production data for individual mines in the Carlin Trend owned by Newmont Gold Co. are not available in some cases, particularly during 1988–1993. Total production of Newmont operations in Nevada by 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

NA= not available



Carlin east portal and pit.

Photo: Chris Henry

Industrial Minerals

by Stephen B. Castor

At an estimated \$373 million, the total value of industrial minerals produced in Nevada in 1998 is slightly above that for 1997. In order of estimated dollar value the most important Nevada industrial minerals produced in 1998 were aggregate, lime, diatomite, gypsum, cement, barite, lithium, silica, clay, and magnesia. 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 1998, construction aggregate production in Nevada had an approximate total value of \$119 million and was ranked second among the state's mined commodities behind gold. For 1998, statewide aggregate production is estimated at 26.5 million tons, 5% below production in 1997. Aggregate produced from sand and gravel deposits accounted for about 75% of aggregate production statewide, with crushed stone and lightweight aggregate making up the balance. Aggregate produced in the Las Vegas area, which accounted for about 17 million tons, decreased about 9% from 1997, while production in the Reno-Sparks-Carson City area, at 5.5 million tons, was 10% higher than in 1997.

Companies in the Las Vegas area that produced more than a million tons of aggregate in 1998, ranked in approximate order of tonnage produced, were Nevada Ready Mix Corp., Hanson Aggregates West (formerly Bonanza Materials Inc.), CSR (formerly WMK Transit Mix Inc.), Frehner Construction Inc, Wells Cargo Inc., and Blue Diamond Materials Co. The largest producer, Nevada Ready Mix, produced most of its aggregate from a single open pit in an alluvial fan in the Lone Mountain area. Hanson Aggregates purchased Lopke Granite Products in 1998 and plans to shut down its Stephanie Pit operation in Henderson in 1999. Community pits and other aggregate mining facilities on land administered by the U.S. Bureau of Land Management and operated by at least seven different companies provided about 2.4 million tons to the Las Vegas area total in 1998. Production from portable crushers operating at construction sites has increased dramatically over the past 5 years, making calculations of total production difficult.

In 1998, 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 Frehner Construction Co., Lopke Granite Products, and Southern Nevada Lightweight.

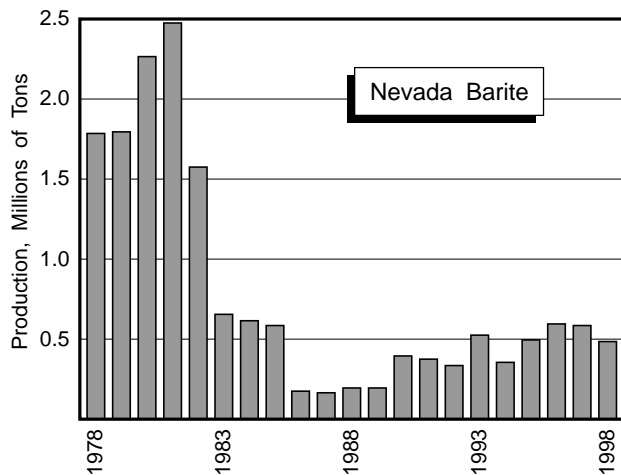
As in the past seven years, the most important source of Las Vegas area aggregate was the Lone Mountain area northwest of Las Vegas. Once located a considerable distance from heavily urbanized areas, the impact of Lone Mountain aggregate operations, particularly on residential traffic, is now coming under scrutiny due to encroaching urbanization. Significant production still comes from sites located in more heavily urbanized parts of the Las Vegas metropolitan area, but it is likely that future production will come increasingly from more distant sources. Since 1997, common aggregate has been hauled into Las Vegas from sites as far as 50 miles away 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 1998. Companies that produced 500,000 or more tons in 1998 included Rocky Ridge Inc. and Rilite Aggregate Co. Paiute Pit Aggregates, 30 miles east of the Reno-Sparks metropolitan area, was also a major producer. Crushed rock continued to be an important source of aggregate in this area; crushed rock operations of Granite Construction and Rocky Ridge Inc. and lightweight rhyolite aggregate from All-Lite Aggregate Co, Rilite Aggregate Co, and Basalite Lightweight Aggregate Corp. accounted for about 70% of the aggregate used in 1998 in the Reno-Sparks-Carson City area.

BARITE In 1998, barite shipments from Nevada totaled 490,000 tons, 16% less than in 1997. M.I. Drilling Fluids Co. was once again the largest Nevada barite producer, with combined production of nearly 300,000 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 1997, Dresser acquired and dissolved Baroid Drilling Fluids. The company shipped barite from the Dunphy mill in Eureka County and the Rossi Mine in Elko County in 1998. In the fall of 1998, Halliburton acquired Dresser and agreed to sell its 36% ownership of M.I. Drilling Fluids to Smith International.

Baker Hughes INTEQ also produced significant amounts of barite for drilling materials at its Argenta property near Battle Mountain, Lander County. Standard Industrial Minerals shipped a small amount of barite in 1998 from the P and S Mine in Nye County to a processing plant in Bishop, California. The company markets high value white paint-grade barite for use in paint and as a filler.



BORATE American Borate Co. mined borate minerals from an underground operation in Death Valley, California, in 1998. 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.

BUILDING STONE Although the company mainly produces crushed landscape rock, Las Vegas Rock produced some sandstone building stone at Goodsprings, Clark County. Nevada Neanderthal Stone, which quarries and cuts Tertiary tuff near Beatty in Nye County for floor tile and other stone products, has seen its sales decline to 20% of former levels due to foreign competition.

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. The Royal Cement Co. owns a cement plant near Logandale in Clark County. Annual production from this plant between 1995 and 1997 was as much as 50,000 tons of cement. The plant was inactive during 1998.

According to U.S. Geological Survey mineral industry surveys, the total consumption of cement in the United States reached record levels in 1998, and cement shipments to Nevada destinations totaled more than 2 million tons. At least two companies have been researching feasibility for new cement plants near Las Vegas. One of these, U.S. Cement, is working on a scheme to process clinker produced outside Nevada, and another company has been studying the possibility of the utilization of local raw materials. Limestone, silica, and gypsum are common in the Las Vegas area and power is relatively cheap. Alumina and iron may not be available from local sources, but could readily be acquired outside Nevada.

CLAY Clay production in Nevada in 1998 declined somewhat from 1997. IMV Nevada, which is owned by Mud Camp Mining Co. of California, is the largest producer. The operation consists of sepiolite, montmorillonite, and saponite mines and a processing

plant in Amargosa Valley, Nye County. The company is the only producer of sepiolite and saponite in the United States, and exports clay mineral products with a variety of uses worldwide.

Other Nevada producers ship relatively minor amounts of clay minerals. Vanderbilt Minerals Co. shipped a small amount of clay from several Nevada deposits from a crushing plant near Beatty in Nye County in 1998. The Art Wilson Co. sold a small amount of montmorillonite from the Jupiter Mine in Lyon County in 1998 for aquaculture and mined halloysite clay from a deposit in Washoe County for Nevada Cement Co. The latter is not reported as clay in NBMG mineral production figures because it is included in portland cement.

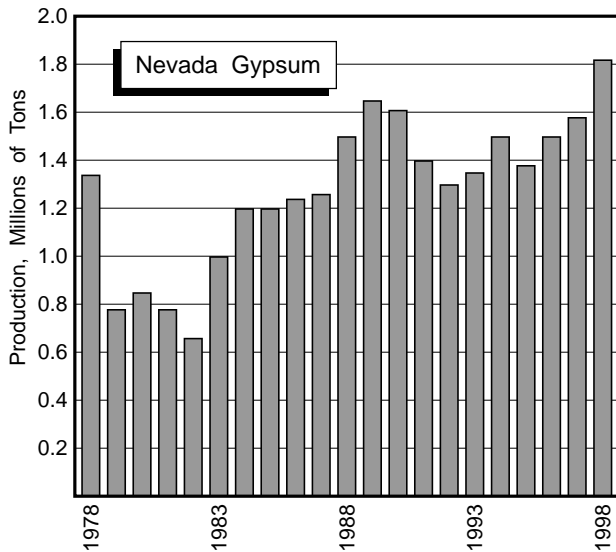
American Colloid Co. has mined small amounts of clay in Nevada for many years, particularly in the Lovelock area, but the company did not ship clay from Nevada in 1998. In order to concentrate on clumpable clay for cat litter, the company sold its calcium bentonite business, which included a property near Wabuska in Lyon County, to Oil Dri Inc. in 1998. However, American Colloid retained specialty clay properties near Lovelock in Pershing County along with its McDermitt caldera hectorite deposits in Humboldt County. Oil Dri, which ships large amounts of cat litter clay to the west coast, continued to wait for approval on patents for clay on the west side of the Smoke Creek Desert.

DIATOMITE Eagle-Picher Minerals, Inc., a division of Eagle-Picher Industries, Inc., produces most of Nevada's diatomite at three different operations. The largest operation is the Colado plant near Lovelock in Pershing County, which produces diatomaceous earth filtration products from diatomite mined northwest of Lovelock. The company also produced 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.

Moltan Co. of Memphis, 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 1998 were Grefco Inc. at its Basalt operation in Esmeralda and Mineral Counties, and CR Minerals at Hazen in Lyon County.

GYPSUM Gypsum production in Nevada increased from 1.6 million tons in 1997 to 1.8 million tons. The Blue Diamond operation of James Hardie Gypsum, just southwest of Las Vegas in Clark County, was the largest producer at more than 750,000 tons. This gypsum was used to make wallboard and plaster. The company shipped more than 500,000 million square feet of wallboard and 100,000 tons of plaster in 1998. USG Corp., which mines gypsum at the other end of the state (northern Pershing County), was the second largest producer at nearly 525,000 tons. USG processes the gypsum into wallboard and plaster at its Empire plant in

central Washoe County. Although PABCO Gypsum in Clark County east of Las Vegas mined nearly 585,000 tons of ore in 1998, actual gypsum production was lower because the ore must be beneficiated to produce a gypsum concentrate. PABCO processes most of this gypsum into wallboard. The Art Wilson Co., Carson City, shipped about 115,000 tons of gypsum from the Adams Mine in Lyon County for use in cement and agricultural markets.



LIME, LIMESTONE, AND DOLOMITE In 1998, lime production in Nevada continued at record levels, increasing 7% over 1997. The Continental Lime, Inc. Pilot Peak high-calcium lime operation near Wendover in Elko County shipped the most lime in 1998, mainly to Nevada gold mining operations for use in pH control. Chemical Lime Co. produced high-calcium and dolomitic lime at Apex near Las Vegas. Hydrated lime is made from Apex quicklime at a plant in Henderson. The high-calcium lime is mainly used for copper and gold mine processing, paper and steel manufacturing, and environmental markets; the dolomitic lime is mostly used 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.

In addition to lime, Chemical Lime Co. shipped crushed limestone for glass flux and flue gas desulfurization. Other carbonate rock producers in Nevada were Min-Ad, Inc. and Nutritional Additives Corp., which are both located near Winnemucca and produce ground dolomite for agricultural use. Min-Ad, the larger of the two agricultural dolomite producers, shipped more than 60,000 tons in 1998, a slight increase over 1997.

LITHIUM In October 1998, the Silver Peak lithium operation in Esmeralda County was sold to Chemetall GmbH, a subsidiary of the giant Metallgesellschaft AG, for \$305 million by Cyprus Amax Minerals Co. The operation, which produces lithium carbonate and lithium hydroxide compounds from brine that is pumped from beneath the Clayton Valley playa and evaporated in

nearby ponds, has been active since 1966. A similar lithium brine facility in Chile and other lithium operations in the U.S. were included in the sale. In recent years, Cyprus Amax earnings from lithium sales have been strong and prices high; however, the new SQM Chemicals (formerly Minsal) lithium brine operation in Chile caused price reductions in 1998. The Journal *Industrial Minerals* listed the price of lithium carbonate at about \$2.00 per pound early in the year; but by June, a price of about \$0.90 per pound for large orders was also listed. On the basis of Securities Exchange information, production at Silver Peak for 1998 is estimated at 12 million pounds lithium carbonate and 5 million pounds lithium hydroxide.

MAGNESIA Annual production of magnesia from magnesite at Gabbs, Nye County, by Premier Services Corp. was approximately the same in 1998 as in 1997. Brucite (magnesium hydroxide) production was up sharply, though still relatively small in comparison to past brucite production from the deposit.

PERLITE In 1998, Eagle-Picher Minerals Inc. produced expanded perlite at the Colado diatomaceous earth facility in Pershing County from perlite mined in Churchill County. In addition, the Wilkin Mining and Trucking Co. mined perlite from the Mackie Mine in Lincoln County.

SALT The Huck Salt Co. of Fallon produced about 18,000 tons of salt in 1998. The salt, mined from Fourmile Flat near the Sand Springs mining district in Churchill County, is now mainly used for deicing roads. Salt has been harvested from this playa deposit more-or-less continuously since salt was hauled to Virginia City for ore processing in the 1860s.

SILICA The Simplot Silica Products plant at Overton in Clark County shipped 640,000 tons of silica sand in 1998, the same as in 1997. The sand is mined from a large deposit of friable sandstone, washed in the pit, and transported via a slurry pipeline to the plant where it is screened and bagged.

ZEOLITES The American Resource Corp. processing plant near Amargosa Valley, Nye County, shipped clinoptilolite for water processing, odor control, and horticultural uses in 1998. The company was placed in receivership along with its parent company, Rea Gold Corp., in March 1998. An offer to buy the zeolite operation by Badger Mining Corp., a Wisconsin-based industrial mineral company, was accepted in 1998. It is anticipated that the acquisition will be finalized in 1999. The clinoptilolite deposit extends from California, where it is presently mined, into Nevada. The operation has plans for plant expansion and development of a mine in Nevada.

American Colloid Inc. sold the Eastgate plant in Churchill County to an unnamed buyer. The plant, which was acquired from American Resource Corp. in 1995, was originally constructed by East West Minerals in 1987 to process mordenite into cat litter and absorbent products.

Geothermal Energy

by Ronald H. Hess

Twenty new geothermal well permits were issued during 1998 by the Nevada Division of Minerals: they include 1 industrial/commercial class well, 13 gradient/observation wells, 4 injection wells, and 2 domestic wells. In addition 4 permits were issued to rework existing wells. During this same period 1 industrial class production well, 6 observation wells, 1 injection well, and one domestic well were reported to have been drilled.

During 1997, 14 new well permits were issued by the Nevada Division of Minerals: they included 4 industrial/commercial class wells, 9 gradient/observation wells, and 1 domestic well. During this same period 1 industrial class production well, 2 observation wells, and 1 domestic well were drilled.

There were 74 federal geothermal noncompetitive leases covering 110,800 acres and 54 competitive federal leases covering 58,900 acres in Nevada during 1998. This is an increase of 1,817 noncompetitive lease acres and an increase of 11,354 competitive lease acres from 1997 totals.

Total gross electrical production from geothermal resources on federal lands was 1.2 million megawatt-hours (MWh); net production was approximately 998,000 MWh. Gross electrical sales from federal lands was 80 million dollars. Production royalties on that amount equaled \$4,200,000.

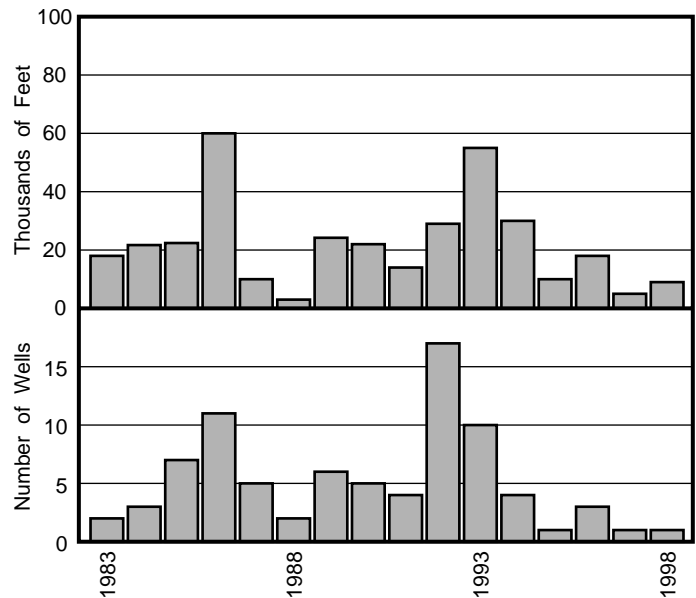
By regulation, half of all Federal geothermal lease rental fees and production royalties are returned to the state. For 1998 \$2.1 million dollars in royalty production fees should be returned to Nevada. Lease rental fee data for 1998 was not available as of press time. (R. Hoops, Bureau of Land Management, personal commun., 1999)

Total Nevada geothermal electrical production from both federal and fee lands combined in 1998 was 1,630,579 MWh gross; net production was 1,326,851 MWh (Nevada Division of Minerals, 1999) with an approximate sales value of \$93,000,000. Production capacity from the currently developed geothermal resources at ten existing

geothermal power plants in Nevada is 210.5 megawatts (MW). Installed equipment capacity based on equipment nameplate rating is 242.4 MW. Nevada is second only to California in total installed geothermal generating capacity.

Bradys Hot Springs and Desert Peak

The **Desert Peak** geothermal power plant, owned by **Western States Geothermal Co.**, is now connected to the general grid at the **Bradys Hot Springs** geothermal plant operated by **Brady Power Partners**. This change in point of sales means that the combined net production from both plants within the Known Geothermal Resource Area is now being purchased through the Bradys Hot Springs power purchase agreement with Sierra Pacific Power Company.



Industrial-class (power generating) wells drilled in Nevada 1982-1998. Depth taken from original drilling permit.

NONDOMESTIC GEOTHERMAL WELLS REPORTED AS DRILLED OR COMPLETED IN NEVADA DURING 1997 AND 1998

Area	Company	Well name	Permit#	Location	Type
Churchill County					
Brady Hot Springs	Brady Power Partners	Industrial Injection Well 74-25	480	NE ¹ / ₄ , S25, T22N, R26E	Injection
	Brady Power Partners	Observation Well BCH #1	448	SE ¹ / ₄ SE ¹ / ₄ , S36, T23N, R26E	Observation
	Brady Power Partners	Observation Well BCH #2	450	SE ¹ / ₄ NW ¹ / ₄ , S1, T22N, R26E	Observation
	Brady Power Partners	Observation Well BCH #3	451	NW ¹ / ₄ SW ¹ / ₄ , S12, T22N, R26E	Observation
	Brady Power Partners	Observation Well BCH #5	455	NE ¹ / ₄ SW ¹ / ₄ , S25, T22N, R26E	Observation
	Brady Power Partners	Observation Well BCH #7	457	NW ¹ / ₄ SE ¹ / ₄ , S25, T22N, R26E	Observation
	Brady Power Partners	Observation Well BCH #8	474	NE ¹ / ₄ NE ¹ / ₄ , S25, T22N, R26E	Observation
	Brady Power Partners	Observation Well BCH #9	475	NE ¹ / ₄ NE ¹ / ₄ , S25, T22N, R26E	Observation
	Brady Power Partners	Observation Well BCH #10	476	NE ¹ / ₄ NE ¹ / ₄ , S25, T22N, R26E	Observation
Dixie Valley	Oxbow Geothermal	Production Well #46-32	446	NE ¹ / ₄ SW ¹ / ₄ , S32, T25N, R37E	Industrial
Stillwater	AMOR IV Corp.	Production Well Stillwater #12A-6	447	NW ¹ / ₄ NW ¹ / ₄ , S6, T19N, R31E	Industrial

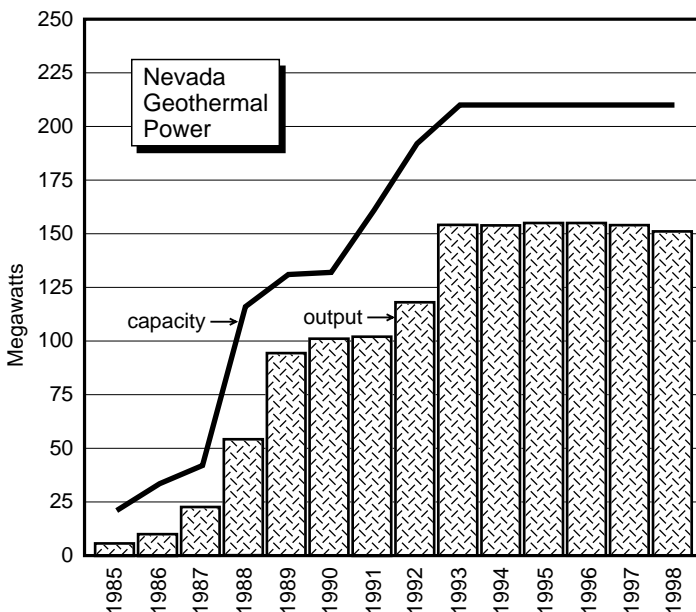
This arrangement insures that the Brady plant will be able to continue providing the minimum net electrical supply required by their existing power purchase agreement. (R. Hoops, personal commun., 1999; and J. Snow, Nevada Division of Minerals, personal commun., 1999)

The Bradys Power Plant produced 153,300 MWh gross (117,701 MWh net) and the Desert Peak Power Plant produced 69,488 MWh gross (59,638 MWh net) during 1998. (Nevada Division of Minerals, 1999)

Dixie Valley

The **Dixie Valley** power plant utilizes 250°C geothermal fluids, produced from a zone approximately 9,000 feet deep in a range-front fault/fracture system, to generate approximately 65 MW of electricity. The plant has been in production for 11 years and produces 5 million pounds per hour of mass flow from 10 production wells. Eight wells are used to re-inject 80% of the produced fluid. (Newsletter, Nevada Petroleum Society, April 29, 1999: Vol. XIV, Issue 2)

During 1998, small amounts of low-maturity oil was found trapped in some small wing valves on one production well and as scale on some hang down strings of several other production wells. This discovery has spurred oil exploration interests in the area and speculation as to the potential source rocks for the oil. The potential also exists to use the trace amounts of oil found in the fluids as a tracer in the geothermal system to help better understand the reservoir flow pattern and other sub-surface mechanisms associated with the resource. (Proceedings, Twenty-fourth Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, CA., January 25–27, 1999 and Newsletter, Nevada Petroleum Society, April 29, 1999: Vol. XIV, Issue 2)



Rated capacity and average net output of Nevada geothermal plants, 1985–1998. 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.

Rye Patch

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

Rye Patch Energy Company and **Mount Wheeler Power Company** are currently in negotiations which may allow the Rye Patch geothermal plant to be completed and brought on-line producing 6–7 MW of electricity from the already proven well field resource. After the plant is brought on-line ongoing development in the well field should provide enough additional resources to eventually bring the plant up to its rated net capacity of 12.5 megawatts. (J. Wood, Rye Patch Energy Co., personal commun., 1999)

Steamboat Hot Springs

S.B. Geo, Inc. at **Steamboat Geothermal Power Plant** have had some success in the development, construction, and testing of some high volume, high temperature down hole submersible pumps. It is reported that these pumps can deliver as much as 3,000 gallons per minute of 400°F+ geothermal fluids. (J. Snow, personal commun., 1999)

S.B. Geo, Inc. filed a drilling permit application for designation of an ongoing project area at their Steamboat area site. It has been approved as State geothermal permit number 458PA. The project area encompasses sections 28, 29, 32, and 33, T18N, R20E in Washoe County. The project area permit allows for future drilling of up to 15 production wells, 7 injection wells, and 6 observation wells. (Nevada Division of Minerals, 1999)

Reno Energy, owned by Far West Capital Group, has been granted approval to develop a heating district with the potential to eventually heat 30 million square feet of industrial and commercial space. The Reno Energy project is currently putting together the financing package necessary to start construction on phase I of the project and it is anticipated that they will be moving forward with the project in the near future. The project is located in southern Reno, which is a rapidly developing area. It will use left over brine from electrical generation plants currently operating at the Steamboat geothermal area to heat a freshwater closed loop system that will circulate throughout the heat district. The freshwater in the closed loop system will be heated to 240°F with connections to energy users metered for volume and energy consumption. The used brine from this process will be re-injected to the geothermal resource. Phase one of the project includes completion of the first loop through the

South Truckee Meadows area. (S. Johnson, Oxbow Power Services, Inc., personal commun., 1999; and Snow, J. personal commun., 1999) Projected cost of phase I is \$41 million. It is estimated that this system

could save its customers between 35 and 55% of the long-term cost of conventional heating and cooling. (Reno Energy LLC News Release, 1996)

NEVADA GEOTHERMAL POWER PLANTS 1998					
Plant name (year on line)	Production capacity ¹ (MW)	1998 Production (MWh)		Location	Operator
		Gross	Net (sales)		
Beowawe (1985)	16.7 (16.6)	131,351	106,854	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)	153,300	117,701	S12,T22N,R26E	Brady Power Partners P.O. Box 649 Fernley, NV 89408
Desert Peak (1985)	9.9 (11.0)	69,488	59,638	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)	526,020	471,151	S7,T24N,R37E S33,T25N,R37E	Oxbow Geothermal Corp. 9790 Gateway Dr. Suite 220 Reno, NV 89511
Empire (1987)	3.6 (4.8)	33,069	30,103	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)	121,419	87,538	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 (58.6)	413,458	310,428	S29,T18N,R20E	S.B. Geo, Inc. P.O. Box 18199 1010 Power Plant Dr. Reno, NV 89511
Stillwater (1989)	13.0 (21.0)	98,356	67,843	S1,T19N,R30E S6,T19N,R31E	Constellation Operating Services 5500 Soda Lake Road Fallon, NV 89406
Wabuska (1984)	1.2 (1.45)	7,995	7,995	S15,16,T15N, R25E	Tad's Enterprises 3535 Southampton Dr. Reno, NV 89502
Yankee Caithness (1988)	14.4 (14.44)	76,123	67,600	S5,6,T17N,R20E	Yankee Caithness J.V.L.P. P.O. Box 18160 Reno, NV 89511
TOTAL	210.5 (242.4)	1,630,579	1,326,851		

¹Production capacity from currently developed geothermal resources (equipment nameplate capacity in parenthesis).
²Gross output of the Dixie Valley plant occasionally exceeds 66 MW.
Sources: Plant operators, Nevada Division of Minerals, and NBMG files.

Brady Power Partners
Geothermal Power
Plant. *Photo by Megan
Hess, 1999.*



Oil and Gas

by David A. Davis

Production

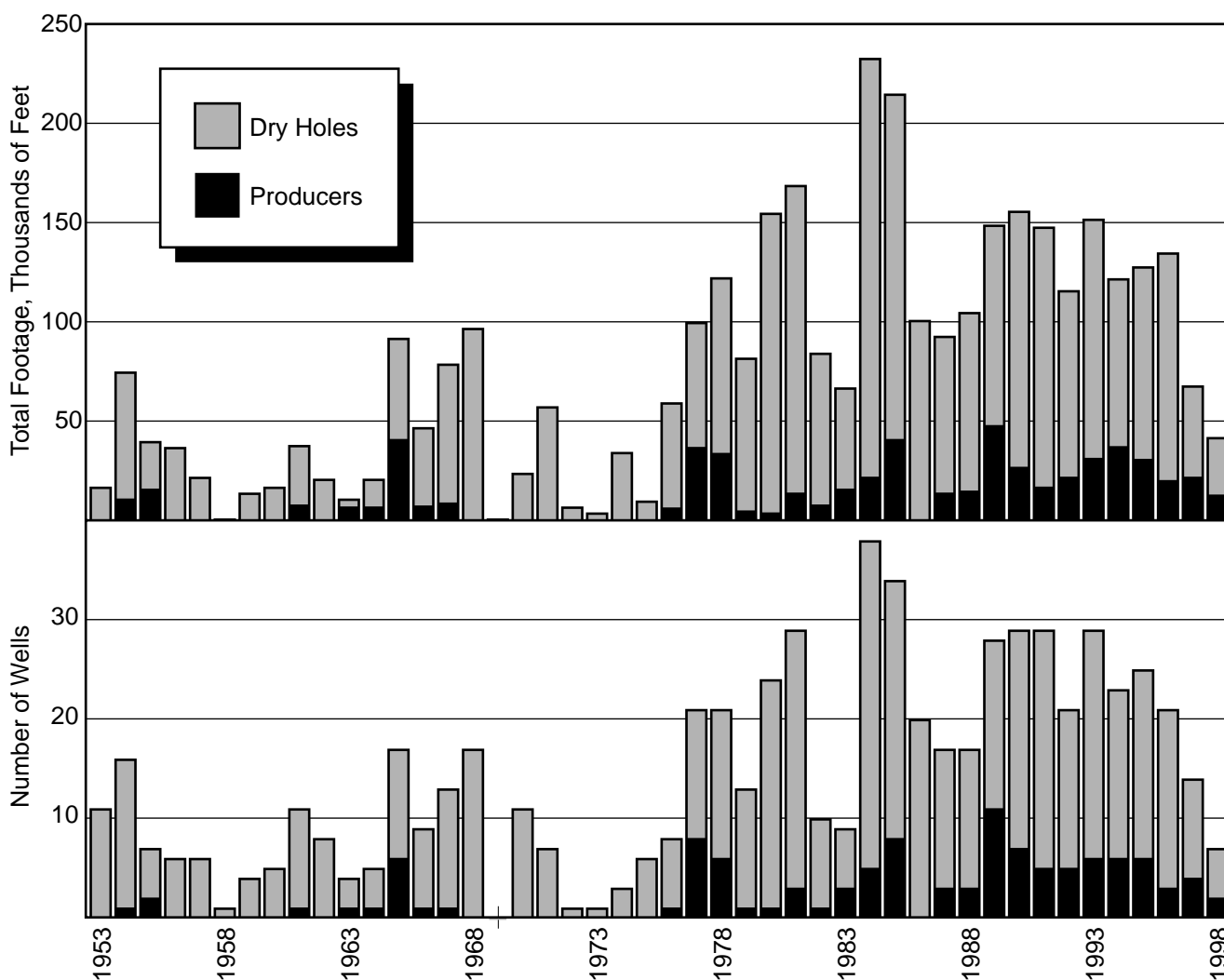
In 1998, Nevada produced oil from 14 of its 15 fields in Nye, Eureka, and Elko Counties. One hundred wells were listed as producers in 1998. Two were new producers and two were plugged and abandoned. Twenty-six were shut in for 6 months or more. Twenty-two of these had been shut in for more than a year, and 17 had been shut in for more than 2 years.

According to the Nevada Division of Minerals, the net oil production in 1998 was 778,770 barrels, which is 0.034% of the total U.S. production. Oil production declined 18.5% from 1997 to 1998 due to an overall drop of 19.8% in production in nine fields that was only partially offset by production increases in four small fields and the bringing on line of the new Sand Dune Field. The average net wellhead price for Nevada crude oil in 1998

dropped 31% to about \$10.37 per barrel, and the sales volume was \$8,075,845, of which \$982,412 was paid out in royalties to the State of Nevada.

Nevada's highest volume producer was Grant Canyon No. 9, which averaged 278 barrels of oil and 448 barrels of water per day during 1998. Nevada's second highest volume producer was Blackburn Unit No. 19, which averaged 172 barrels of oil and 1038 barrels of water per day. Both have held these rankings since 1996.

Oil production from the Trap Spring Field decreased 10.7% while water production decreased 19.8%. Of the 43 wells listed as producers at Trap Spring, six were shut in throughout 1997, three were shut in for 6 to 12 months, and three were shut in for 1 to 6 months. Three have been shut in for 1 to 2 years, and four have been shut in for more than 6 years. Of the 36 wells actually producing, 13 had production increases, and 23 had production



Number and total footage of Nevada oil wells completed as producers or plugged and abandoned, 1953–1998.

decreases. One that produced a little last year was shut in throughout 1998. One that had been shut in for 6 years produced for a few days in March.

Oil production from the Blackburn Field decreased 25.9% while water production increased 9%. Oil production dropped in five wells, and increased in two. Oil production from the Bacon Flat Field decreased 16.5% while water production decreased 85.2%. Only one of its three producers was in operation during 1997. The other two have been shut-in for more than 5 years.

The Eagle Springs field gained one new producer in May, but the field's overall oil production decreased 18.7% while water production increased 12.4%. Of the 20 older wells listed as producers at Eagle Springs, six were shut in throughout 1998, two were shut in for 6 to 12 months, and two were shut in for 1 to 6 months. Five have been shut in for 1 to 3 years, and one has been shut in for 12 years. Of the 14 wells actually producing, one had a production increase, but 13 had production decreases. Three that produced in 1997 were shut in throughout 1998.

Beginning in late 1997, Foreland Corp. began an Enhanced Oil Recovery (EOR) program in the Eagle Springs Field by injecting air at 1200 psi into the well Eagle Springs No. 24-36. The recovery forecast was to produce an extra 8.8 million barrels. However, the program did not produce the desired results and was terminated in November 1998 (www.foreland.com).

Oil production from the Grant Canyon Field decreased 12.2% while water production increased 12.5%. Two of Grant Canyon's four producers remained shut-in throughout 1998 and have been so for more than 5 years. Oil production from the other two declined.

Oil production from the Kate Spring Field decreased 7.8% while water production decreased 10.0%. Production decreased at three wells, increased at one, and remained constant at one. One well shut-in last year remained shut-in throughout 1998. A second well has been shut-in for 5 years. A total of 8,658 thousand cubic feet of gas was produced from the Kate Spring Field in 1998, a decrease of 7.7% from 1997. 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 Ghost Ranch Field decreased 42.2% while water production increased 72.0%. One well completed as a producer in 1997 and then was shut in throughout 1998. Oil production decreased from the other three producers.

Oil production from the Sans Spring Field decreased 51.7% while water production increased 56.1%. Of Sans Spring's three producers, one has been shut in for 5 years, and the other two had decreases in production (one only producing January through March).

The new Sand Dune Field came on line with one producer in July 1998 and ended the year as the ninth out of Nevada's 14 producing fields.

Oil production from the North Willow Creek Field decreased 1.6% while water production ceased. Of North Willow's three producers, one produced only through October, one remained shut-in since February 1997, and one (Foreland-Southern Pacific No. 5-27), which has been shut in since 1992, was plugged and abandoned in October 1998.

Oil production from the only producer in the Tomera Ranch Field decreased 12.9% while water production

OIL WELL DRILLING ACTIVITY IN NEVADA IN 1998

Company	Well	Permit No.	Location	Permit Date	Spud Date	Completion Date	Depth (Ft.)	Status
ELKO COUNTY								
Foreland Corp.	North Humboldt Federal No. 1-2	824	NE ¹ / ₄ NE ¹ / ₄ S2 T36N R56E	Sep-98				Not Drilled
EUREKA COUNTY								
Foreland Corp.	North Pine Creek No. 1-6	823	NW ¹ / ₄ SE ¹ / ₄ S6 T28N R52E	Aug-98	Oct-98	Oct-98	5627	P&A
Foreland Corp.	Hot Creek No. 2-7	825	SE ¹ / ₄ SE ¹ / ₄ S7 T28N R52E	Sep-98				Not Drilled
LINCOLN COUNTY								
Falcon Energy/Kriac Energy, Inc.	Kriac No. 3	810	SE ¹ / ₄ SE ¹ / ₄ SE ¹ / ₄ S18 T8N R70E	Dec-97	Jan-98			Suspended
Conley P. Smith Operating	Flat Top Federal No. 27-16	811	SE ¹ / ₄ SE ¹ / ₄ S27 T7N R63E	Jan-98	May-98	Jun-98	6090	P&A
Conley P. Smith Operating	Flat Top Federal No. 27-15	812	SW ¹ / ₄ SE ¹ / ₄ S27 T7N R63E	Jan-98	Jul-98	Jul-98	5320	P&A
NYE COUNTY								
Connelly Exploration, Inc.	Gap Mountain No. 33-1	817	SE ¹ / ₄ NW ¹ / ₄ NW ¹ / ₄ S33 T5N R62E	Aug-98	Aug-98	Aug-98	4447	P&A
MKJ Xploration, Inc.	Trough Spring Canyon Federal No. 25-7	808	SW ¹ / ₄ NE ¹ / ₄ S25 T6N R61E	Nov-97	Dec-97	Sep-98		TA
Eagle Springs Production, LLC	Eagle Springs Federal No. 44-35	813	SE ¹ / ₄ SE ¹ / ₄ NW ¹ / ₄ S35 T9N R57E	Feb-98	Feb-98	May-98	6925	Producer
Eagle Springs Production, LLC	Eagle Springs Federal No. 14-35	814	SW ¹ / ₄ SW ¹ / ₄ NW ¹ / ₄ S35 T9N R57E	Feb-98	Mar-98	Apr-98	7326	P&A
Eagle Springs Production, LLC	Eagle Springs Federal No. 33-36	815	NW ¹ / ₄ SE ¹ / ₄ NW ¹ / ₄ S36 T9N R57E	Apr-98				Not Drilled
Eagle Springs Production, LLC	Sand Dune Federal No. 88-35	816	SE ¹ / ₄ SE ¹ / ₄ SE ¹ / ₄ S35 T9N R57E	Apr-98	Apr-98	Jul-98	6411	Producer
Eagle Exploration, Inc.	Meteor Federal Well No. 1	822	SW ¹ / ₄ NW ¹ / ₄ S34 T10N R56E	Jul-98	Aug-98			Drilling
PERSHING COUNTY								
Evans-Barton, Ltd.	Kyle Spring No. 11-23	819	NE ¹ / ₄ SW ¹ / ₄ S11 T29N R36E	Jul-98				Not Drilled
Evans-Barton, Ltd.	Kyle Spring No. 11-42	820	NE ¹ / ₄ SW ¹ / ₄ S11 T29N R36E	Jul-98				Not Drilled
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

increased 10.9%. Both of the producers in the Three Bar Field remained shut in throughout 1998 as they have been for over 4 years. Oil production from the only producer in the Duckwater Field increased 192.3% while water production increased 149.3%. Oil production from the only well in the Currant Field increased 13.9%. The only well in the Deadman Creek Field produced 258 barrels of oil with no water in November only and then was plugged and abandoned.

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 and the Foreland Corp. (formerly: Petro Source Refining Partners') refinery and asphalt storage facility at Tonopah. The Crysen Refining refinery at Woods Cross, Utah, was purchased by Inland Refining, Inc., and is not presently refining Pine Valley crude oil as it has in the past.

New Producers

Two new wells were completed as producers in 1998, both in Railroad Valley. These were Eagle Springs Production, LLC, wells Eagle Springs Federal No. 44-35 and Sand Dune Federal No. 88-35.

Eagle Springs Production, LLC, Sand Dune Federal No. 88-35 was located using 3-D seismic methods and was drilled to a total depth of 6,411 feet. This is the discovery well for the new Sand Dune Field. Production began July 6, 1998, with an initial daily production rate of

248 barrels of 25.5-gravity oil and 240 barrels of water. It averaged 72 barrels of oil and 135 barrels of water per day through the rest of the year. The casing was perforated in seven places between 5,974 and 6,212 feet. The upper three sets of perforations were in porous and fractured Permian limestone, and the rest were in porous and fractured Pennsylvanian limestone. An oil show was reported between 4,590 and 4,616 feet consisting of globs of oil and a brown stain with a blue white cut in brownish cryptocrystalline to very fine microcrystalline limestone conglomerate. A second oil show was reported between 5,090 and 5,105 feet consisting of oil and a strong odor in the mud shaker but no show in the sample. Two more shows were reported between 5,262 and 5,290 feet consisting of black asphaltic stains with no fluorescence and a yellow streaming cut in brown cryptocrystalline limestone conglomerate. Four major shows and five lesser shows occur between 5,888 and 6,070 feet ranging from block spotty stains on fracture faces with dull golden fluorescence and a good streaming cut to free oil in mostly brown to gray cryptocrystalline to microcrystalline limestone and some dolomite. Seven shows also occur between 6,148 to 6,278 feet. These shows are similar to the previous ones and occur in the same type of rock.

In the Eagle Springs Field, Eagle Springs Production, LLC, Eagle Springs Federal No. 44-35 was drilled to a total depth of 6,925 feet. Production began May 11, 1998, with an initial 24-hour production rate of 63 barrels of 27.0-gravity oil and 250 barrels of water. It averaged 44 barrels of oil and 226 barrels of water per day through the rest of the year. The casing was perforated in two places between 6,400 and 6,545 feet; all in the Tertiary

FEDERAL OIL AND GAS LEASES IN EFFECT IN FISCAL YEARS 1997 AND 1998 ¹												
County	NUMBER OF LEASES						ACREAGE					
	Competitive		Noncompetitive		Simultaneous ²		Competitive		Noncompetitive		Simultaneous ²	
	FY97	FY98	FY97	FY98	FY97	FY98	FY97	FY98	FY97	FY98	FY97	FY98
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	1	0	2	2	0	0	640	0	5,761	5,761
Douglas	0	0	0	0	0	0	0	0	0	0	0	0
Elko	29	1	61	10	5	5	45,923	720	107,641	14,237	10,435	10,435
Esmeralda	0	0	22	0	0	0	0	0	47,810	0	0	0
Eureka	46	14	86	2	13	13	66,239	18,076	136,847	3,120	14,358	14,358
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	24	2	157	1	4	4	42,530	1,271	284,919	2,080	17,805	17,805
Lyon	0	0	0	0	0	0	0	0	0	0	0	0
Mineral	0	0	2	0	0	0	0	0	12,441	0	0	0
Nye	294	42	275	23	28	28	247,202	38,673	509,332	28,719	13,137	13,137
Pershing	18	0	10	0	0	0	38,604	0	18,794	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	70	6	134	10	6	6	104,393	5,634	234,831	17,703	22,331	22,331
TOTAL	481	65	750	46	60	60	544,891	64,374	1,357,129	65,859	89,106	89,106

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.

PRODUCTION OF NEVADA'S OIL FIELDS (barrels)

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

Field (year discovered)	Thru 1990	1991	1992	1993	1994	1995	1996	1997	1998	Total
Eagle Springs (1954)	3,987,201	42,043	49,767	7,075	66,565	162,296	171,638	137,278	111,562	4,735,425
Trap Spring (1976)	9,235,632	690,257	554,410	427,150	378,955	362,985	306,858	288,686	257,921	12,502,854
Currant (1979)	641	0	0	0	0	278	0	202	230	1,351
Bacon Flat (1981)	314,660	0	178,845	102,030	192,601	43,057	28,891	22,465	18,757	901,306
Blackburn (1982)	2,143,744	203,023	231,719	599,857	576,853	435,975	239,934	151,151	112,008	4,694,264
Grant Canyon (1983)	14,184,526	2,124,021	2,499,831	495,934	308,709	202,129	168,163	143,707	126,128	20,253,148
Kate Spring (1986)	705,497	339,310	203,274	150,309	122,436	104,574	87,789	76,280	69,768	1,859,237
Tomera Ranch (1987)	9,083	3,067	2,295	2,140	1,970	1,405	387	659	574	21,580
N. Willow Creek (1988)	16,662	2,365	4,491	3,928	3,736	6,419	3,619	1,478	1,502	44,200
Three Bar (1990)	3,601	17,684	362	1,961	229	0	0	0	0	23,837
Duckwater Creek (1990)	3,095	4,190	2,764	2,256	1,269	655	433	168	491	15,321
Sans Spring (1993)				69,478	44,279	22,174	17,228	45,001	21,736	219,896
Ghost Ranch (1996)							34,166	113,016	65,370	212,552
Deadman Creek (1996)								109	258	367
Sand Dune (1998)									12,465	12,465
TOTAL	30,604,342	3,425,960	3,727,758	1,862,118	1,697,602	1,341,947	1,059,106	980,200	798,770	45,497,803
Change from previous year		-15%	9%	-50%	-9%	-21%	-21%	-7%	-19%	

Garrett Ranch Volcanics. The Garrett Ranch Volcanics consists of mottled light gray to light green to reddish brown quartz and biotite rich tuff with a microcrystalline groundmass. It extends from 6,364 feet to TD, and the show is reported to extend down through that entire length. The show ranges from brown stains with 50 to 70% dull golden fluorescence with streaming yellow cut to black asphalt stains.

Exploration

Ten wells were spudded for oil and gas in 1998, down from fourteen spudded in 1997. One well spudded in 1997 was listed as temporarily abandoned in 1998. Drilling was completed on seven wells totaling 42,146 feet during 1998. At year-end, one well was temporarily abandoned, one had drilling suspended, one was being drilled, and one was being tested. The peak drilling rig count reached

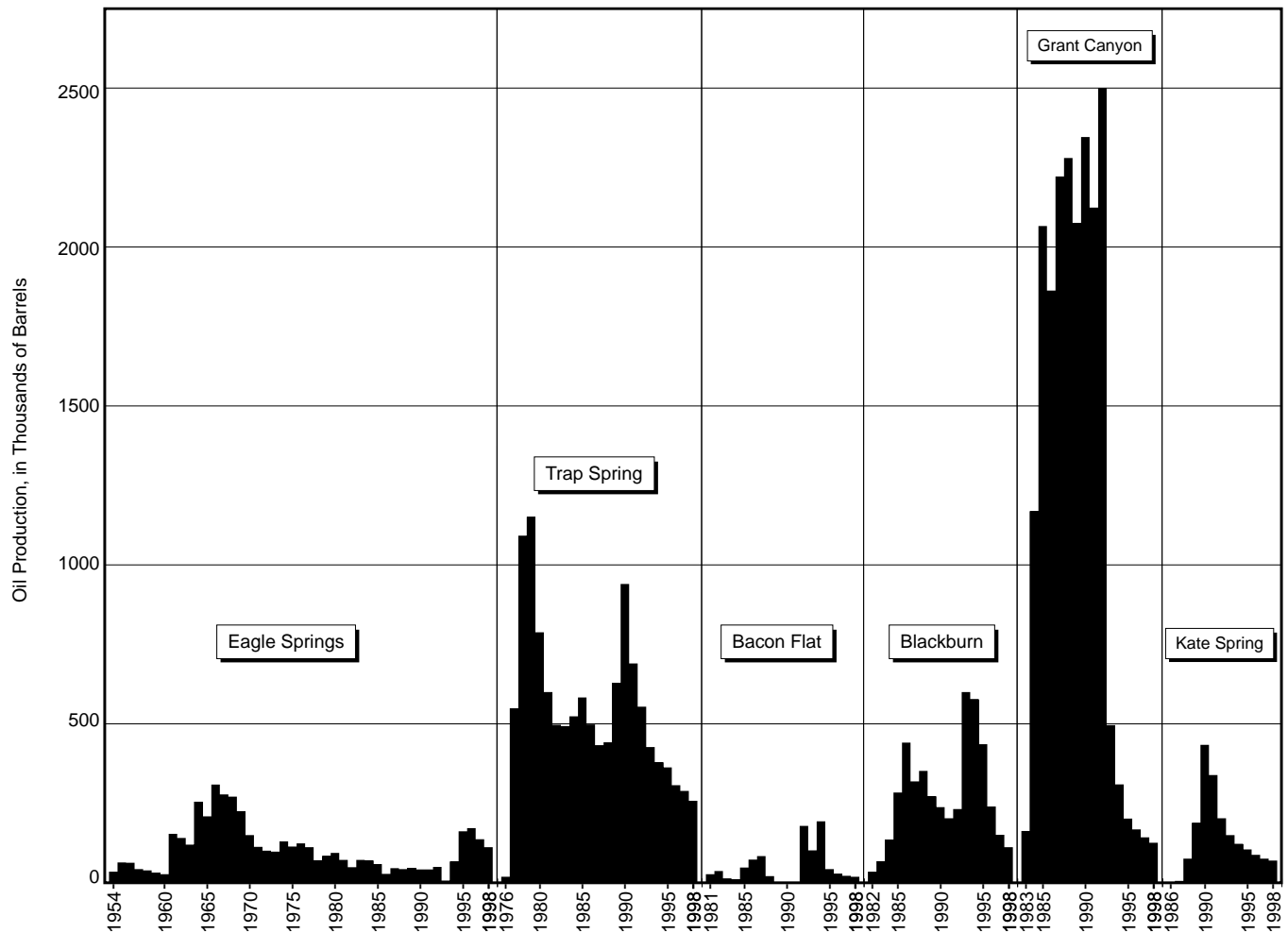
Production of Water from Nevada's Oil Fields (barrels)						
	1994	1995	1996	1997	1998	Total since 1993
Eagle Springs	160,982	331,999	432,300	364,900	410,290	1,700,471
Trap Spring	3,066,458	3,079,669	2,870,437	3,046,366	2,444,444	14,507,374
Currant	0	0	0	0	0	0
Bacon Flat	341	127,111	107,164	100,708	14,929	350,253
Blackburn	2,035,611	2,041,599	1,788,791	1,777,941	1,937,981	9,581,923
Grant Canyon	153,794	260,390	284,006	335,603	377,934	1,411,727
Kate Spring	467,059	514,034	580,219	529,503	476,347	2,567,162
Tomera Ranch	27,676	36,645	15,013	31,948	35,441	146,723
N. Willow Creek	871	923	727	135	0	2,656
Three Bar	5,958	0	0	0	0	5,958
Duckwater Creek	23,336	12,592	6,787	1,853	4,620	49,188
Sans Spring	252,190	263,659	273,928	233,046	363,845	1,386,668
Ghost Ranch			2,775	99,945	171,921	274,641
Deadman Creek				0	0	0
Sand Dune					23,335	23,335
Total	6,194,276	6,668,621	6,362,147	6,521,948	6,261,087	32,008,079
Change from previous year		10.8%	-4.5%	2.5%	-4.0%	

five between July through August but varied between two and three the rest of the year dropping to one between November and December.

Significant oil shows were reported for one well in Lincoln County. Conley P. Smith Operating's Flat Top Federal No. 27-15 contained about 21 minor shows. Fifteen shows occurred between 3,974 and 4,146 feet in light brown, fossiliferous, microcrystalline limestone, light brown to light gray, very fine grained, poorly sorted sandstone, and gray, micaceous shale of the Pennsylvanian Ely Limestone. These shows consisted of brown stains with yellow fluorescence and slow to fair yellow streaming cut. Another show occurred between 4,654 and 4,640 feet in light brown to light gray, very fine grained sandstone of the Scotty Wash and had no stain but left a faint ring cut in a spot dish. Four shows occurred in brown, fine to medium grained, fairly porous sandstone of the Mississippian-Pennsylvanian Scotty Wash Quartzite and consisted of good brown stains with dull gold fluorescence and good streaming yellow cut. The last show was between 5,340 and 5,314 feet in grown to gray, fine-grained, quartzose sandstone of the upper Scotty Wash Quartzite and consisted of a brown stain with no fluorescence and a streaming yellow cut. This well also crossed narrow bands of black vitrinite coal at 4,098 feet, 4,204 feet, 4,254 feet, 4,256 feet, and about 5,310 feet.

Significant oil shows were reported for two wells in Nye County. Eagle Springs Production, LLC, reported its Eagle Springs Federal No. 14-35 contained about 13 minor shows. At 7,326 feet, Eagle Springs Production, LLC, Eagle Springs Federal No. 14-35 was the deepest well drilled in Nevada in 1998. The first show was between 7,064 and 7,072 feet in light gray, quartz rich, bentonitic tuff of the Tertiary Garrett Ranch Volcanics and consisted of a trace golden fluorescence and a faint yellow cut but no stain. The remaining shows were in the Eocene Sheep Pass Formation. Three shows were between 7,154 and 7,188 feet in light brown, cryptocrystalline limestone and ranged from black asphaltic stains to scattered brown stains with scattered yellow fluorescence and fair yellow cut. The remaining shows were between 7,230 feet to TD in interbedded light brown, cryptocrystalline limestone and black to brown, carbonaceous, calcareous shale. They ranged from trace to scattered brown stains with yellow fluorescence and fair to streaming yellow cut.

Connelly Exploration, Inc., reported its Gap Federal No. 33-1 contained two minor shows. One was between 2,788 and 2,796 feet and the other was between 3,004 and 3,220 feet. Both were in the Mississippian Chainman Shale.



The February 1999 edition of the U. S. Department of Energy "Geothermal Technologies" noted that in 1998, Oxbow Power Services found small amounts of oil in some of its geothermal production wells in the Dixie Valley Geothermal Field. These production wells are 28-33, 37-33, 45-33, and 76A-7. These wells are cased down to 2600 m with open holes only between 2600 to 2800 m. The Dixie Valley geothermal reservoir temperature is about 250°C, which is well above the oil window range of 90 to 150°C. The molecular configuration of the oil indicates it had formed around 120°C, and that it had been in the hot-water reservoir for a very small fraction of the geothermal system's probable age of tens to hundreds of thousands of years. It is thought that the presence of the oil is a recent phenomenon, and that oil is drawn in from some outside source at the rate of several kilometers per year by a production induced "pressure sink." A paper concerning this occurrence, "Oils in the Dixie Valley and Kyle Hot Springs Geothermal Systems, Nevada - Potentially Sensitive Indicators of Natural and Induced Reservoir Processes" by J. Hulén, J.W. Collister, S.D. Johnson, and R. Allis, was presented at the 24th Workshop on Geothermal Reservoir Engineering, Stanford University, January 25–27, 1999. Their work cites nearby Tertiary sedimentary rocks as being the source of the oil.

In an effort to streamline permitting and record keeping processes, the Nevada Division of Minerals and the U.S. Bureau of Land Management combined their application for drilling, well completion, plugging and abandoning, sundry notices, and other forms in 1997 (John Snow, personal commun.). In 1998, the Nevada Division of Minerals and the Bureau of Land Management also began a study of the 450 cultural resources reports done in Railroad Valley over the last 20 years that have identified over 1,300 archaeological sites. Oil exploration projects are required by the National Historic Preservation Act to conduct costly and time-consuming cultural resource surveys, some of which may be redundant. The purpose is to use these reports and related data in a Geographic Information System (GIS) to predict which parts of Railroad Valley were occupied by prehistoric hunter-gatherers. It is reasoned that if such predictions can be successfully made, then for large areas of Railroad Valley, separate cultural resource surveys may not be necessary, thereby saving time and money. As of the end of 1998, a preliminary report on this project was under review (www.state.nv.us/minerals/oil_gas.htm).

Transfers

No transfers of wells occurred in 1998. However, on 12 Aug 1998, Foreland Corp. acquired the refineries at Carrant and Tonopah from Petro Source Corp. of Houston, Texas, for \$8 million in cash and stock. The deal also included 24 tractor trailer rigs from Petrosources Transportation that are used to pick up and deliver crude

and refined products in a five state area. The combined capacity of the two refineries is 12,000 barrels per day, but 1998 throughput was about 2,400 barrels per day. Foreland plans to refine the crude from both their Eagle Springs and Ghost Ranch Fields at these refineries (www.foreland.com).

U.S. Oil Production and Consumption

According to the Energy Information Agency (EIA) of the Department of Energy (www.eia.doe.gov), petroleum imports accounted for 57.8% of U. S. consumption in 1998, which surpasses the previous annual peak of 56.0% set in 1997. Domestic crude oil production dropped to its lowest level since 1951, and dependence on imports reached a new high. U.S. crude oil production averaged about 6,243,000 barrels per day in 1998, 3.2% less than in 1997. Petroleum consumption increased by 0.34%. Oil provided about 40.4% of the nation's total energy supply in 1998, according to EIA. This percentage has hovered near 40% since 1991. The use of oil for the production of electricity increased 30.2% in 1998, up from 10.5% in 1997; however, it only accounted for 2.6% of oil consumption in 1998, up from 1.8% in 1997. The use of oil for gasoline production increased 2.3% and accounted for 43.9% of oil consumption in 1998, up from 43.1% in 1997. Because of overproduction, a drop in Asian demand due to recession, and a relatively warm heating season, the price of oil declined 36.5% from an average \$16.94 in 1997 to \$10.75 per barrel in 1998 for imported oil, and 36.8% from an average \$17.23 to \$10.88 per barrel for domestic oil.

In comparison to oil, natural gas consumption decreased 2.9% to 2,132 billion cubic feet in 1998, the second drop in consumption since 1996. Production of electricity accounted for 15.2% of natural gas consumption in 1998, up from 13.5% in 1997. Natural gas provided 24.1% of the nation's total energy supply in 1998, according to EIA. This percentage peaked in 1995 at 25.3% and dropped to 23.1% by 1997. The use of natural gas for the production of electricity increased 8.9%, but other commercial and residential use declined. The average wellhead price declined 15.5% from an average \$2.32 in 1997 to \$1.96 per thousand cubic feet in 1998 (www.eia.doe.gov).

Coal consumption increased 1.6% in 1998 and was 1,045,600,000 short tons, a new record and the third year of consumption over 1 billion short tons. Production of electricity accounted for 90.1% of coal consumption in 1998, up from 89.6% in 1997. Coal provided 23.4% of the nation's total energy supply in 1998, according to EIA. This percentage has hovered near 23% since 1983. The price of coal delivered to electrical utilities declined 1.7% from an average \$26.16 in 1997 to \$25.70 per short ton in 1998 (www.eia.doe.gov).

NEVADA OIL PRODUCERS			
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
Eagle Springs Production, LLC	Deadman Creek Eagle Springs Ghost Ranch Sand Dune	Bruce C. Decker	2561 South 1560 West Suite 200 Woods Cross, UT 84087 Phone (801) 298-9866 FAX (801) 298-9889
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	2900 Phritzie 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	49	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 775-343-1818 Fax: 343-1821
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
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
Bonanza Materials Pit and Plant	Hanson Aggregates West	S9,16,T22S,R62E	sand gravel	OP,ML	multiple bench crushing screening	40	P.O. Box 92170 Henderson, NV 89109 702-565-1313 Fax: 565-3324
Buffalo Road Pit and Mill	CSR West	S21,T21S,R60E	sand gravel	OP,ML	single bench crushing screening	18	4511 S. Buffalo Road Las Vegas, NV 89117 702-876-2699 Fax: 871-8139
El Dorado Pit	Hanson Aggregates West	S11,T23S,R63E	crushed stone	OP	single bench 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	single bench 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	single bench crushing screening	17	89 Glen Carran Circle Sparks, NV 89431 775-263-2150
Lone Mountain Mendenhall Pit	Las Vegas Paving Corp.	S35,T19S,R59E	sand gravel	OP	single bench	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	single bench 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	single bench	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
PABCO Gypsum Pit and Plant	Pacific Coast Building Products, Inc.	S7,T20S,R64E	gypsum	OP	single bench 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

continued

DIRECTORY OF MINING AND MILLING OPERATIONS (continued)

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
CLARK COUNTY (continued)							
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	37	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	46	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	449	HC31, Box 78 Elko, NV 89801 775-758-9221 Fax: 758-9231
Ken Snyder Mine	Dynatec Mining Corp.	S21,22,27,28,33,34 T39N,R46E	gold silver	UG	milling	108	P.O. Box 2310 Winnemucca, NV 89446 775-529-0611 Fax: 529-0612
Kinsley Mountain Mine	Alta Gold Co.	S4,5,6,T26N,R68E	gold	OP	HL	9	778 S. Pioche Highway Ely, NV 89301 775-289-3007 Fax: 289-4138
Meikle Mine	Barrick Goldstrike Mines, Inc.	S13,T36N,R50E	gold	UG	CIL cyanide autoclaving	354	P.O. Box 29 Elko, NV 89803 775-778-8196 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	43	P.O. Box 2520 Wendover, NV 89883 775-478-5463 Fax: 478-5149
Rossi Mine	Baroid Drilling Fluids, Inc.	S14-16,21-23,26-28, 34-35; S15,21,22, T37N,R49E	barite	OP	multiple bench crushing	14	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	6	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	74	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 775-937-2222 Fax: 937-2250
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	1,455	P.O. Box 29 Elko, NV 89803 775-778-8196 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
Newmont Gold Operations	Newmont Mining Corp.	T31-36N, R49-53E	gold silver mercury	OP,ML,UG	bioleaching HL roasting	1,773	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	105	P.O. Box 676 Eureka, NV 89316 775-237-6060 Fax: 237-5408

DIRECTORY OF MINING AND MILLING OPERATIONS (continued)

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
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	44	P.O. Box 3030 Winnemucca, NV 89446 775-623-5260 Fax: 625-0215
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	635	P.O. Box 220 Golconda, NV 89414 775-529-5001
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	373	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	18	4210 W. Jungo 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	66	P.O. Box 2280 Winnemucca, NV 89445 775-529-5026 Fax: 529-5030
Sexton Mill	Nutritional Additives Corp.	S20,T36N,R38E	dolomite	ML	crushing screening	8	1230 Bridge Street Winnemucca, NV 89445
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 775-635-9400 Fax: 635-4596
LANDER COUNTY							
Argenta Mine and Mill	Baker Hughes INTEQ	S13,14,T32N,R46E; S6,18,19,T32N,R47E	barite	OP	gravity grinding	20	P.O. Box 277 Battle Mountain, NV 89820 775-635-5441
Battle Mountain Complex (Fortitude)	Battle Mountain Gold Co.	S22,27,33,34, T31N,R43E	gold silver	OP	HL	21	P.O. Box 1627 Battle Mountain, NV 89820 775-635-2465 Fax: 635-8677
Battle Mountain Grinding Plant	M-I Drilling Fluids LLC	S18,T32N,R45E	barite	ML	gravity grinding	25	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	455	HC66-50 Beowawe, NV 89821 775-468-4400 Fax: 468-4496
Greystone Mine	M-I LLC	S35,T28N,R45E	barite	OP	gravity	48	P.O. Box 370 Battle Mountain, NV 89820 775-635-5135 Fax: 635-2191
McCoy/Cove Mine	Echo Bay Minerals Co.	S2-11,T28N,R42E; S36,T29N,R42E	gold silver	OP,ML	HL milling	356	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

DIRECTORY OF MINING AND MILLING OPERATIONS (continued)

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
LYON COUNTY							
Adams Claim	Art Wilson Co.	S25,T16N,R20E	gypsum/ anhydrite	OP,ML	crushing	7	P.O. Box 1160 Carson City, NV 89701 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 775-343-1818 Fax: 343-1821
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	139	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							
Aurora Mine	Nevada Goldfields, Inc.	S17-20, T5N,R28E	gold silver	OP,UG, ML	crushing grinding CIL	4	P.O. Box 3070 Hawthorne, NV 89415 775-945-3368 Fax: 945-3360
Candelaria Mine	Kinross Candelaria Mining Co.	S32-34,T4N,R35E;	silver gold	OP	HL Merrill-Crowe	18	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	183	P.O. Box 2070 Fallon, NV 89407 775-945-1015 Fax: 945-1213
NYE COUNTY							
Ash Meadows Plant	American Resource Corp.	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	127	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/Ione Placer/ Primary Mill	Ione Gold Mining Co.	S28,34, T13N,R39E	gold silver	ML,OP	screening washing	15	Route 1, Box 29A Austin (Ione), 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	14	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
Invite Plant and Pits	IMV Nevada	S28,29,T17S,R49E; S6,21,T17S,R51E	clay minerals	OP	screening grinding drying	38	Route Box 549 Amargosa Valley, NV 89020 775-372-5341 Fax: 372-5640
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
Nevada Neanderthal Plant	Nevada Neanderthal Stone	S10,T11S,R47E	dimension stone	ML	stone cutting	6	P.O. Box 897 Beatty, NV 89003 775-553-2454
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
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

continued

DIRECTORY OF MINING AND MILLING OPERATIONS (continued)

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
NYE COUNTY (continued)							
Sterling Mine	Cathedral Gold US Corp.	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	255	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	157	150 Coal Canyon Road Lovelock, NV 89419 775-273-2636 Fax: 273-7553
Empire Quarry	United States Gypsum Co.	S31,T31N,R24E	gypsum	OP	crushing calcining	10	P.O. Box 130 Empire, NV 89405 775-557-2341
Florida Canyon Mine	Florida Canyon Mining, Inc.	S1-4,9-15,T31N,R33E S37-39,T31N,R33E S33-35,T32N,R33E	gold silver	OP	HL	227	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		103	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	8	415 Wellington Street Winnemucca, NV 89445 775-623-3328
STOREY COUNTY							
Clark Mine and Mill	Eagle-Picher Minerals, Inc.	S27,33,34, T20N,R23E; S35,T20N,R22E	diatomite	OP,ML	grinding drying	62	P.O. Box 10408 Reno, NV 89510 775-343-1818 Fax: 343-1821
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
Empire Mill	United States Gypsum Co.	S11,13,T31N,R23E	gypsum	ML	grinding calcining	132	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	135	1525 E. Newlands Drive #5 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

continued

DIRECTORY OF MINING AND MILLING OPERATIONS (continued)

Mine/plant name	Operator	Location	Commodity	Type	Process/ activity	Employees	Address
WASHOE COUNTY (continued)							
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.	S14,15,19,20 T24N,R57E	gold	OP	HL	148	P.O. Box 2706 Elko, NV 89803 775-744-4227 Fax: 744-4216
Griffon Mine	Alta Gold Co.	S24,2S,T14N,R58E	gold silver	OP	HL	51	778 Great Basin Blvd. Ely, NV 89301 775-289-3007 Fax: 289-4138
Robinson Mine	BHP Copper North America	S7-18,T16N,R62E	copper gold silver	OP,ML	milling	440	P.O. Box 382 Ruth, NV 89319 775-289-7000 Fax: 289-7009

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

Statewide Commodity Bulletins

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

County Mineral Resource Bulletins

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

Special Publications

- Oil and gas wells drilled in Nevada since 1986 (L-8)
- Geothermal wells drilled since 1979 (L-5)
- Nevada mining and you (SP8)
- Nevada ore and concentrate buyers, custom mills, and smelters available to mine operators (L-7)
- Major mines of Nevada 1997 (P-9)
- Outline of Nevada mining history (SP15)
- Mining districts of Nevada (R47)

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- mineral resources and reserves
- mineral resource assessments
- core and cuttings library
- mining claim data
- wilderness study area reports
- general geologic studies
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