

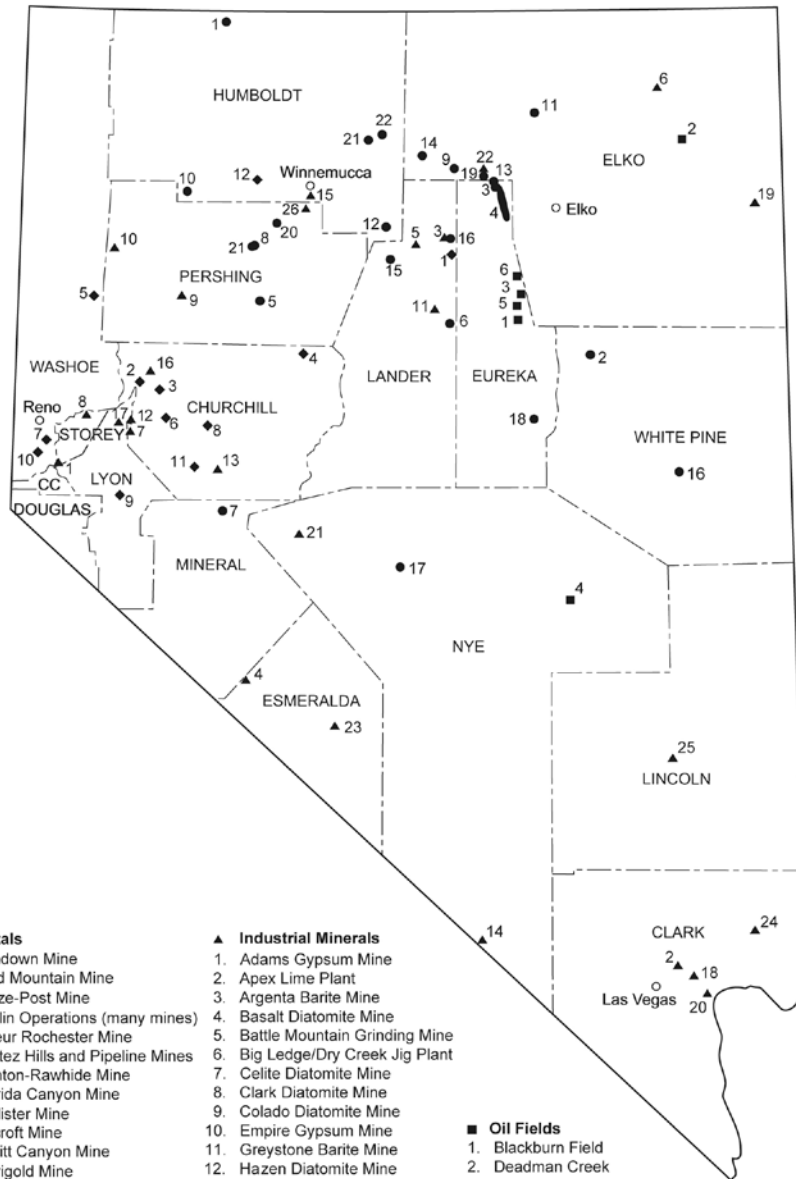
**Nevada Bureau of Mines and Geology  
Special Publication MI-2010**

**The Nevada Mineral Industry  
2010**

**Contents**

- 3 Overview**  
*by Jonathan G. Price*
- 20 Metals**  
*by John L. Muntean*
- 49 Major Precious-Metal Deposits**  
*by John L. Muntean*
- 85 Other Metallic Deposits**  
*by John L. Muntean*
- 88 Industrial Minerals**  
*by David A. Davis*
- 109 Geothermal Energy**  
*by Lisa Shevenell and Richard Zehner*
- 131 Oil and Gas**  
*by David A. Davis*
- 141 Directory of Mining and Milling Operations**  
*by David A. Davis*





- **Metals**
- 1. Ashdown Mine
- 2. Bald Mountain Mine
- 3. Betze-Post Mine
- 4. Carlin Operations (many mines)
- 5. Coeur Rochester Mine
- 6. Cortez Hills and Pipeline Mines
- 7. Denton-Rawhide Mine
- 8. Florida Canyon Mine
- 9. Hollister Mine
- 10. Hycroft Mine
- 11. Jerritt Canyon Mine
- 12. Marigold Mine
- 13. Meikle Mine
- 14. Midas Mine
- 15. Phoenix Project
- 16. Robinson Mine
- 17. Smoky Valley Common Ops.
- 18. Ruby Hill Mine
- 19. Storm Mine
- 20. Sunrise Gold Placer Mine
- 21. Turquoise Ridge Joint Venture
- 22. Twin Creeks Mine
- ▲ **Industrial Minerals**
- 1. Adams Gypsum Mine
- 2. Apex Lime Plant
- 3. Argenta Barite Mine
- 4. Basalt Diatomite Mine
- 5. Battle Mountain Grinding Mine
- 6. Big Ledge/Dry Creek Jig Plant
- 7. Celite Diatomite Mine
- 8. Clark Diatomite Mine
- 9. Colado Diatomite Mine
- 10. Empire Gypsum Mine
- 11. Greystone Barite Mine
- 12. Hazen Diatomite Mine
- 13. Huck Salt Mine
- 14. IMV Nevada Clay
- 15. MIN-AD Dolomite Mine
- 16. Moltan Diatomite Mine
- 17. NCC Limestone Quarry
- 18. PABCO Gypsum
- 19. Pilot Peak Limestone Quarry
- 20. Pioneer Gypsum Mine
- 21. Premier Magnesite Mine
- 22. Rossi Barite Mine/Dunphy Mill
- 23. Silver Peak Lithium Carbonate
- 24. Simplot Silica Products
- 25. Tenacity Perlite Mine
- 26. W. Glen Sexton Dolomite Mine
- **Oil Fields**
- 1. Blackburn Field
- 2. Deadman Creek
- 3. North Willow Creek Field
- 4. Railroad Valley (Eagle Springs, Trap Spring, Currant, Sand Dune, Grant Canyon, Bacon Flat, Kate Spring, Duckwater Creek, Sans Spring, and Ghost Ranch Fields)
- 5. Three Bar Field
- 6. Tomera Ranch Field
- ◆ **Geothermal Power Plants**
- 1. Beowawe
- 2. Bradys Hot Springs
- 3. Desert Peak 1 and 2
- 4. Dixie Valley
- 5. Empire
- 6. Soda Lake 1 and 2
- 7. Steamboat I, IA, II, and III, Galena
- 8. Stillwater 1 and 2
- 9. Wabuska
- 10. Steamboat Hills
- 11. Salt Wells
- 12. Blue Mountain

**Major mines, oil fields, and geothermal plants, 2010.**

# Overview

by Jonathan G. Price

This report highlights activities through 2010 in metals, industrial minerals, geothermal energy, and petroleum. Numerous graphs and charts are incorporated for rapid inspection of trends in production and price. The value of overall mineral and energy production in Nevada increased to an all-time high of \$7.72 billion, up substantially from the previous high of \$6.26 billion in 2008. Gold production experienced an increase to 5.3 million ounces in 2010, after more or less steadily decreasing from a high of 8.86 million ounces in 1998 to 5.0 million ounces in 2009. 2010 was the 22<sup>nd</sup> consecutive year with production in excess of 5.0 million ounces. Nevada led the nation in the production of gold, barite, and gypsum, and was the only state that produced magnesite, lithium, and the specialty clays, sepiolite and saponite. Other commodities mined and produced in Nevada in 2010, more or less in order of value, included copper, construction aggregate (sand, gravel, and crushed stone, including limestone and dolomite), silver, geothermal energy, petroleum, lime (produced from limestone and dolomite), cement (produced from limestone, clay, gypsum, and iron ore), silica (industrial sand), diatomite, clays, molybdenum, perlite, iron ore, dimension stone, salt, semiprecious gemstones (turquoise and opal), and mercury (as a byproduct of gold and silver processing). Locations of many of the sites mentioned in the text of this report are shown on NBMG map E-49, *Nevada Active Mines and Energy Producers*, which is available at [www.nbmjg.unr.edu/dox/e49.pdf](http://www.nbmjg.unr.edu/dox/e49.pdf).

As was the case in 2009, Nevada ranked first in the United States in terms of value of overall

nonfuel (excluding oil, gas, coal, uranium, and geothermal) mineral production in 2010 (according to the U.S. Geological Survey, Mineral Commodity Summaries 2011, <http://minerals.usgs.gov/minerals/pubs/mcs/2011/mcs2011.pdf>).

Arizona, the country's major copper producer, retained second place. Utah, a major producer of copper and molybdenum, primarily from one mine near Salt Lake City, was third. Minnesota, the leading iron producer in the U.S., was fourth. Alaska, a significant producer of zinc, silver, and gold, was fifth. California, with its large population and commensurate demands for construction raw materials, dropped to sixth, because of the downturn in the housing market. Texas, another populous state and major producer of construction raw materials, was seventh.

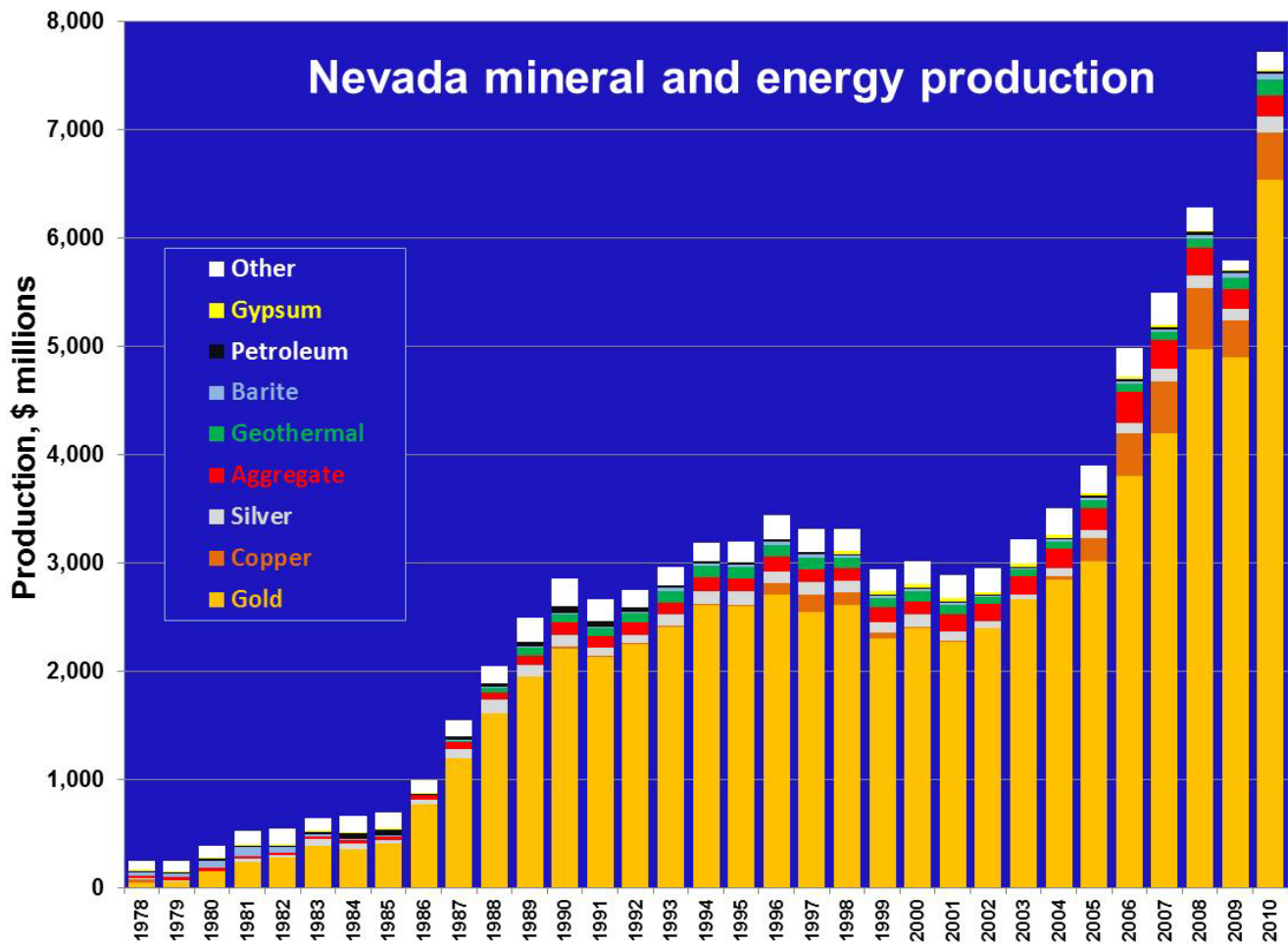
Nevada's production of gold, valued at \$6.5 billion, was 73% of the U.S. total and helped make the U.S. the third leading gold producer in the world in 2010. Nevada alone accounted for 7% of world production of gold. China, Australia, South Africa, Russia, and Peru each produced more gold than the state of Nevada in 2010. Second to gold in terms of Nevada's mineral value in 2010 was copper (\$438 million), followed by construction aggregate (\$193 million). Silver, chiefly a byproduct or co-product of gold production, ranked as the fourth leading mineral commodity in 2010, with a value of \$149 million. Electrical power from geothermal energy production in Nevada in 2010 was valued at \$145 million; its 31% increase in value resulted from an increase in production (23%) and price.

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

Commodity	2009 (revised)		2010		% change from 2009 to 2010	
	Quantity	Value (millions)	Quantity	Value (millions)	Quantity	Value
<b>Gold</b> (thousand troy ounces)	5,033	\$4,893.7	5,339	\$6,537.2	6.1	33.6
<b>Silver</b> (thousand troy ounces)	7,310	107.3	7,361	148.6	0.7	38.5
<b>Copper</b> (thousand pounds)	145,733	345.4	127,976	437.7	-12.2	26.7
<b>Aggregate</b> (thousand short tons)	27,760	175.4	26,800	190.8	-3.8	-0.1
<b>Barite</b> (thousand short tons)	476	38.8	657	49.3	38.1	27.1
<b>Gypsum</b> (thousand short tons)	983	12.1	851	11.7	-13.4	-3.0
<b>Geothermal energy</b> (thousand megawatt-hours)	1,669	110.8	2,060	145.3	23.4	31.1
<b>Petroleum</b> (thousand 42-gallon barrels)	455	21.8	427	26.7	-6.2	22.3
<b>Other minerals<sup>2</sup></b>	-----	86.9	-----	169.5	-----	95.0
<b>Total</b>	-----	\$5,792.2	-----	\$7,716.8	-----	32.9

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

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



The contributions that mining makes to the economies of Nevada and the U.S. are significant in terms of jobs, commerce, taxes, improvements to the infrastructure, and lowering of the U.S. trade deficit. According to the U.S. Geological Survey, in 2010 the U.S. was a net importer of gold, most of which is sold on the international market for bullion, jewelry, and arts, and some of which is sold for its conductive and non-corrosive qualities in computers and other electronics, for its heat-reflecting quality as a coating on windows, and for use in dental work.

Through a survey conducted early in 2011, the Nevada Division of Minerals (NDOM) collected data for Nevada Bureau of Mines and Geology Special Publication P-22, *Major Mines of Nevada 2010*. This publication includes, in handbook form, location maps, names and telephone numbers of operators, numbers of employees, and nonproprietary production figures for most mines in Nevada. It also contains a section on economic impacts of the industry. The full contents are available free of charge on the World Wide Web ([www.nbmng.unr.edu](http://www.nbmng.unr.edu)), as are the contents of this report. The data from the NDOM survey are used in this publication and, along with information from

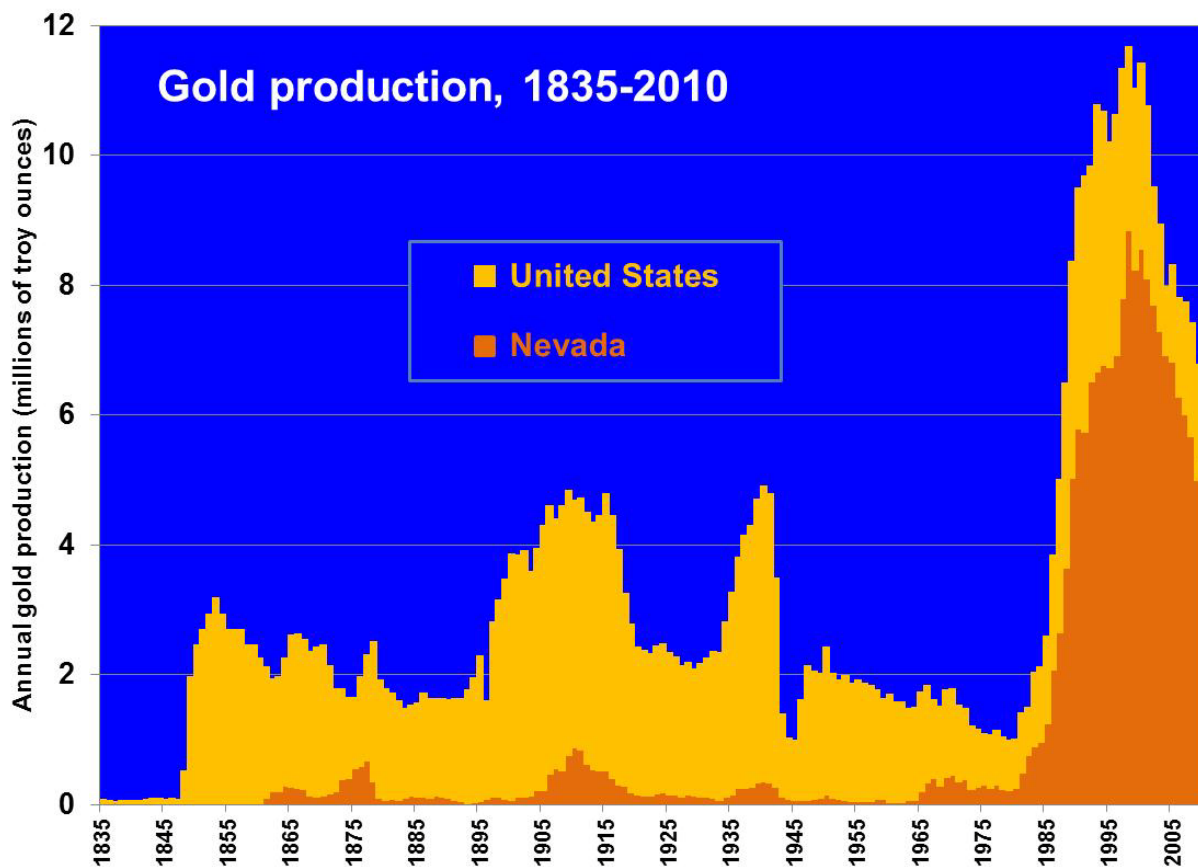
other sources, are used to update, revise, and check preliminary statistics collected and released by the U.S. Geological Survey.

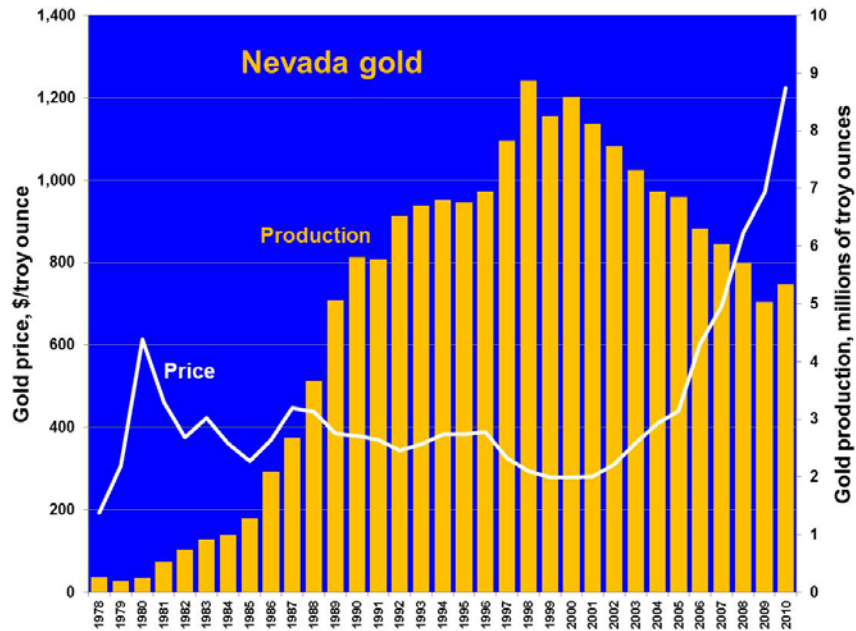
The section on **Metals** and the tables of **Major Precious-Metal Deposits** and **Other Metallic Deposits** provide details on new deposit discoveries, new mine openings, mine closures, additions to reserves, and mine expansions. As has been the case in recent years, gold continues to be the leading commodity produced in Nevada. Production of gold in 2010 came from 20 major mining operations. The Carlin trend in northeastern Nevada accounted for 41% of the total production, down from about 50% in recent previous years. Ten mining operations not on the Carlin trend each produced over 100,000 ounces of gold from mostly multimillion-ounce deposits, some of which are of the Carlin type.

Nevada and the U.S. have produced a significant portion of world gold. The U.S. Geological Survey estimates that total world gold production, since the beginning of civilization, has been approximately 164,000 metric tons (5.3 billion troy ounces). Although this seems like a large quantity,

all the gold ever mined would fit into a cube only 20.4 meters (67 feet) on a side. Interestingly, about 85% of that gold is still in use (in bullion, coins, jewelry, electronics, etc.), and most gold currently being used will be recycled. Through 2010, cumulative gold production in Nevada (beginning with the Comstock Lode in 1859) stands at 5,969 metric tons (191.90 million ounces). Cumulative Nevada gold production will reach the milestone of 200 million ounces in 2012. Remarkably, 87% has been produced since the Carlin Mine began production in 1965; 85% has been produced during the current boom from 1981 to the present; and 34% has been produced in the decade from 2001 to 2010. Cumulative U.S. production, primarily since 1835, is approximately 17,200 metric tons (551 million ounces or approximately 10% of total world gold production), and total Nevada production is 3.6% of cumulative world production. The Carlin trend alone accounts for 1.4% of all the gold ever mined in the world. By the end of 2010, cumulative production from the Carlin trend had reached 2,373 metric tons of gold (76.3 million ounces), assuring its place as one of the most productive gold-mining districts in the world.

Nevada continues to be in the midst of the biggest gold boom in U.S. history, as the graph of historical U.S. gold production illustrates. The recent surge in production in the U.S. is largely the result of discoveries of Carlin-type gold deposits and other deposits in which gold occurs primarily in grains that are too small to be visible to the naked eye. These deposits are mostly in Nevada. The U.S. production so far in the current boom, the period since 1981, has been 232 million ounces. This is significantly greater than the total U.S. production during the era of the California gold rush (1849 to 1859, with 29 million ounces, although some estimates of unreported production may bring that figure up to 70 million ounces); the Comstock (Nevada) era from 1860 to 1875 (with 34 million ounces); and the period from 1897 to 1920, when Goldfield (Nevada), the Black Hills (South Dakota), Cripple Creek (Colorado), and byproduct gold production from copper mines in Arizona and Utah contributed to cumulative production of 95 million ounces. U.S. production in the decade from 2001 through 2010 alone was 82 million ounces. The current boom is bigger than previous booms not only in terms of cumulative production but also in terms of



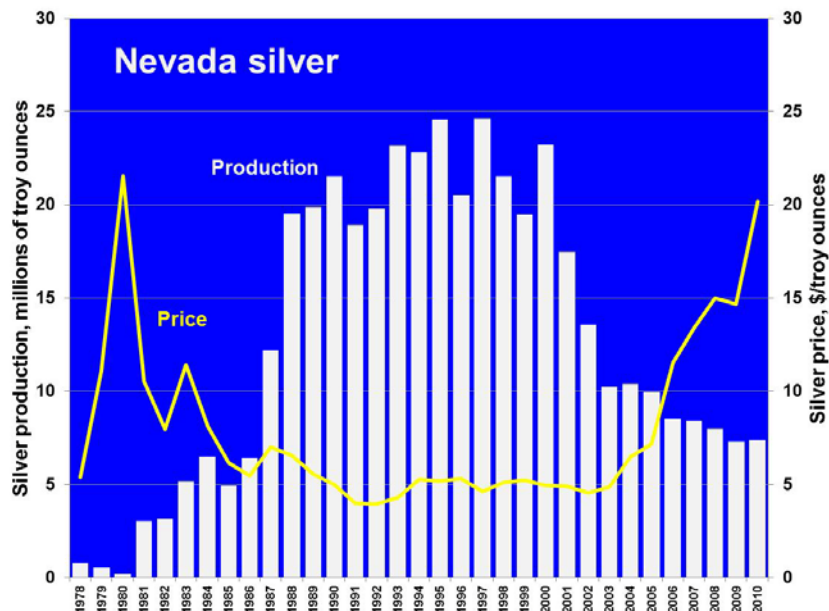


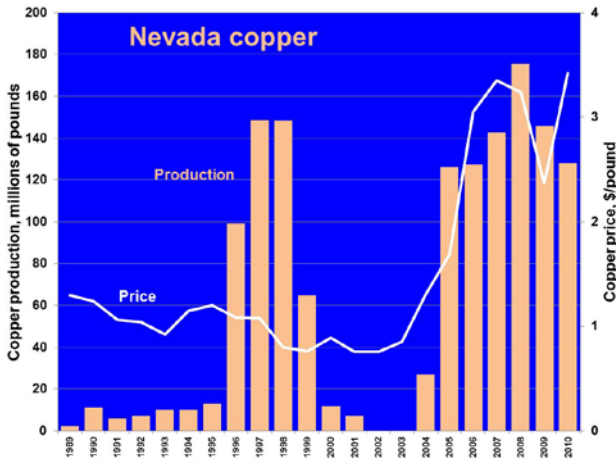
peak annual production (11.6 million ounces in 1998 versus 4.8 million ounces in 1909, 2.6 million ounces in 1866, and 3.1 million ounces in 1853) and duration (at least 32 years for the current boom versus no more than 24 years for any of the earlier booms).

In 2010, Nevada's largest gold operations included Barrick Gold Corporation's mines on the Carlin trend (1,239,937 ounces), Newmont Mining Corporation's mines on the Carlin trend (934,282 ounces) in Eureka and Elko Counties, Barrick's Pipeline and Cortez Hills mines (1,139,976 ounces) in Lander and Eureka Counties, Newmont's Twin Creeks mine (452,744 ounces) in Humboldt County, and the Kinross-Barrick Smoky Valley joint venture Round Mountain mine (358,614 ounces) in Nye

County. Combined, Barrick and Newmont accounted for 81% of Nevada gold production in 2010.

Much of Nevada's silver production in 2010, which totaled 7.36 million ounces, was a co-product or byproduct of gold mining. With a ratio of value (average price of gold to average price of silver) of 61:1 in 2010, only those deposits with more than 61 times as much silver as gold can be considered primary silver deposits. Only one such deposit operated in Nevada in 2010—the Coeur Rochester Mine in Pershing County (with a silver-to-gold production ratio of 210:1 and total silver production of 2.0 million ounces). It produced 27% of Nevada's silver in 2010. Nevada's silver production in 2010 accounted for 18% of the U.S. total and 1.0% of the world total.





Nevada's copper production was dominated by the Robinson copper-gold-silver-molybdenum mine, operated by Quadra Mining Ltd. near Ely in White Pine County. Byproduct copper was also produced at Newmont's Phoenix project near Battle Mountain in Lander County.

Golden Phoenix's molybdenum production from its Ashdown Mine in northwestern Humboldt County added to total molybdenum production from Nevada in 2010 (approximately 350,000 pounds valued at \$5.6 million).

Exploration activity in 2010 is summarized in the section on **Metals**. Most exploration focused on gold, which maintained high prices throughout the year; some companies explored for copper, molybdenum, silver, lithium, limestone for cement, diatomite, uranium, and rare earth elements. The average gold price in 2010 was \$1,225 per ounce, well above prices in the previous nine years (rising steadily from a low of \$280 in 2001 to \$972 in 2009). Gold's continued rise in price in 2011 and an improving global economy have stimulated exploration. The gold price has reached historically high values in recent years, and it is approaching an inflation-adjusted all-time annual high. Adjusted for inflation, the average gold price in 1980 (\$613/ounce, the previous peak value for a year) would equal \$1,689/ounce in 2011.



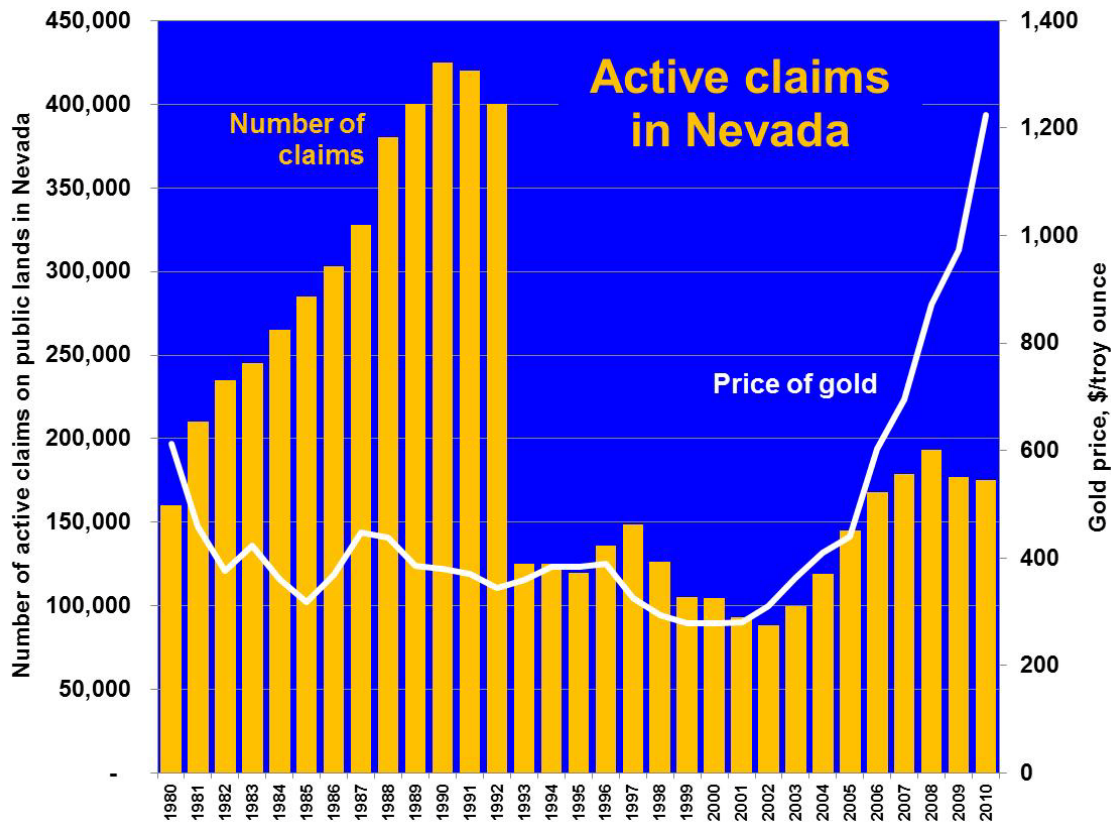
New discoveries and promising drilling results were reported in several districts. To help guide exploration for concealed deposits below alluvial or young volcanic cover, geologists are successfully employing various geophysical methods (seismic, electrical, magnetic, gravity). Exploration activity, including new claims staked,

was reported in most of Nevada's 17 counties. Advanced exploration projects show promise for major developments, particularly for gold along the Carlin and Battle Mountain-Eureka (Cortez) trends in Eureka and Elko Counties and in the Pequop Mountains in Elko County, in the Yerington district in Lyon County (at the Pumpkin Hollow copper-iron

deposits and at the Ann Mason and MacArthur copper deposits) and at the Mount Hope molybdenum deposit in Eureka County.

According to a survey of exploration activities by the Nevada Division of Minerals (D. Driesner and A.R. Coyner, 2010, Nevada Exploration Survey 2010, available at <http://minerals.state.nv.us/>), exploration activity in Nevada in 2010 increased significantly from 2009. The 17 companies responding to the survey reported spending \$214.1 million on exploration in Nevada in 2010, more than any recent year,

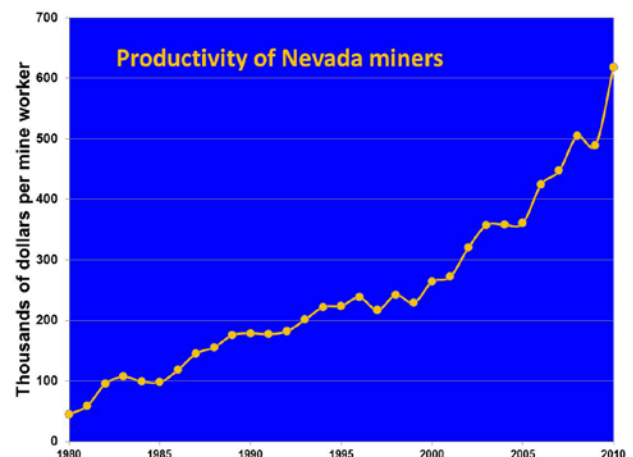
including the \$110.9 million reported by 20 companies in 2009, the \$167.9 million reported by 31 companies in 2007, and well above the level of \$51.2 million in 2001. Although the companies responded with guarded optimism, they planned to spend more, \$295.5 million in 2011. Because of its favorable geology for gold deposits, and because of its regulatory climate, Nevada continues to attract a large portion of the worldwide exploration expenditures of the companies actively exploring in Nevada.



The Nevada Division of Minerals reported that the mining industry held 81.0 million ounces in gold reserves at the end of 2010. The announced gold resources in Nevada (as reported in announcements by companies, with deductions for production), are enough to sustain gold production at current levels for at least 15 years, assuming stable prices. With relatively high gold prices and continued technological improvements, some of the subeconomic resources of previous years will be upgraded to reserves.

Productivity of Nevada mining operations is exceptionally high. Measured simply by the value of the commodities produced divided by the number of employees, productivity of Nevada miners is outstanding. On the average, each of the workers in the non-energy mineral industry in Nevada produced

approximately \$618,000 in mined products in 2010, an all-time high.



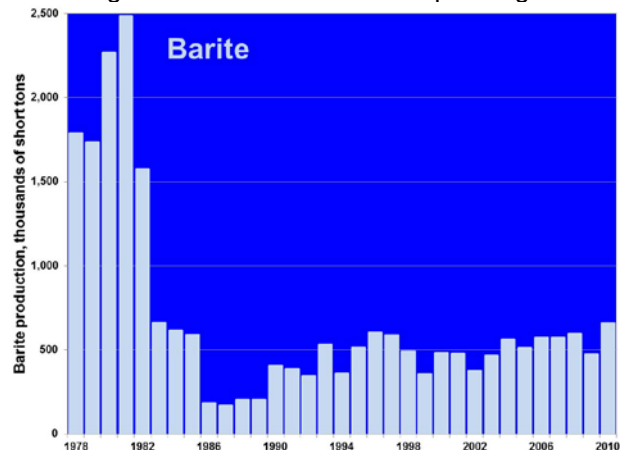
Challenges that face the precious metal mines in Nevada include:

- Economic, safety, and environmental concerns, particularly uncertainty in metal prices
- The ability to replace mined-out reserves through “greenfield” and “brownfield” exploration, that is, in areas without and with previous mining, respectively
- Obtaining financial assurances (bonds) for reclamation and closure
- Sustaining local economies when, sometime in the future, mining ceases
- Hazards of underground mining
- Possible regulatory and mining-law changes
- The length of time that it typically takes to obtain permits
- Preservation of archaeological and ecological resources
- Treating refractory (iron sulfide- and/or carbon-bearing) ores, including innovative ways to oxidize these ores and to recover gold-bearing pyrite by flotation
- Dewatering mines
- Predicting the ultimate chemical compositions of pit lakes
- Procedures for closure of heaps used for leaching gold and silver from ore
- Controlling the release of mercury to the atmosphere (mercury is typically concentrated along with gold during ore formation and is recovered along with gold during mineral processing)
- Treatment and disposal of large volumes of water, some of which may be too warm to introduce directly into streams or may contain potentially toxic elements that need to be removed.

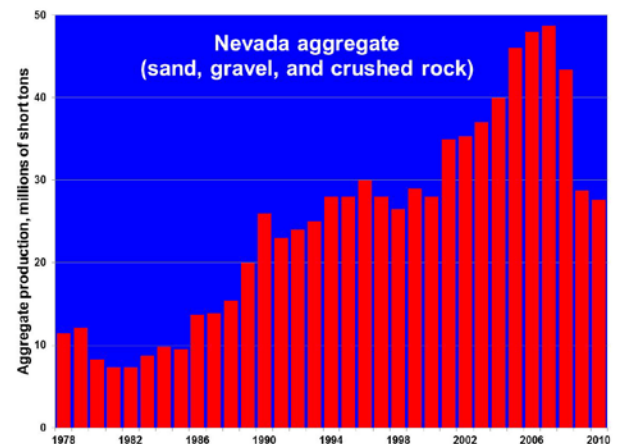
Industry is responding proactively to these challenges through research on and use of new technologies and engineering approaches, and through interaction with people in nearby communities.

The section on **Industrial Minerals** covers developments during 2010 and gives details on important commodities produced from or processed in Nevada, including aggregate, barite, cement, clays, diatomite, dimension stone, dolomite, gypsum, lime, limestone, lithium, magnesite and brucite, perlite, potassium alum (kalinite), pozzolan, salt, semiprecious gemstones (opal and turquoise), silica, and zeolites. Four major operations in Lander and Elko Counties combined to produce most of the barite mined in the U.S.; production increased in 2010 to a level that is higher than has been seen in more than 20 years.

Aggregate production, which, until the recession hit Nevada particularly hard, had been increasing as a result of Nevada's expanding

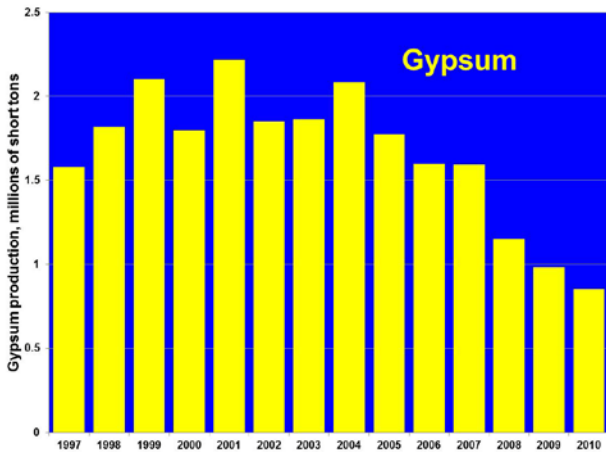


population and need for construction materials for homes, schools, streets, highways, airports, resort hotels, and other businesses, declined slightly from 2009 to 2010. Similarly, the production of gypsum declined in 2010, relative to 2009, because of the continuing effects of the economic recession on construction in Nevada and California. Nonetheless, demand for construction raw materials is likely to remain strong because of Nevada's population and need for highways. The U.S. Census Bureau ([www.census.gov](http://www.census.gov)) reported Nevada's population as 2.701 million in 2010, up 35% from 1.998 million in the 2000 census.



An interesting trend that is occurring in the Las Vegas area as well as nationwide is the combination of aggregate quarries with landfill operations. Planning for the eventual uses of quarries is vital in areas where urban expansion encroaches on the mineral resources. Aggregate is mined locally to reduce transportation costs, associated air pollution, and related concerns regarding highway safety. Post-mining land uses include suburban developments, landfills, and

recreation areas. Gypsum mines near the urban growth areas of Las Vegas are now being considered as sites for housing developments.



Chemetall Foote Corporation's Silver Peak lithium operation in Clayton Valley, Esmeralda County, where subsurface brines are evaporated on a playa, is the only domestic lithium producer, and Premier Chemicals' (now Premier Magnesia) Gabbs Mine in Nye County is currently the nation's only hard-rock producer of magnesite.

Developments in the geothermal industry are covered in the section on **Geothermal Energy**. Approximately 18 plants operating at 12 sites sold a record amount of electricity in 2010.

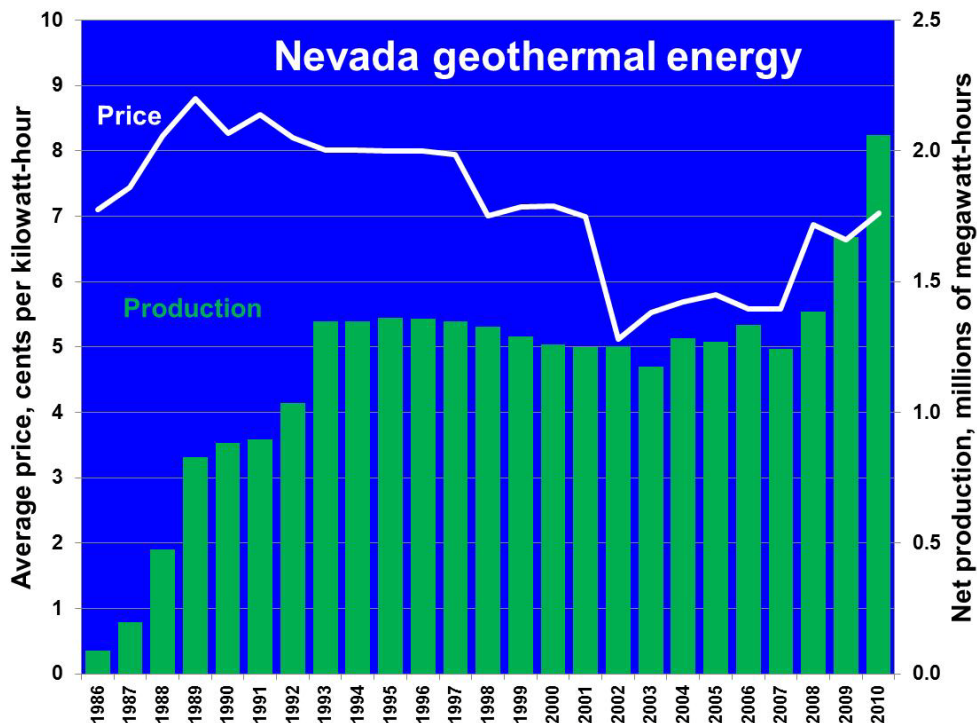
Additionally, geothermal energy is used at numerous places in Nevada for space heating, domestic warm water, recreation, dehydrating

vegetables, and other agricultural applications. Programs in the U.S. Department of Energy, energy bills passed by the Nevada and California legislatures, and activities of researchers at the University of Nevada, Reno are stimulating geothermal development in Nevada. One new plant went into production early in 2011 (Ormat's Jersey Valley plant in Pershing County), and several new plants are under construction or planned to meet Nevada's renewable energy portfolio standard. Nevada Bureau of Mines and Geology Map 161, *Nevada Geothermal Resources (2010)*, available online at

<http://www.nbmgs.unr.edu/sales/pbsdtls.php?sku=M161>, shows the locations of geothermal plants, direct-use locations, hot springs, and hot wells; it demonstrates the fact that Nevada has considerable potential for geothermal development. Nevada Bureau of Mines and Geology Open-File Report 09-10, *Preliminary Geothermal Potential and Exploration Activity in Nevada (2009)*, available at

<http://www.nbmgs.unr.edu/dox/dox.htm>, provides regional information for assessing the potential for high-temperature (>150°C) geothermal systems. Considerable information on geothermal energy resources in Nevada is provided on the Web at: [www.nbmgs.unr.edu/geothermal/gthome.htm](http://www.nbmgs.unr.edu/geothermal/gthome.htm).

At a 2005 meeting of a task force set up by the Western Governors' Association to assess geothermal resource potential, geothermal energy experts estimated that by 2025 Nevada could add

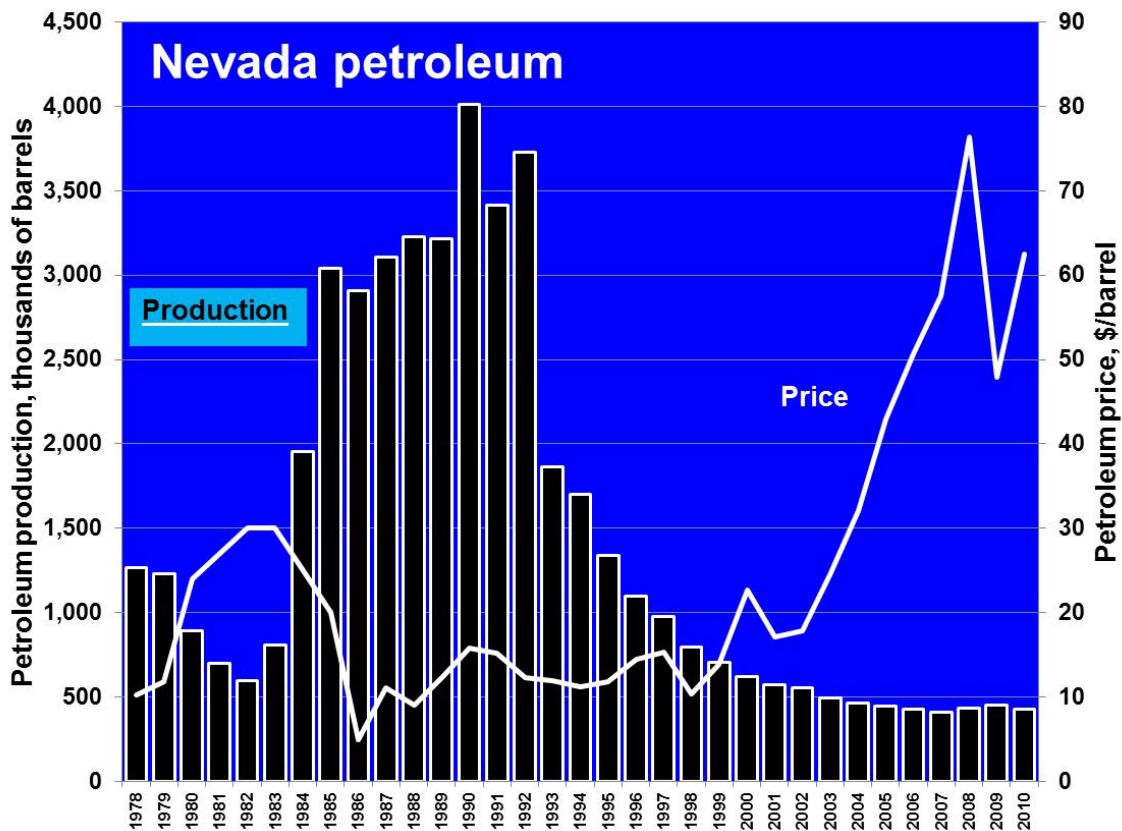


approximately 1,500 to 2,900 megawatts of geothermal power-generating capacity. If this potential were realized, and if energy prices continue to rise, geothermal power could become a billion-dollar per year business in Nevada. Current projects under development in Nevada should result in construction of between 2,100 and 2,400 megawatts of capacity within 10 years. Production capacity stood at 437.9 megawatts at the beginning of 2011.

Nevada has great potential for renewable energy (particularly geothermal, wind, and solar energy for electricity). Currently, of all the energy consumed by people in Nevada, approximately 91.8% comes from fossil fuels (12.6% from coal, 42.7% from natural gas, and 36.5% from petroleum products). Hydroelectric dams account for 3.6%, followed by geothermal power (2.6%), biomass (1.5%), and solar (0.5%). (Data are from the latest,

2009 statistics of the Energy Information Administration, Table CT2, <http://www.eia.gov/>). New solar plants are being constructed, primarily in southern Nevada, and new wind farms are planned for several areas.

Developments in the Nevada petroleum industry are covered in the section on **Oil and Gas**. Oil is produced primarily in two areas—Railroad Valley in Nye County and Pine Valley in Eureka County. Total annual oil production from Nevada (valued at \$21.8 million in 2010) is a minor part of U.S. production. The amount of Nevada oil production decreased slightly from 2009, and no new fields were discovered. Small amounts of co-produced natural gas are used to fuel equipment used for oil production. The value of Nevada oil production increased from 2009 to 2010 as a result of higher prices for Nevada's oil.



In 2005, the U.S. Geological Survey released its assessment of undiscovered oil and gas resources of the Eastern Great Basin (available at <http://energy.cr.usgs.gov/oilgas/noga/index.htm>), an area that includes the eastern portion of Nevada, western Utah, and part of southeastern Idaho. The U.S. Geological Survey estimated mean figures of 1.6 billion barrels of oil and 1.8 trillion cubic feet of natural gas remaining to be found in this region. In 2011, the Nevada Bureau

of Mines and Geology released Open-File Report 11-2, *Qualitative Petroleum Potential Map of Nevada* (available at <http://www.nbmng.unr.edu/dox/dox.htm#8>), which highlights areas of relative potential for discovery of oil in Nevada, based primarily on the presence and thermal maturity of likely source rocks.

Exploration for oil in Nevada is encouraged by the cumulative production from the two premier fields in Railroad Valley: Grant Canyon and Trap Spring (21 million and 14 million

barrels, respectively). Historically, few exploration wells have been drilled in the state (fewer than 1,000 wells, or fewer than one well per 111 square miles or 286 square kilometers). With so much area unexplored, even discounting areas underlain by high-grade metamorphic and granitic rocks, Nevada has the potential for discovery of more multimillion-barrel fields. Four new exploration wells were spudded, and four wells were permitted in 2010, up from three each in 2009.

The U.S. is a net exporter of few mined commodities and a net importer of many. These exports help offset the staggering U.S. trade deficit (difference between imports and exports of

goods and services), which amounted to \$500 billion in 2010 (according to the Department of Commerce, Bureau of Economic Analysis, [www.bea.gov](http://www.bea.gov)). Among the major products mined in Nevada, the U.S. relies upon imports for barite (76% of total U.S. consumption from imports in 2010, according to the U.S. Geological Survey, used primarily to prevent blowouts in oil and gas drilling) and silver (65%, used in photographic and other applications). The U.S. also depends on imports of copper (30%, used primarily to conduct electricity) and gypsum (15%, used in wallboard). Somewhat surprisingly, the U.S. was a net importer of gold in 2010 (33%).

### Statistics on selected mineral resources, 2010<sup>1</sup>

Commodity	US Import Reliance (% of US consumption)	Leading Producers (% of world mine production in 2010)
Aluminum ore	100	Australia (33%), China (19%), Brazil (15%), India (9%)
Manganese	100	China (22%), Australia (18%), South Africa (17%), Gabon (11%)
Rare Earths	100	China (97%), India (2%), Brazil (0.4%), Malaysia (0.3%)
Platinum	94	South Africa (75%), Russia (13%), Zimbabwe (3%), Canada (3%)
Potash	83	Canada (29%), Russia (21%), Belarus (15%), China (9%)
Barite	76	China (52%), India (14%), US (10%), Morocco (7%)
Zinc	77	China (29%), Peru (13%), Australia (12%), India & US (6%)
Tin	69	China (44%), Indonesia (23%), Peru (15%), Bolivia (6%)
Silver	65	Peru (18%), Mexico (16%), China (14%), Australia (8%)
Tungsten	68	China (85%), Russia (4%), Bolivia (2%), Austria (2%)
Chromium	56	South Africa (39%), India (17%), Kazakhstan (15%)
Nickel	43	Russia (17%), Indonesia (15%), Philippines (10%), Canada (13%)
Gold	33	China (14%), Australia (10%), US (9%), South Africa & Russia (8%)
Copper	30	Chile (34%), Peru (8%), China (7%), US (7%)
Gypsum	15	China (31%), Iran (9%), Spain (8%), US (6%)
Phosphate rock	15	China (37%), US (15%), Morocco (15%), Russia (6%)
Cement	8	China (55%), India (7%), US (2%), Turkey (2%)
Coal	(US is exporter)	China (46%), US (14%), India (8%), Australia (6%)
Iron ore	(US is exporter)	China (38%), Australia (18%), Brazil (15%), India (11%)
Molybdenum	(US is exporter)	China (40%), US (24%), Chile (17%), Peru (5%)
Silica	(US is exporter)	US (25%), Italy (13%), Germany (6%), UK (5%)
Diatomite	(US is exporter)	US (30%), China (25%), Denmark (12%), Mexico (7%)
Beryllium	(US is exporter)	US (89%), China (11%), Mozambique (1%)

<sup>1</sup> Sources: Production data and import reliance are from USGS Mineral Commodity Summaries 2011 for most commodities, Energy Information Administration for coal. Percentages are calculated from these data.

Local economies benefit from mining in Nevada. Construction of new homes, hotels, casinos, other businesses, schools, and roads requires local sources of sand, gravel, crushed stone, gypsum, and raw materials for cement, all of which are abundant in Nevada. The mining industry directly employed 12,210 people in 2010 (including oil; according to the Nevada Department of Employment, Training and Rehabilitation, <http://www.nevadaworkforce.com/>), and the industry is responsible for another 51,000 jobs related to providing the goods and services needed by the industry and its employees (D. Driesner and A.R. Coyner, 2010, Major Mines of Nevada 2010, Mineral Industries in Nevada's Economy, Nevada Bureau of

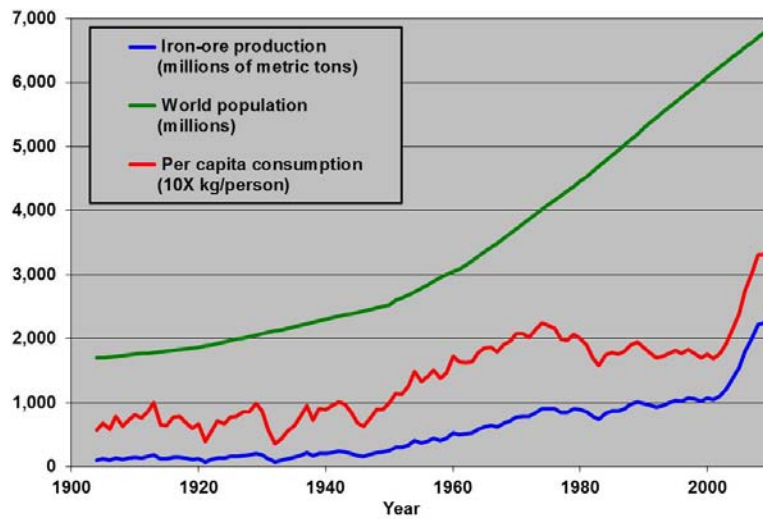
Mines and Geology Special Publication P-21, 28 p.; available at [www.nbmng.unr.edu/dox/mm/mm10.pdf](http://www.nbmng.unr.edu/dox/mm/mm10.pdf)).

Nevada and the U.S. make significant contributions to the world's production of several mineral commodities. Thanks in part to Nevada's production, the U.S. is a major producer, as well as consumer, of gypsum (with the U.S. accounting for 6% of world production in 2010) and industrial sand (25% of world production). In addition to gold, the U.S. is a leading silver producer (8% of world production). The U.S. is essentially self-sufficient, as are most countries, in construction aggregate, which usually is mined from sources near where it is used. Total U.S. production of construction sand, gravel, and crushed stone in 2010 (approximately 1.9 billion

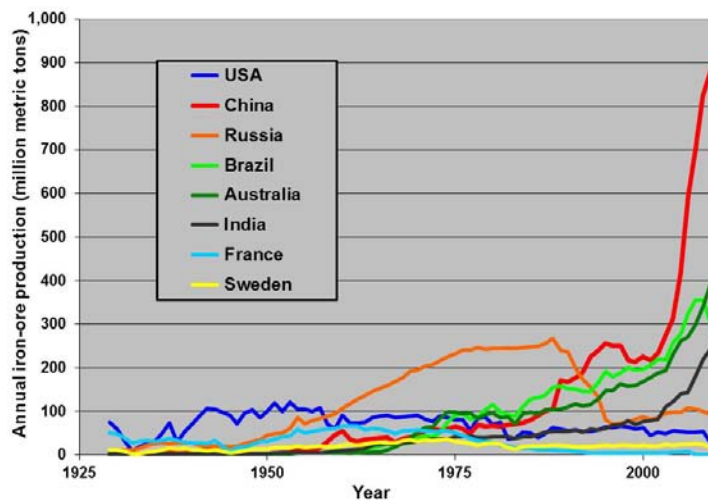
metric tons, according to the U.S. Geological Survey) decreased by 2% from 2009 (after decreasing that year by 22% from 2008), because of weaker demand from the residential and commercial construction industry. Net imports of aggregate account for approximately 1% of consumption. The U.S. is also self-sufficient in the other major mined material, coal. According to the U.S. Energy Information Administration ([www.eia.doe.gov](http://www.eia.doe.gov)), the U.S. produced approximately 985 million metric tons of coal in 2010, up 1.2% from 2009, but lower than the record high of 1.063 billion metric tons of coal in 2008. Although no coal is produced in Nevada, coal is a major source of energy for generation of electricity in Nevada and many other states.

Global demand for nearly every mineral (and energy) commodity has increased sharply over the last decade, and, despite the current economic recession, trends suggest heavy demand for the foreseeable future. Demand is growing partly because world population is increasing, and partly because standards of living (measured by per capita consumption) are increasing.

Annual global iron-ore production reached an all-time high of 2.4 billion metric tons in 2010. That equals approximately 0.4 km<sup>3</sup> of magnetite or hematite ore, or at least 1 km<sup>3</sup> of ore plus overburden and waste rock – the equivalent of one huge mine, per year.



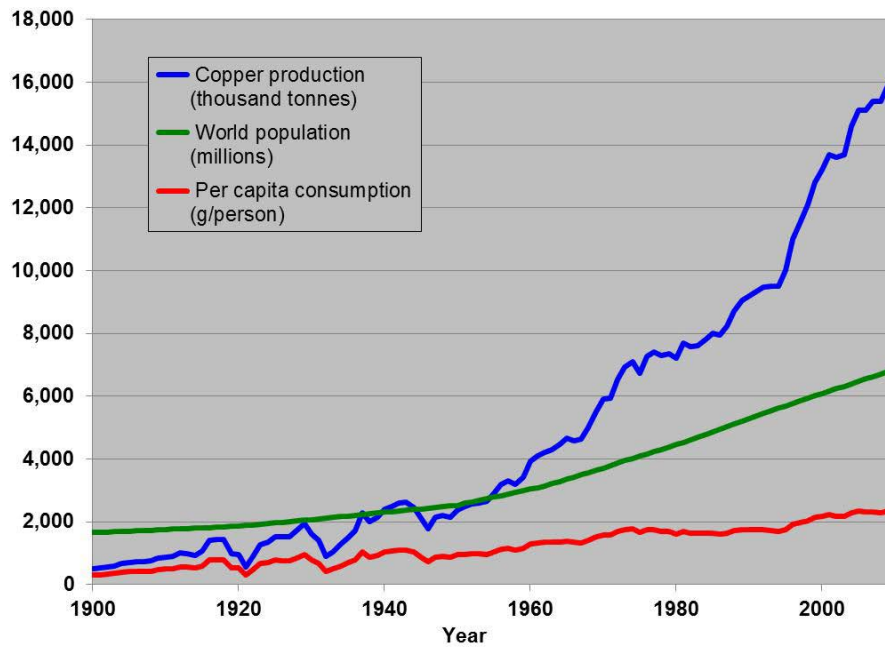
**Global iron-ore production, per capita consumption (approximated as global production divided by population), and world population, 1904-2010.**



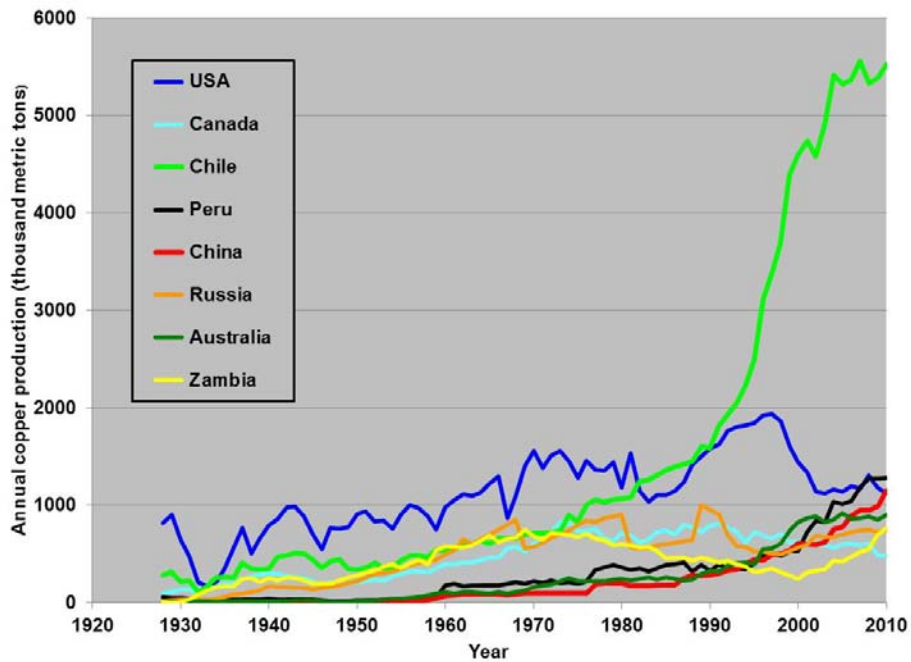
**Iron-ore production by country, 1929-2010.**

Global copper production, which reached an all-time high of 16.2 million metric tons in 2010, nearly equaled more than 100 years of production

from the Bingham Canyon Mine in Utah (17.0 million metric tons).



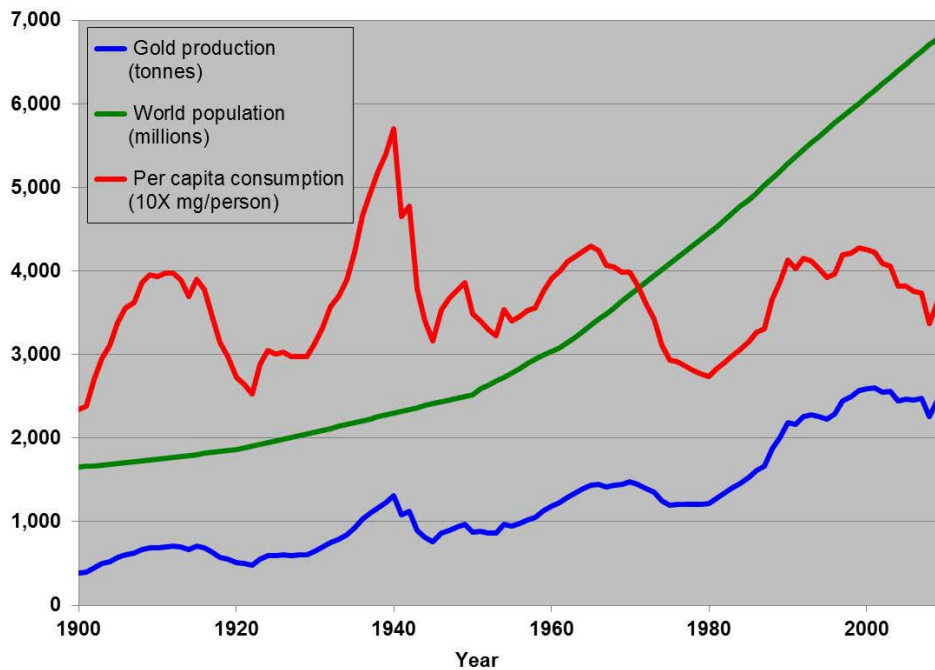
**Global copper production, per capita consumption, and population, 1900-2010.**



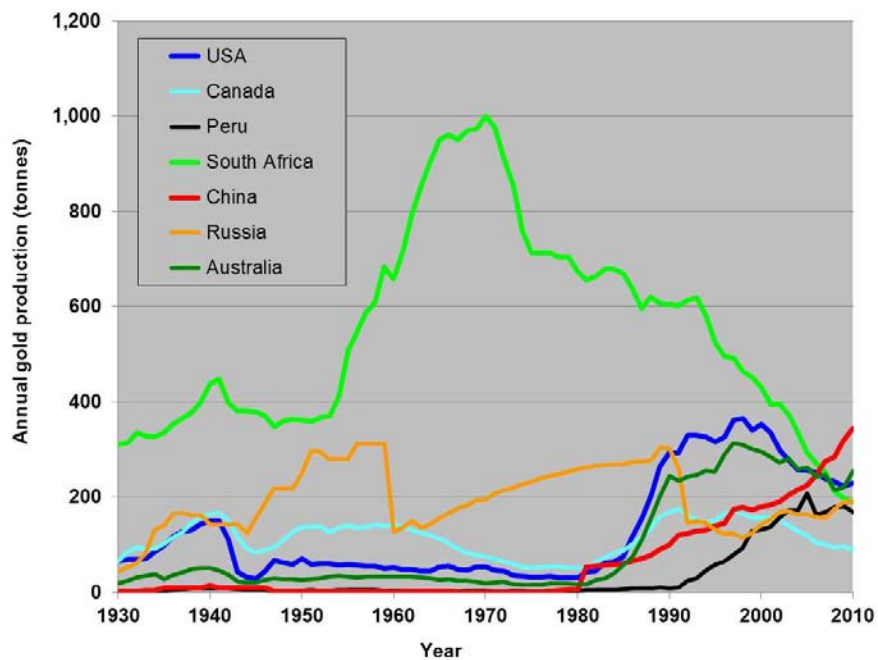
**Copper production by country, 1928-2010.**

Global gold production in 2010 (2,500 metric tons) exceeded the cumulative production from the Carlin trend (2,373 tons), one of world's top gold-

mining regions. Despite the rise in gold price in recent years, production has not reached the peak of 2,600 metric tons in 2001.



**Global gold production, per capita consumption, and population, 1900-2010.**



**Gold production by country, 1930-2010.**

**Global production of selected mineral commodities (metric tons)\*  
by country in 2010, compared to Nevada.**

Country/State	Area (10 <sup>6</sup> km <sup>2</sup> )	Gold	Silver	Copper	Gypsum	Barite	Industrial Sand
Algeria	2.38	1			1,700,000	60,000	
Argentina	2.78	60			1,300,000		
Australia	7.68	261	1,860	900,000	3,500,000		5,200,000
Austria	0.08						1,500,000
Belgium	0.03						1,800,000
Bolivia	1.10	6	1,260				
Brazil	8.51	58			1,900,000		
Bulgaria	0.11	4					650,000
Canada	9.96	91	600	480,000	3,500,000		1,300,000
Chile	0.76	38	1,280	5,520,000			1,400,000
China	9.57	345	3,500	1,150,000	45,000,000	3,600,000	
Czech Republic	0.08						1,370,000
Egypt	1.00	3			2,500,000		1,750,000
France	0.57	2			2,300,000		5,000,000
Germany	0.36				1,900,000	75,000	6,500,000
Ghana	0.24	82					
India	3.28	3			2,500,000	1,000,000	1,700,000
Indonesia	1.90	120		840,000			
Iran	1.65	<1			13,000,000	250,000	1,500,000
Italy	0.30	<1			4,100,000		14,000,000
Japan	0.38	8			5,800,000		3,500,000
Kazakhstan	2.72	30		400,000		100,000	
Korea, South	0.10	<1					450,000
Mexico	1.97	73	4,410	230,000	5,800,000	140,000	2,800,000
Morocco	0.45	1				460,000	
Norway	0.32						1,500,000
Papua New Guinea	0.46	68					
Peru	1.29	164	3,640	1,285,000			900,000
Poland	0.31	<1	1,180	430,000	1,500,000		4,350,000
Russia	17.07	192	1,150	750,000	2,900,000	65,000	
Saudi Arabia	2.15	5			2,100,000		
Slovakia	0.05	<1					620,000
South Africa	1.22	189					2,300,000
Spain	0.50	4			11,500,000		5,000,000
Thailand	0.51	5			8,500,000		
Turkey	0.78	17			3,100,000	150,000	1,300,000
United Kingdom	0.24	<1			1,700,000	50,000	5,600,000
Uzbekistan	0.43	90					
Zambia	0.75	3		770,000			
USA	9.37	231	1,270	1,120,000	9,000,000	670,000	26,500,000
<b>Nevada</b>	<b>0.29</b>	<b>166</b>	<b>229</b>	<b>58,000</b>	<b>772,000</b>	<b>596,000</b>	<b>363,000</b>
WORLD	149.90	2,500	22,200	16,200,000	146,000,000	6,900,000	108,000,000

\* Production data for all areas except Nevada are from the U.S. Geological Survey (USGS) minerals information publications (<http://minerals.usgs.gov/minerals/>), with revisions from USGS mineral commodity specialists during their review of a draft of this report; USGS lacks data for some commodities in some countries; production data for Nevada are from Driesner and Coyner (2010), with modifications as noted in this report; USGS statistics are adjusted to be consistent with Nevada data.

Historical iron-ore production reflects significant economic changes. For example, the 20<sup>th</sup> century history of iron-ore production reflects the decline of France as a superpower, the impact of the Great Depression on the U.S. economy, and the economic boom after World War II. The 52% drop in U.S. iron-ore production from 2008 to 2009 (with a rebound in 2010) illustrates the depth of the recession in the U.S., whereas the global impacts of the recession are hardly visible on the graphs of global iron, copper, and gold production, thanks primarily to China's booming economy.

Although China lags behind the European Union and the U.S. in gross domestic product (estimated as \$10.09 trillion for China, \$14.82 trillion for the EU, \$14.66 trillion for the U.S., \$4.31 trillion for Japan, and \$4.06 trillion for India in 2010, according to <https://www.cia.gov/>), China can be considered the world's dominant economic superpower today in terms of mineral production. Russia and the U.S. have declined. For gold, copper, and iron, China's domestic production reached all-time highs in 2010. With 19% of the world's population, China can be expected to be a major producer of mineral resources for the foreseeable future. India, with 17% of the world's population, is also emerging as an economic superpower, but not on the scale of China. Of the countries listed as producers of 23 key mineral commodities in 2010, China was a significant producer (with  $\geq 10\%$  of the world's supply) of 17, and the U.S., with 4% of the world's population, was a significant producer of four. In 2010, China accounted for 46% of global coal production, compared with 14% for the U.S. Global coal production reached its all-time high of approximately 7.3 billion metric tons in 2010.

China actually needs more iron ore than it can supply domestically. Much of the recent increase in iron-ore production in Australia and Brazil (2.4 and 1.8 times more in 2010 than in 2000, respectively) is supplying demand from China. Some iron ore from the U.S. (Iron Mountain, Utah) is shipped to China for steel production. The U.S. is a supplier of raw materials to an increasingly industrialized China. Nevada is experiencing interest from China as a source of raw materials (particularly copper, molybdenum, and iron) for their industries.

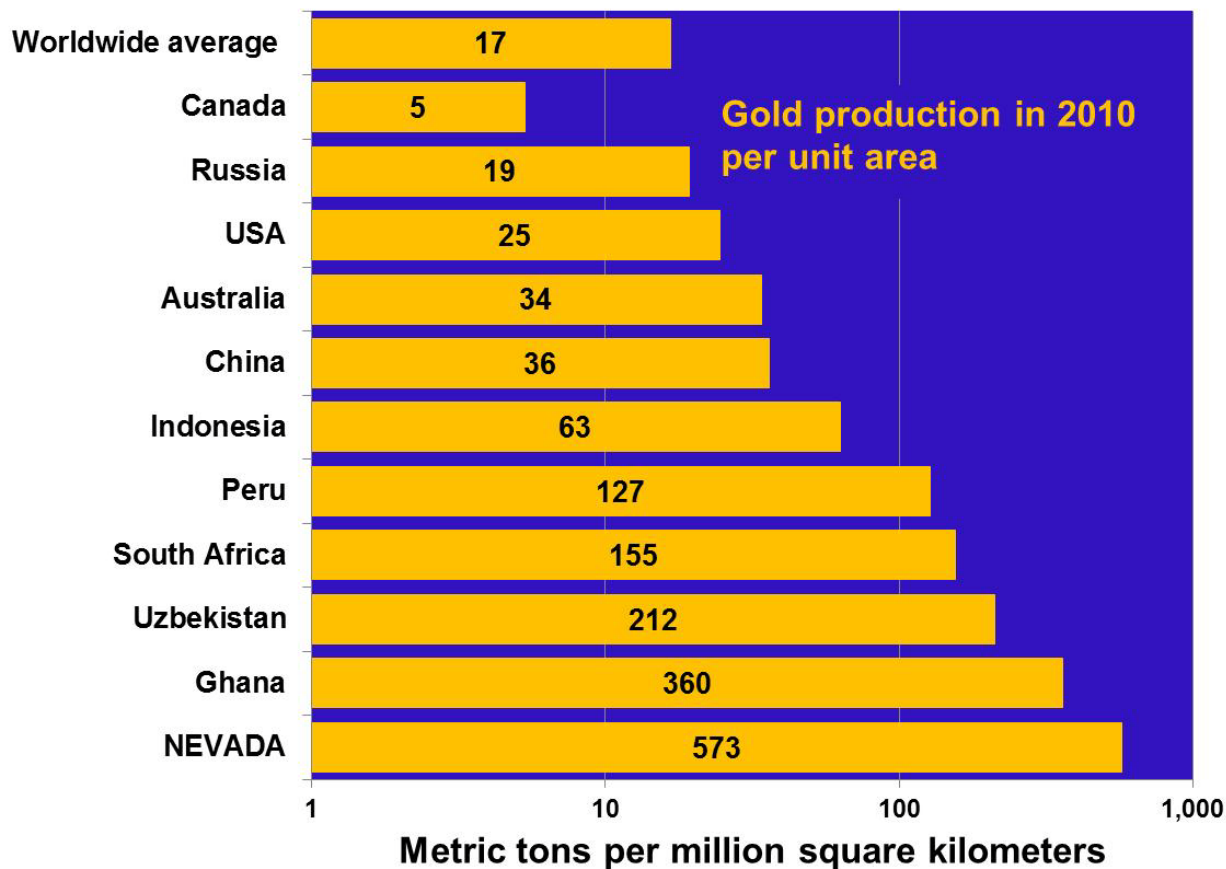
China overtook South Africa as the leading gold producer in 2007 and extended its percentage lead in 2010. South Africa, whose production peaked at 1,000 metric tons of gold in 1970, had held the lead for over 100 years. China's production

reached an all-time high of 345 metric tons in 2010. The South African mines on the Witwatersrand are getting deeper and more costly to operate than ever before. Production in the USSR peaked at approximately 311 tons of gold per year in 1956-1959 and reached 304 tons in 1989. Production in the USA peaked at 366 metric tons (11.7 million troy ounces) of gold in 1998, approximately one third of South Africa's peak. Today, China accounts for 14% of world gold production; Australia is second with 10%, followed by the U.S. at 9% and South Africa and Russia each with 8%.

For industry, the global demand for minerals is creating opportunities for exploration both domestically and worldwide, particularly in areas with potential for large deposits. New opportunities exist for increased development and production, including new technologies for extracting metals from known deposits, and for sustainability, including the future of the environment, local and national economies, social and governmental stability, recycling, and substitutions of other minerals and products. Emerging technologies are increasing demand for many mineral commodities (such as lithium for automobile batteries; neodymium and dysprosium, two of the rare earth elements, for magnets in wind turbines; tellurium and cadmium for solar panels).

For geological surveys and academia, the high level of demand for mineral resources is creating opportunities for such activities as geologic mapping and interpretation of the 4D geologic framework; geoscience sample and data preservation; and collaborations among states, universities, industry, and the federal government on mineral-resource research, information, and policy. A 2011 report on *Energy Critical Elements – Securing Materials for Emerging Technologies*, by the American Physical Society and Materials Research Society (<http://www.aps.org/policy/reports/popa-reports/index.cfm>) highlights some of the research, information, and policy opportunities.

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



Comparison of gold production in Nevada, measured in metric tons per million square kilometers of total area, versus the worldwide average (using area of land mass) and major producing countries.

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

Energy Information Administration ([www.eia.doe.gov](http://www.eia.doe.gov)) provides data on oil and gas, geothermal, solar, wind, hydroelectric, and other energy sources. The Nevada Bureau of Mines and Geology supports several interactive maps on the Web that are backed by periodically updated databases on mineral and energy resources and potential, exploration activity, land ownership and restrictions, and other geographic information.



Blast-hole drill (upper right) at the Carlin mine, near the portal of the Carlin East underground mine.

### CONVERSION FACTORS

1 metric ton = 1.1023113 short ton = 1,000 kilograms = 2,204.6226 pounds = 32,150.7 troy ounces.

31.1035 metric tons = 1 million troy ounces (31.1035 grams = 1 troy ounce).

453.592 grams = 1 pound (avoirdupois) = 16 ounces (avoirdupois) = 14.5833 troy ounces.

34.2857 grams per metric ton = 34.2857 parts per million by weight = 1 troy ounce per short ton.



Complexly folded sedimentary rocks of the Devonian Rodeo Creek Formation, host of ore in the Gold Quarry mine on the Carlin trend.

# Metals

by John L. Muntean

## PRODUCTION

Nevada produced 5,338,559 ounces of gold, 7,361,123 ounces of silver, 127,975,833 pounds of copper and 354,054 pounds of molybdenum from 23 active mines in 2010. Production of three of the four metals was up from 2009, a 6.1% increase for gold, a 0.7% increase for silver, 16.7% increase for molybdenum. Copper production decreased 12.1%.

The increase in gold production ended a nine-year decline in production. Based on the number of projects that are planned to be made into mines, gold production is anticipated to continue to increase in the near term. The Carlin trend helped Barrick Gold Corp. and Newmont Mining Corp. continue their dominance of Nevada's gold production. Barrick and Newmont accounted for 81% of production in 2010, a decrease from 89% in 2009. The Carlin trend share of gold production decreased to only 41% of Nevada's total production, the lowest percentage in several years. A decreasing share of the production from the Carlin trend is mainly due to the resurgence of the Cortez mine as well as a 14% decrease in production along the trend, from 2,527,888 to 2,174,219 ounces. The decrease in Barrick and Newmont's share of the ounces produced is mainly due to increased production from the mid-tier companies Allied Nevada Gold Corp. and Great Basin Gold Ltd. at their Hycroft and Hollister mines, as well as Yukon-Nevada Gold Corp.'s resumption of production at Jerritt Canyon. Approximately one-third of Nevada's 2010 gold production came from underground mines.

Nevertheless, Barrick remained the leading producer of gold in 2010, with production coming from its Goldstrike, Bald Mountain, Ruby Hill, Cortez, and Turquoise Ridge mines (75% share), plus its 50% share of the Round Mountain mine's production and 33% share of the production from the Marigold mine. In fact, Barrick's production increased 3.2% from 2009, to 2,519,706 ounces of gold. The increase was the result of a 120% upsurge in production at its Cortez mine to 1,139,976 ounces—one-fifth of Nevada's output. The total cash cost of the production from Cortez was only \$312 an ounce. The surge in production at Cortez was primarily due to initiation of full-scale open-pit mining at the Cortez Hills deposit.

Newmont produced 1,792,171 ounces of gold, a 10.8% decrease from 2009. It reported production from its Carlin trend mines and from Twin Creeks, Phoenix, and Midas, plus its 25% share of the Turquoise Ridge mine. The decrease in production was due mainly to a giant pit wall failure

at its Gold Quarry open pit deposit in December 2009, which halted production in 2010. Newmont hopes to reverse the recent trend of decreasing gold production in Nevada by mining again at Gold Quarry in 2011, opening the Emigrant open pit mine in 2011, and begin mining again in the Genesis open pit in 2012. Other gold mines that are in the permitting stage and could begin production sometime in 2011 or 2012 include the Gold Hill deposit near Round Mountain (50% Kinross Gold Corp., 50% Barrick), Atna Resources Ltd.'s Reward deposit near Beatty in Nye County, and Imperial Metals Corp.'s underground Sterling deposit, which is also near Beatty. All bodes well for annual increases in gold production in Nevada for at least the next few years.

Newmont was the leading silver producer in 2010, producing 3,006,168 ounces, primarily from its Midas and Phoenix mines. Coeur d'Alene Mines Corp. recovered 2,023,423 ounces of silver from the leach pads at its Rochester mine, where mining stopped in 2007 but recommenced in 2011. Quadra Mining LTD.'s Robinson mine produced 85% of Nevada's copper in 2010, which amounted to 108,967,015 pounds, an 11% decrease from 2009. Newmont's Phoenix mine made up the balance of the 2010 copper production, producing 19,008,818 pounds, a 20% decrease from 2009. Newmont is in the process of permitting a copper-leach circuit at Phoenix, which should increase production. Quadra reported 226,688 pounds of molybdenum from its Robinson Mine in 2010, a 53% increase from 2009. Win-Eldrich Mines Ltd. reported 127,367 pounds of molybdenum production in 2010 from its underground Ashdown mine.

## EXPLORATION

Exploration in Nevada rebounded considerably in 2010 from the slump that started in the fall of 2008 due to the international financial crisis. Nevada county recorders registered 189,797 claim filings in fiscal year 2010, an 11% decrease from fiscal year 2009 (which started in July 2008). These included new claims and annual maintenance of existing claims. The distribution of active claims, as of the end of 2010, is shown in **figure 1**. The U.S. Bureau of Land Management (BLM) listed 17,356 new active claims that were located in calendar year 2010 (**fig. 2**), a 10% increase from 2009. **Table 1** shows the 14 companies that staked 300 or more claims in 2010.

At least 99 projects were drilled in 2010, compared to 64 in 2009. **Table 2** shows the breakdown of the drill projects by size of company and size of drill program. Four "major" companies—Barrick, Newmont, Kinross Gold Corp., and Goldcorp Inc.—and eight "mid-tier" companies drilled

at least 37 projects in 2010<sup>1</sup>. The mid-tier companies included Agnico-Eagle Mines Ltd., Allied Nevada Gold Corp., Coeur d'Alene Mines Corp., Fronteer Gold Inc., Jipangu Inc., Great Basin Gold Ltd., International Minerals Corp., and Quadra Mining Ltd. The remaining 62 projects were drilled by 49 different "junior" companies. Although junior companies still experienced difficulties raising money to finance drilling in 2010, they drilled almost twice as many projects as they did in 2009. Actually, more than the 99 projects reported here were likely drilled in 2010, especially small drill programs carried out by major or mid-tier companies, because these companies only occasionally release information on such projects. **Figure 3** shows the distribution of the drill projects across the state. For comparison **figure 4** shows the distribution of projects in 2009. Note the distribution is similar except for a much larger number of projects in western Nevada in 2010 in the area known as the Walker Lane in Mineral and Esmeralda Counties, as well as in Lincoln County.

The main exploration objective in Nevada continued to be gold. Only ten of the 99 projects drilled in 2010 targeted metals other than gold. Six of the projects were drilled for copper. These included the Robinson mine (Quadra), Copper Basin (Newmont), Contact (International Enxco Ltd.), and three in the Yerington district—Ann Mason (Entrée Gold Inc.), MacArthur (Quaterra Resources Inc.), and Pumpkin Hollow (Nevada Copper Corp.). Other non-gold projects drilled in 2010 included Rochester (Coeur) and Simon (International Millennium Mining Corp.) for silver, Apex (AusAmerican Mining Corp.) for uranium, and Gibellini (American Vanadium Corp.) for vanadium, which has an excellent chance of being mined in the near future. Important molybdenum projects that were not drilled in 2010 were General Moly Inc.'s Mount Hope project north of Eureka and its Liberty project north of Tonopah. General Moly continued its aggressive permitting and financing efforts at Mount Hope in 2010, while continuing to leave Liberty idle for the time being.

---

<sup>1</sup> The classification of companies into major, mid-tier, or junior in this section of the report is arbitrarily based on gold production and market capitalization. The loose criteria are as follows: 1) major companies produce greater than 1 million ounces of gold worldwide, and have market capitalizations of over \$3 billion, 2) mid-tier companies produce between 50,000 and 1 million ounces of gold and/or have market capitalizations less than \$3 billion but more than \$500 million, and 3) junior companies produce less than 50,000 ounces of gold and/or have market capitalizations less than \$500 million.

---

The major companies that drilled for gold in 2010 continued to focus on their active mine sites. Barrick carried out major drill programs at Cortez, Turquoise Ridge, Bald Mountain, South Arturo, and Goldstrike. At Turquoise Ridge, Barrick adjusted its strategy and began testing the potential to develop a large-scale open pit to mine the lower grade mineralization that envelops the high-grade ores currently being mined underground. Five surface rigs were drilling much of the year. Though no results were released in 2010, multiple rigs continued to drill in the lower Horse Canyon area on its Cortez mine property. Away from its mines, Barrick completed another major drill program on the Spring Valley project (joint venture with Midway Gold Corp.) located near the Rochester mine in Pershing County. Much of Newmont's effort was focused on drilling out its underground deposits on the northern Carlin Trend, including Leeville, Turf, and Exodus. It spent \$43 million alone on underground development at Leeville and Turf, where 1.8 million ounces of reserves and 6 million ounces of resources were added. In addition, Newmont greatly increased its activity at Twin Creeks, where it focused on the Fiberline deposit located adjacent and below the east highwall of the Megapit. Newmont's main projects outside its immediate mine areas were Copper Basin and Buffalo Valley in the Battle Mountain area, and the Sandman project west of Winnemucca. Goldcorp completed another major drill program at Marigold, whereas Kinross carried out relatively minor drill programs at Round Mountain and nearby Manhattan. However, Kinross also carried out programs well away from Round Mountain, at its Callaghan project northeast of Austin and its Castle Peak project in the Monte Cristo Range west of Tonopah.

The most exciting new discovery continued to be Fronteer's Long Canyon deposit in the Pequop Mountains in eastern Elko County, where it and its joint venture partner AuEx Ventures Inc. spent nearly \$25 million in 2010 drilling 225,000 feet in developing Long Canyon. For approximately \$267.8 million, Fronteer acquired AuEx's 49% share of Long Canyon and the adjacent West Pequop property, where Agnico-Eagle continued to drill in 2010. Subsequently, in April 2011, Newmont Mining Corp. acquired Fronteer Gold Inc. in a deal valued at approximately \$2.3 billion. Based on drilling through 2010, the measured and indicated resource at Long Canyon stood at 20,250,000 tons grading 0.069 opt gold for a total of 1,324,000 ounces—almost double the previous year's estimate. Oxide ore comprises this relatively high-grade, open-pittable deposit. Other major drill programs by mid-tier companies were completed by Allied Nevada at its Hycroft mine, by Great Basin Gold at its underground Hollister Mine, by Jipangu Inc. at its Florida Canyon mine, and by Fronteer at its Northumberland project.

Centerra Gold Corp. completed drill projects at Tonopah Divide and its Oasis porphyry gold project in Esmeralda County.

Other drill projects of interest in 2010 included US Gold Corp's Gold Pick and Gold Ridge deposits in the Roberts Mountains and its Limousine Butte (Limo) project in White Pine County. It continued to push these projects forward, further increasing the chances that they will be put into production at some point in the future. Similarly Timberline Resources Corp. continued to grow its Lookout Mountain/South Lookout Mountain resource in the Ratto Canyon area in the south part of the Eureka district. Midway Gold Corp. drilled some of the highest grades to date at its Pan project and released a preliminary economic assessment, further increasing the chances that Pan will be mined. Comstock Mining Inc. drilled over 150 holes in 2010 pushing forward its plans to mine the resource it controls on the Comstock, which centered on the old Lucerne open cut near the town of Silver City. Klondex Mines Ltd. continued to drill and find new veins at Fire Creek in advance of its plans to construct a decline in order to drill out the resource from underground. Pilot Gold Inc., comprised of Fronteer geologists, appeared to push the "frontier" of gold exploration in Nevada once again, by joint venturing and drilling their epithermal vein prospects at Easter and Gold Springs in Lincoln County.

With an average gold price of \$1,224.53 per ounce in 2010, many projects long considered "dogs," as well as some new deposits in Nevada, have a very good chance of being put into production in the near future. In 2010, not counting resources around operating mines, 21 new resource estimates were released in 2010 or early 2011, driven mainly by the high gold price. New resource estimates were released for Bell Mountain, Borealis, Buffalo Valley, Comstock, Cove, Dayton, Easter, Fire Creek, Gold Pick/Gold Ridge, Limousine Butte, Lookout Mountain/South Lookout Mountain, Long Canyon, Mineral Ridge, Monte Cristo, Pan, Pine Grove, Relief Canyon, Reward, South Arturo, and West Pequop.

Exploration activity is summarized on **pages 28-48** by county and district. Projects that were drilled in 2010 are emphasized. Production, reserves and resources of gold and silver are updated in the section "Major Precious-Metal Deposits." Recent production, reserves, and resources from projects producing or targeting other metals are listed in the section "Other Metallic Deposits."

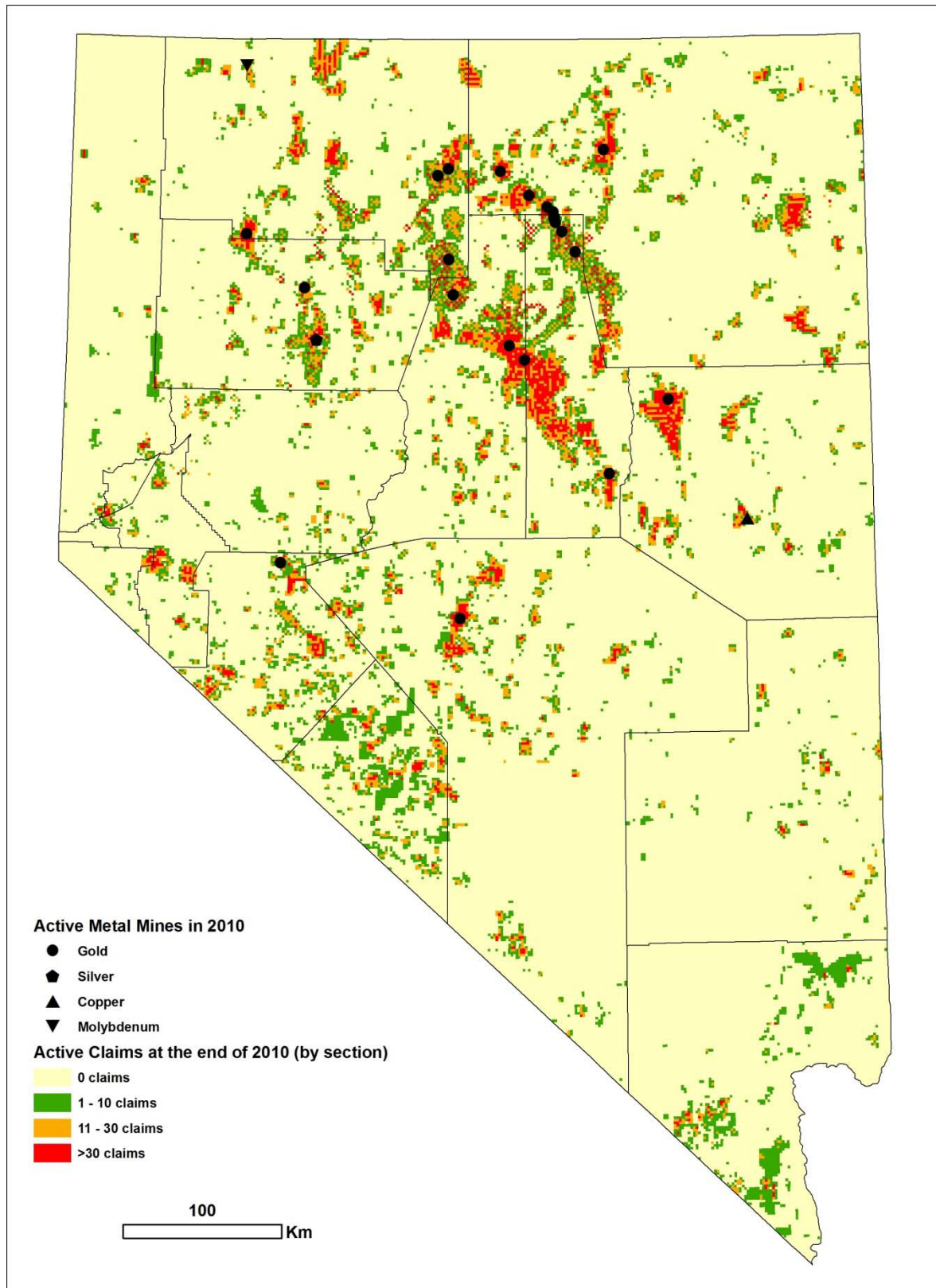
**Table 1. Claimants that staked the most new claims in 2010.**

Claimant	Number of Claims	Areas
<b>QUATERRA ALASKA INC</b>	1721	1) Mostly around the Butte Valley porphyry copper prospect in northeast White Pine County. 2) Reveille district in Nye County. 3) Wassuk Range (Copper Canyon area south of the Sunny Slope mine).
<b>NEWMONT USA LTD</b>	502	1) Along eastern range front of Hot Creek Range between Tybo and Hot Creek (Nye County). 2) Pediment between Ely Springs Range and Highland Range near Pioche (Lincoln County).
<b>EPH 3:20 LLC</b>	495	1) North edge of Adobe Range southeast of Jerritt Canyon mine (Elko County).
<b>HYCROFT RESOURCES &amp; DEV INC</b>	466	1) East and south of the Hycroft mine in Humboldt and Pershing Counties.
<b>LAMB JAN B</b>	462	1) South end of Clayton Valley, probably for lithium (Esmeralda County).
<b>ASARCO LLC</b>	445	1) Mostly in Lodi Hills and Quartz Mountain in northeast Nye County. 2) Pyramid district near Burris mine (Washoe County).
<b>GENESIS GOLD CORP</b>	418	1) East flank of Toiyabe Range at northwest end of Grassy Valley (Lander Co.). 2) W flank of Tobin Range near Golconda Canyon (Pershing Co.). 3) Pediment at the north end of Fish Creek Mountains, north of old Cove-McCoy mine (Lander County).
<b>BUENA VISTA MINERALS INC</b>	410	1) North end of the Kennedy district in the East Range (Pershing Co.).
<b>TATMAR VENTURES (US) INC</b>	391	1) Pediment along the west flank of Toiyabe Range, just east of old Quito mine (Lander County).
<b>WPC RESOURCES USA INC</b>	349	1) Pediment along east flank of Toiyabe Range near Wenban Springs (Lander County).
<b>AURION RESOURCES (USA) LLC</b>	340	1) Pahrnagat polymetallic district, Mount Irish Range (Lincoln County).
<b>3 AMIGOS EXPLORATION INC</b>	303	1) Goodsprings and Crescent districts (Clark County).
<b>EVOLVING GOLD CORP</b>	300	1) Expanded their Carlin project near Rain mine southwestward across the highway to Palisades (Elko County).

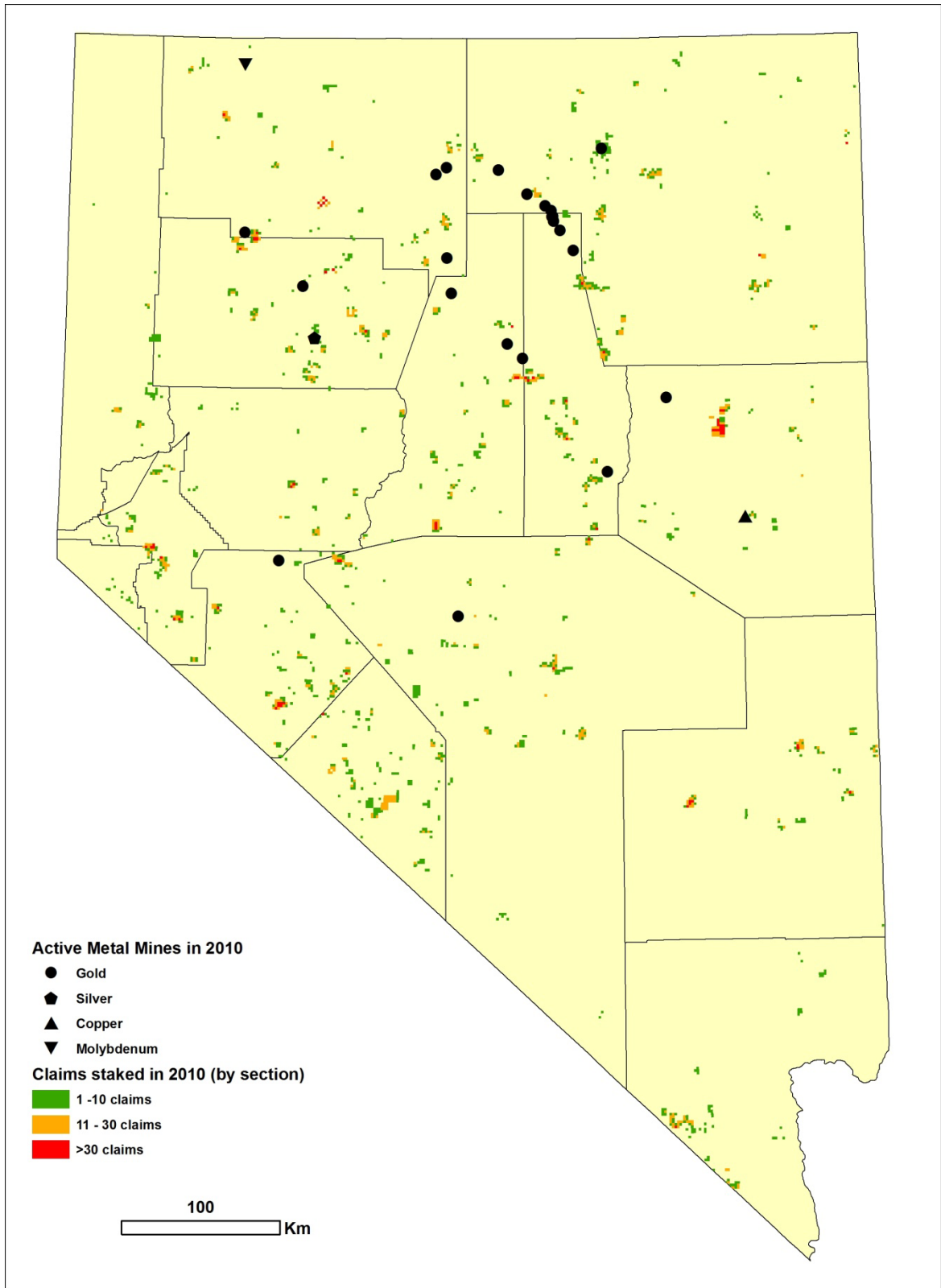
**Table 2. Breakdown of 2010 Drill Programs.**

	Major/Mid-Tiers	Juniors	Total
Major Drill Program	30	8	38
Minor Drill Program	7	54	61
Total	37	62	99

Major programs are arbitrarily defined as ≥25 drill holes.



**Figure 1. Map showing distribution of active mining claims by township at the end of 2010. Source of data is the U.S. Bureau of Land Management's LR 2000 database.**



**Figure 2. Map showing distribution of active mining claims by township that were staked in 2010. Source of data is the U.S. Bureau of Land Management’s LR 2000 database.**

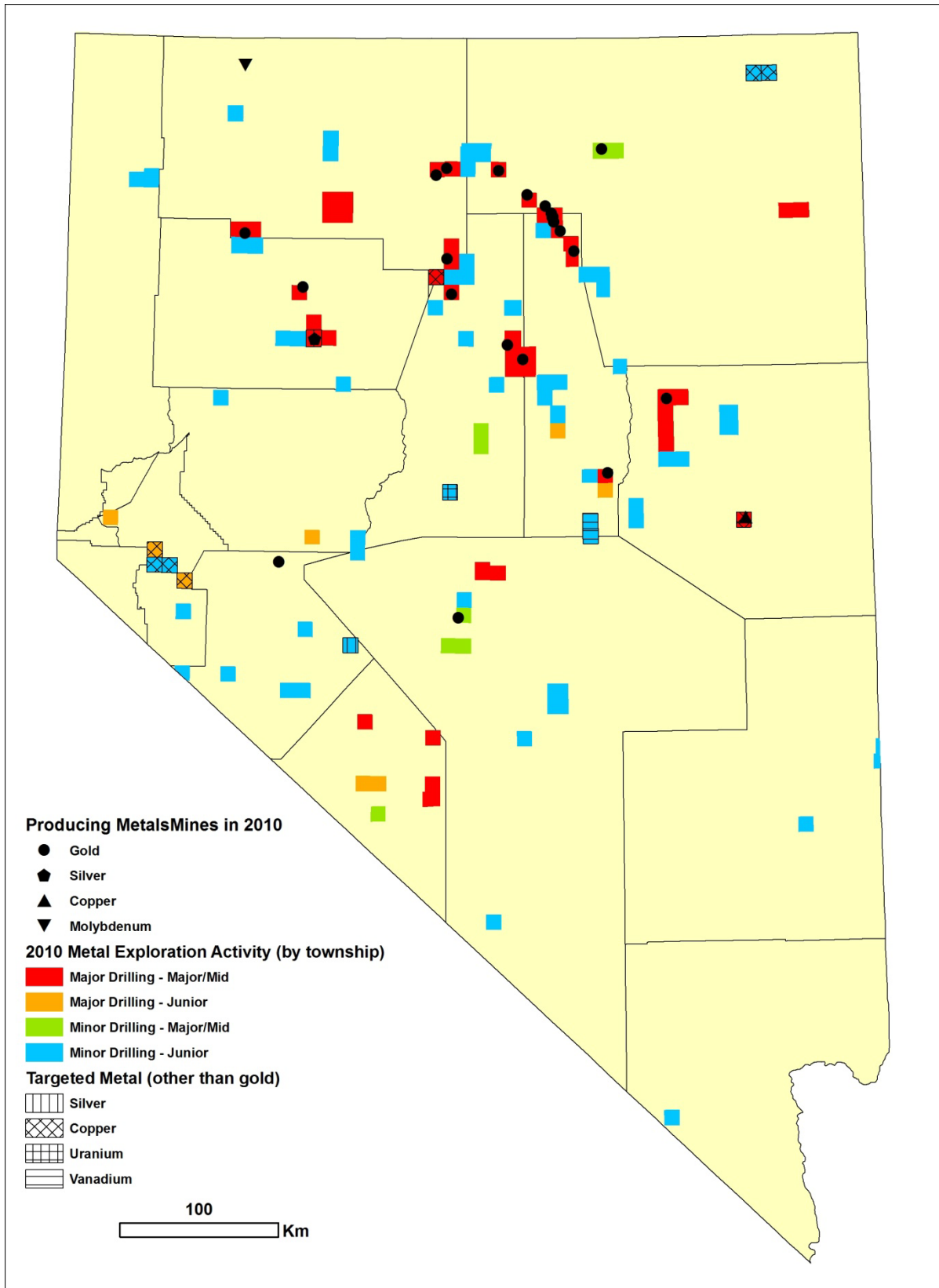


Figure 3. Map summarizing drilling and mine development activity by township in 2010.

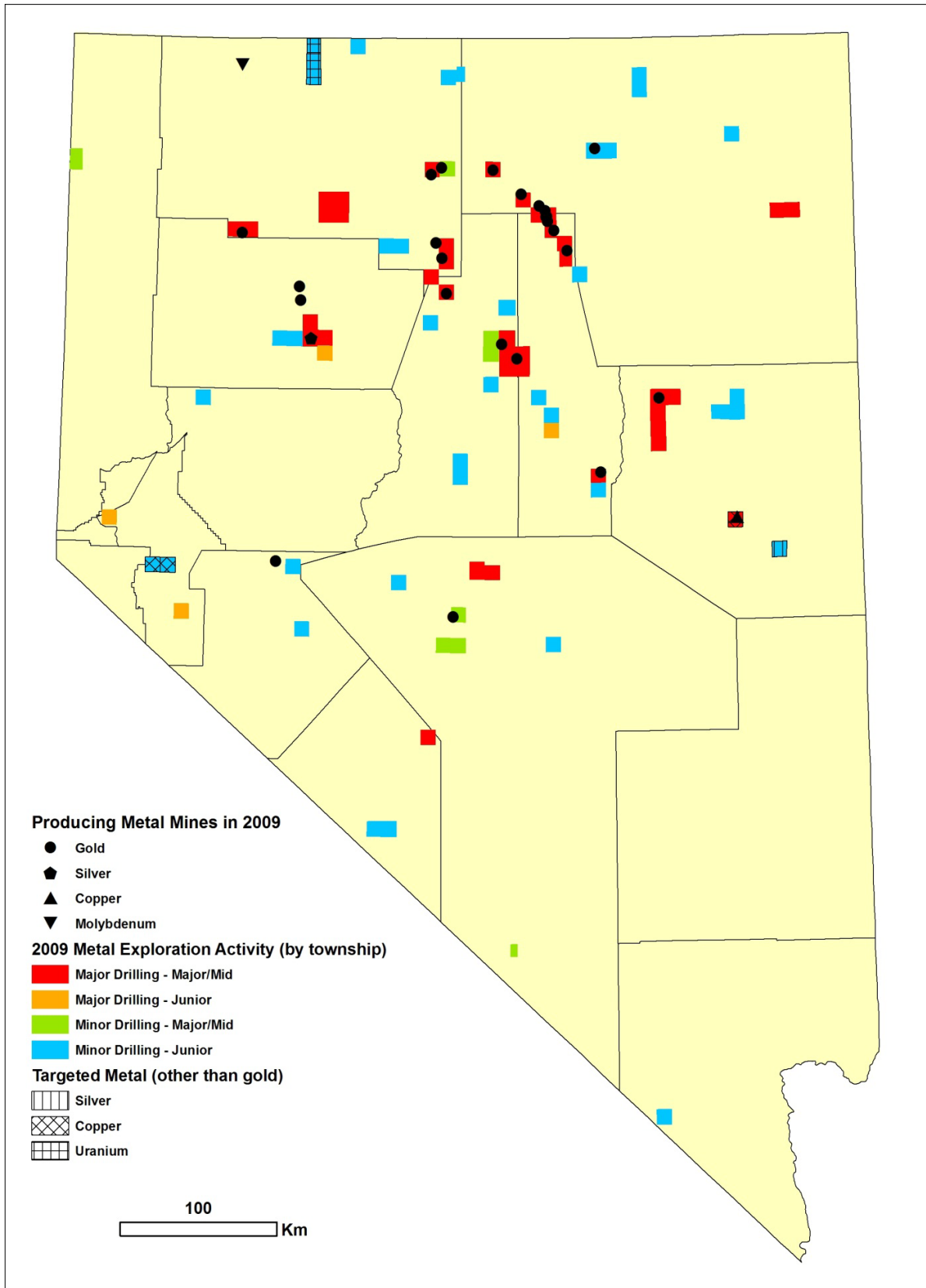


Figure 4. Map summarizing drilling and mine development activity by township in 2009.

## CHURCHILL COUNTY

### Bell Mountain District

**Bell Mountain.** Laurion Mineral Exploration Inc. drilled 56 reverse circulation holes totaling 14,240 feet. The program was designed to confirm and expand a previous resource estimate completed in 1991. Highlights of the drilling included 50 feet averaging 0.070 opt gold and 0.70 opt silver and 100 feet averaging 0.018 opt gold and 0.35 opt silver, which included 15 feet grading 0.076 opt gold and 1.10 opt silver. Based on the 2010 drill program and previous drilling, Laurion released a new resource estimate in early 2011. The measured and indicated resource is 10,760,000 tons grading 0.015 opt gold and 0.514 opt silver for a total of 165,018 ounces of gold and 5,533,907 ounces of silver. (Laurion Mineral Exploration Inc. press release, 12/16/2010; Laurion Bell Mountain 43-101 Report, 5/3/2011; Laurion website, [www.laurion.ca](http://www.laurion.ca))

### Jessup District

**Jessup.** Rye Patch Gold Corp. drilled 12 holes, totaling 8,123 feet. Drilling at the North Jessup deposit confirmed that breccia zones have preferentially higher grades. The best drill intercept was 85 feet averaging 0.029 opt gold, which included 10 feet grading 0.11 opt. The breccias appear to be oriented along a west-northwest fault zone and associated margins of grabens. Drilling identified a new zone of mineralization nearly 700 feet from and possibly parallel to the San Jacinto deposit. (Rye Patch Gold Corp. press release, 11/23/2010).

## CLARK COUNTY

### Goodsprings District

**Boss.** Boxxer Gold Corp. drilled three core holes totaling 4,219 feet. The first hole was drilled to test a geophysical target—a strong chargeability and low resistivity anomaly. The hole went through 660 feet of Quaternary sediments and then intersected limestone. The cause of the chargeability anomaly was not explained. The second and third holes were drilled to test another chargeability anomaly and intersected five multi-element geochemical anomalies that range from 30 to 100 feet in thickness. Individual assays ranged up to 0.075 ppm gold and 23 ppm silver. (Boxxer Gold Corp. Management and Discussion Analysis, 12/31/2010; Boxxer Gold Corp. website, [www.boxxergold.com](http://www.boxxergold.com))

## ELKO COUNTY

### Bootstrap District

**South Arturo.** Barrick Gold Corp. continued to grow the South Arturo deposit (60% Barrick, 40% Goldcorp Inc.) with another major drill program. The program tracked mineralization northeastward from South Arturo through the Hinge zone and to the Button Hill zone. Some of the better intercepts were from Button Hill and included 100 feet averaging 0.432 opt gold and 90 feet grading 0.241 opt gold. Mineralization occurs at the top of the Bootstrap Limestone. The total resource and reserve at the end of 2010 stood at just under three million ounces of gold. Barrick's plans for South Arturo call for expansion of the mined-out Dee open pit into a much larger open pit with a footprint of just under a square mile. In June of 2010 Barrick submitted a proposal for the Arturo Mine Project Plan of Operations. (E. Cope, Barrick Gold Corp., oral commun. 12/14/2010; Barrick Gold website, [www.barrick.com](http://www.barrick.com))

### Carlin District

**Carlin.** Evolving Gold Corp. continued to drill its Carlin/Humboldt project south of the town of Carlin, where it discovered deep high-grade gold mineralization in 2009. Evolving Gold expanded the project in 2010 by staking an additional 300 claims, mainly to the southeast across the Humboldt River toward Palisade. The project now has claims that cover a 56 square mile area, mostly in the northeast Piñon Range. The Carlin portion of the project covers about one third of the area and is subject to an agreement with Newmont Mining Corp., who has back-in rights up to 70%. The Humboldt portion of the project, which surrounds the Carlin portion, is controlled entirely by Evolving Gold.

In 2010, Evolving Gold drilled 5 diamond drill holes totaling 21,574 feet, four on the Carlin portion of the project and one on the Humboldt part. Holes CAR-008 and CAR-009 were collared 670 feet northwest and 600 feet southeast of hole CAR-007, which was the hole that discovered in 2009 deep high-grade gold northwest of Newmont's inactive Rain Mine. CAR-008, drilled to 3,930 feet, intersected the same sequence of favorable host rocks encountered in CAR-007 as well as anomalous gold intervals from 2,077 feet to the bottom of the hole. CAR-009, drilled to 4,291 feet, encountered the same favorable stratigraphic units and intercepted 564 feet grading 0.009 opt gold from 3,727 feet to the bottom of the hole. This intercept had a 37-foot interval averaging 0.036 opt gold, which included 3.6 feet grading 0.227 opt gold. The third drill hole on the Carlin portion, EVGQ-001, was completed to a depth of 4,606 feet on a new target about 3 miles northwest of CAR-008. This hole

encountered the same favorable host rocks as in the other holes along with anomalous gold and associated trace elements in the bottom 524 feet of the hole. Hole EHB-003, collared at the southeast end of the Carlin area, was drilled to 4,449 feet, where it also intersected favorable host rocks and anomalous gold and trace elements.

Hole EHB-002, the only hole drilled on the Humboldt portion of the project, went down to a depth of 4,298 feet. Anomalous gold, arsenic, and antimony were encountered between 3,658 and 3,773 feet. In addition two reverse circulation pre-collar holes were drilled in the western part of the Humboldt block, which will be deepened by diamond drilling in 2011. (Evolving Gold Corp. press releases 6/30/2010, 7/27/2010, 1/24/2011; Evolving Gold Corp. 2010 year-end Management and Discussion Analysis; Evolving Gold Corp. website, [www.evolvinggold.com](http://www.evolvinggold.com); BLM LR2000 database)

**Carlin Vanadium.** EMC Metals Corp. released a 43-101 compliant resource estimate on its vanadium project located on the northwestern flank of the Piñon Range near Cole Creek. The inferred resource is 8 million tons grading 0.515 wt% V<sub>2</sub>O<sub>5</sub>. The resource is based on 152 rotary holes drilled by Union Carbide Corporation in 1967. The vanadium mineralization occurs in a 50-foot-thick section of black shale in the Devonian Woodruff Formation, which is a formation that hosts vanadium mineralization elsewhere in Nevada. (EMC Metals Corp. Carlin Vanadium Project, 43-101 Report, 4/30/2010; EMC Metals website, [www.emcmetals.com](http://www.emcmetals.com))

### Contact District

**Contact.** In 2010, International Enxco Ltd. re-examined its 2009 pre-feasibility, and improvements were made to the block model, resulting in an enhancement of the mineral resource estimate. The updated changes resulted in a 161% increase in mineable copper and improvements to a cash flow model of 20.2% internal rate of return, and a net present value of \$44.5 million, using a 10% discount rate. In June 2010, Enxco announced an updated proven and probable reserve of 54,149,000 million tons grading 0.293%, for a total of 316,900,000 million pounds of copper, using a cut-off grade of 0.1% copper.

At the end of 2010, Enxco drilled 3 holes on the northeast corner of the deposit area to test a skarn target, along a potential future mine conveyor route. The first hole, EN-154, intersected mineralized skarn from 854 to 995 feet, grading 0.49% copper, with the upper 57 feet grading 0.89% copper and 8.2 g/t silver. The second hole, EN-155, was lost at 450 feet. In hole EN-156, copper-molybdenum mineralization was encountered in altered intrusive rock from 1,132 feet to the bottom of the hole at

2,067 feet. (International Enxco Ltd. Management and Discussion Analysis, 12/31/2010, 9/30/2011)

### Eastern Elko County

**Angel Wing.** Ramelius Resources Ltd. (joint venture with Miranda Gold Corp.) completed 1,500 feet of drilling in five holes. Of particular interest was hole AW10-03, which was drilled on the DaVinci vein, where surface channel sampling had returned 10 feet of 0.736 opt gold and 2.6 opt silver. The hole intersected 5 feet of 0.118 opt gold and 5 feet of 0.111 opt gold. The target is steeply dipping quartz-calcite-adularia "bonanza" veins that occur in Triassic limestone. (Miranda Gold Corp. news release, 11/29/2010; Miranda Gold website, [www.mirandagold.com](http://www.mirandagold.com))

### Gold Circle District

**Jake Creek.** Evolving Gold Corp. drilled 2 holes to test geophysical and mercury vapor anomalies on their Jake Creek property in the Northern Nevada Rift west of Midas. One of the holes intersected 150 feet averaging 0.028 opt gold beginning at a downhole depth of 690 feet. The intercept included 5 feet grading 0.33 opt gold. Beginning at a depth of 836 feet, the hole intercepted Paleozoic sedimentary rocks including carbonates, interpreted to be lower plate to the Roberts Mountain thrust. The Paleozoic rocks contain anomalous concentrations of trace elements and gold (10-300 ppb). The other hole intersected multiple zones of anomalous gold starting at downhole depths of 1,245 feet to the bottom of the hole at 2,295 feet. At the top of the hole, sinter with mercury concentrations up to 233 ppm were intersected immediately below unaltered, post-mineral rhyolite. The highest gold grade over 5 feet was 0.011 opt gold. Evolving Gold interpreted the mineralization at Jake Creek as being confined to an early sequence of Miocene volcanic rocks, buried by post-mineral volcanic units. (Evolving Gold Corp. press release, 11/18/2010).

**Midas.** Newmont Mining Corp. spent about \$12.5 million at its Midas gold-silver mine, mainly on an underground exploration drilling program. About 3,200 feet of exploration drifting was completed, and up to four underground core rigs were operating in 2010. Drill stations were up to 2,000 feet away from the current production workings. Mining at Midas will come to an end in 2012, if no more gold and silver reserves are added. (Elko Daily Free Press Fall 2010 Mining Quarterly)

### Independence Mountains District

**Jerritt Canyon.** Yukon-Nevada Gold Corp. re-started underground mining at the Smith mine in 2010. A total of 45,302 ounces were delivered to the

mill from Smith mine in 2010 at a total cost of \$29.2 million. Total production from mining, processing of ore purchased from Newmont, and the processing of stockpiles amounted to 65,104 ounces of gold in 2010. The 9,770 ounces of gold produced in 2009 were solely from stockpiles. The mine experienced no shut-downs in 2010. Yukon-Nevada spent \$800,000 on exploration, mainly on underground drilling at the Smith mine—eight core holes totaling 8,126 feet and three reverse circulation holes totaling 630 feet. The best intercepts were 23 feet averaging 0.324 opt gold and 39 feet grading 0.201 opt gold. These intercepts helped extend the previously productive Zone 3 structure at Smith mine about 300 feet to the southeast. Proven and probable reserves at the end of 2010 stand at 4,365,800 tons grading 0.164 opt gold for a total of 717,000 ounces of gold. Most of the remaining reserves occur in the Smith and SSX mines. (Yukon-Nevada Gold Corp. press releases, 9/7/2010, 1/24/2011; Yukon-Nevada Gold Management Discussion and Analysis, 12/31/2010; Yukon-Nevada Gold Jerritt Canyon Property 43-1-1 Report, 6/28/2011)

#### **Ivanhoe District**

**Hollister.** Great Basin Gold Ltd. continued trial mining at its underground Hollister Mine. Over 105,000 ounces of gold were produced and nearly 579,000 ounces of silver. Recoveries were 82% for gold and 60% for silver. The first gold was poured in April at its refurbished Esmeralda mill. It completed 44,414 feet of underground exploration and infill core drilling and 41,108 feet of stope delineation core drilling. A new measured and indicated resource estimate was released in August—1,121,000 tons grading 1.305 opt gold and 10.35 opt silver at a cut-off grade of 0.25 opt gold. Progress continued to be made on the environmental impact study required for full-scale mining.

Underground drilling is also testing “blanket” mineralization above the Tertiary unconformity. Channel sampling of new stope exposures along and just above the unconformity between the Ordovician basement rocks and the overlying Tertiary volcanic rocks have encountered grades as high as 2,560 opt gold over 10 feet. The very high-grade zones are related to the propagation of the Clementine vein (#18 structure) upwards into the Tertiary volcanic strata, and upwards to the surface, creating a geothermal vent, close to the historical Clementine mercury mine. Potential exists to test other “blanket-style” zones in similar structural setting at the top of all mineralized veins at Hollister. No surface exploration drilling was completed in 2010. (Great Basin Gold Ltd. Management Discussion and Analysis, 12/31/2010; Great Basin Gold website, [www.greatbasingold.com](http://www.greatbasingold.com))

**Sheep Creek.** Evolving Gold Corp. informed Newmont Mining Corp. that it would no longer pursue its interest in the Sheep Creek or Cottonwood Creek mineral properties. (Evolving Gold Corp. 2010 year-end Management and Discussion Analysis).

#### **Lime Mountain District**

**Deep Creek.** Ashburton Ventures Inc. drilled five core holes totaling 2,460 feet at its Deep Creek project located on the west flank of Wilson Peak in the southern Bull Run Mountains. Mineralization is associated with epithermal(?) quartz veins hosted by Paleozoic and Proterozoic sedimentary rocks. The best intercept was 6.5 feet grading 0.114 opt gold. Visible gold was recognized in the quartz veins both in drill core and surface samples. The drilling was focused on the Range Front Structure target. Drilling on the same target in the mid-1980s by Franco-Nevada, who called the target Millionaria, produced an “estimated reserve” of 477,000 ounces of gold in 7.4 million tons and a resource of 70,000 ounces of gold in 1.1 million tons. (Ashburton Ventures Inc. Management Discussion and Analysis, 12/31/2011; Ashburton website, [www.ashburtonventures.com](http://www.ashburtonventures.com))

#### **Pequop District**

**Long Canyon.** Fronteer Gold Inc. and joint venture partner AuEx Ventures Inc. spent nearly \$25 million in 2010 developing the Long Canyon gold deposit. Work consisted of over 225,000 feet of infill and exploration drilling (both diamond drill core and reverse circulation), metallurgical testing, and the purchase of additional surface and water rights. Fronteer, formerly known as Fronteer Development Group Inc. changed its name to Fronteer Gold Inc. in October right before its acquisition of AuEx's 49% share of the Long Canyon project, and AuEx's 49% share of its adjacent West Pequop project. AuEx's remaining properties were spun off into a new company called Renaissance Gold Inc. The cost of Fronteer's acquisition of AuEx was approximately \$267.8 million. Subsequently, in April 2011, Newmont Mining Corp. acquired Fronteer Gold Inc. in a deal valued at approximately \$2.3 billion. Newmont acquired Long Canyon, Fronteer's 49% share of West Pequop, Northumberland, Sandman, and several other Fronteer properties in eastern Nevada. Fronteer's remaining properties were spun off into a new company called Pilot Gold Inc.

Fronteer advanced the Long Canyon project on many key fronts in 2010. It completed the purchase of the adjacent Big Springs Ranch for \$12 million, which secured 37,540 acres of surface rights critical for access, nearly all the water rights appurtenant to the ranch, the mineral rights on the ranch, and dwellings and improvements. The

acquisition of the ranch should significantly help speed up the completion of development activities.

Metallurgical test work in 2010 confirmed that the gold mineralization at Long Canyon is amenable to low-cost conventional heap-leach processing. Column leach gold recoveries for high- and medium-grade samples (>0.037 opt gold) averaged 85% to 88% for various crushed size fractions.

The drilling continued to intersect wide intervals of high-grade gold mineralization along the northeast extension of the Long Canyon deposit. Highlights include 145 feet averaging 0.296 opt gold (including 81 feet grading 0.449 opt gold), 129 feet averaging 0.305 opt gold (including 50 feet grading 0.488 opt gold), and 70 feet averaging 0.479 opt gold (including 19 feet grading 1.146 opt gold). The deposit at the end of 2010 was nearly 2 miles long. The drilling also identified a new, parallel zone at the northeastern end, where 155 feet averaging 0.187 opt gold (including 25 feet grading 0.725 opt gold) were encountered. In addition, drilling 660 feet southwest of the resource area intersected 30 feet grading 0.091 opt gold. Also, drilling along the sparsely drilled western edge of the resource was tested, resulting in an intercept of 90 feet averaging 0.287 opt gold (including 56 feet grading 0.427 opt gold). Significant intercepts in 2010 continued to be in oxidized rock, and the resource remains open in most directions.

Based on drilling through 2010, Fronteer released a new resource estimate in early 2011 before the Newmont acquisition. The measured and indicated resource is 20,250,000 tons grading 0.069 opt gold for a total of 1,324,000 ounces—almost double the previous year's estimate. Over 99% of that resource is in the indicated class. The inferred resource is 12,313,000 tons grading 0.065 opt gold for a total of 803,000 ounces—a 45% increase over the previous year. (Fronteer Gold Inc. press releases, 6/19/2010, 8/18/2010, 11/8/2010, 11/15/2010, 11/30/2010, 12/13/2010, 1/12/2011, 1/18/2011, 4/6/2011; Fronteer Gold 2010 Management Discussion and Analysis 9/30/2010, 12/31/2010; Fronteer Gold Long Canyon Technical Report, February, 2011)

**Summit.** Agnico-Eagles Mines Ltd. (joint venture with Columbus Gold Corp.) drilled three core holes totaling 6,392 feet. Anomalous gold values were reported in the drill results from a shear zone stratigraphically above a known favorable horizon of gold mineralization, and from a footwall of a bedding-parallel structure. An anomalous mercury zone was encountered in an interpreted karst breccia. (Columbus Gold Corp. Management Discussion and Analysis, 12/31/2010)

**West Pequop.** Agnico-Eagle Mines Ltd. (joint venture with AuEx Ventures Inc.) released West

Pequop's first resource estimate, which encompassed the Acrobat, Section 34, and Mountain Top Deposits, based on drilling through 2009. The total indicated resource is 1,349,700 tons grading 0.0475 opt gold, for a total of 64,138 ounces of gold. The inferred resource is 6,055,500 tons grading 0.0411 opt gold, for a total of 249,441 ounces. Agnico-Eagle spent approximately \$7 million on West Pequop in 2010, mainly on drilling (~50,000 ft). Fronteer Gold Inc. became Agnico Eagle's joint venture partner after Fronteer's acquisition of AuEx in late 2010. Then in early 2011, Newmont Mining Corp. became Agnico-Eagle's partner after Newmont acquired Fronteer. (Agnico Eagle Mines Ltd. Management Discussion and Analysis, 12/31/2010; AuEx Ventures Inc. Management Discussion and Analysis, 6/30/2010; AuEx Ventures Inc. West Pequop Gold Exploration Project 43-101 Report, 7/15/2010)

### Railroad District

**Railroad.** Gold Standard Ventures Corp. drilled 16 holes, both reverse circulation and core, totaling 18,330 feet. Gold Standard acquired the Railroad project from Royal Standard Minerals Inc. in 2009 for \$1.2 million. Most of the drilling focused on the Bullion fault zone. Hole RR10-8 drilled a new zone of mineralization along the fault zone, a few thousand feet north-northeast of the previously drilled POD and East Jasperoid zones. Hole RR10-8 hit three mineralized zones. The uppermost intersection was 20 feet grading 0.585 g/t gold, starting at a depth of 393 feet, within a barite-bearing jasperoid breccia with mudstone of the Webb Formation. The middle intercept was 105 feet averaging 0.038 opt gold, starting at 744 feet, within a zone of barite-alunite-bearing, silicified, brecciated Chainman Shale. The deepest intercept was 140 feet grading 0.035 opt gold, starting at 1,120 feet, within a zone of mudstone and dolomite collapse breccia developed along the contact between the Webb formation and the underlying Devils Gate Limestone. Hole RR10-11, drilled about 1,000 feet south of hole RR10-8, intersected 35 feet grading 0.029 opt gold, starting at 435 feet, and 270 feet averaging 0.012 opt gold, starting at 1,015 feet. Hole RR10-16, drilled about 1,000 feet north of hole RR10-8 intercepted 20 feet grading 0.033 opt gold, starting at 875 feet. (Gold Standard Ventures Corp. Management Discussion and Analysis, 12/31/2010; Gold Standard Ventures website, [www.goldstandardv.com](http://www.goldstandardv.com))

### Snowstorm Mountains District

**Goldstorm.** West Kirkland Mining Inc. (joint venture with Mexivada Mining Inc.) drilled two core holes. The first hole, an angle hole, encountered a zone of low-sulfidation epithermal mineralization from

downhole depths of 207 to 410 feet. Gold assays of up to 0.268 opt gold and 2.12 opt silver were intercepted. The second hole, drilled down to 1,787 feet, did not intercept its intended target—a west-dipping reverse fault. The hole bottomed in Tertiary volcanic rocks, and no significant zones of gold mineralization were encountered. (Mexivada Mining Inc. website, [www.mexivada.com](http://www.mexivada.com))

## ESMERALDA COUNTY

### Divide District

**Hasbrouck Mountain.** Allied Nevada Gold Corp. drilled 14 core holes totaling 7,615 feet, mainly to verify gold grades from previous drilling and for metallurgical testing. The best intercept was 394 feet grading 0.046 opt gold and 1.07 opt silver. (Allied Nevada Gold Corp. press release 6/17/2010; Allied Nevada Gold SEC Form 10-K, 12/31/2011)

**Tonopah Divide.** Centerra Gold Corp. (joint venture with Tonogold Resources Inc.) drilled 36 reverse circulation holes totaling 33,790 feet. Significant grades and thickness of mineralization were drilled over a strike length of 1,300 feet to depths of 400 feet in the Combination fault zone. This mineralization appears to merge to the southeast into the previously drilled gold mineralization in the North Monte Cristo area. The best intercept was 75 feet grading 0.037 opt gold at a depth of 475 to 500 feet. At the Ruby Hill zone on the southwest end of the property, drilling encountered 245 feet grading 0.016 opt gold between depths of 240 to 485 feet. That intercept included 25 feet averaging 0.049 opt gold. Most of the higher grade material is in oxidized Fraction Tuff. Since the project began in 2008, Centerra has drilled 79 holes totaling 74,070 feet. (Tonogold Resources Inc. press releases, 11/4/2010, 3/25/2011; Tonogold Resources Inc. website, [www.tonogold.com](http://www.tonogold.com))

### Gilbert District

**Castle Peak.** In 2010 Kinross Gold Corp. drilled 35 reverse circulation holes on the large claim block that it staked in 2009. Grades of greater than 0.003 opt gold were encountered over at least 20 feet in 23 of the holes. Gold mineralization is hosted in Miocene rhyolite and overlying andesite that has undergone quartz-illite alteration related to sheeted veins and stockworks of quartz. (Golden Gryphon Corp. press release, 11/15/2011)

**Gold Summit.** In early 2010, Gold Summit Corp. released an updated resource estimate for its Monte Cristo deposit, using less restrictive geologic and economic parameters than those applied to the previous resource estimate it released in 2006. The

inferred resource for the McLean Lode, at a cut-off grade of 0.02 opt Au, is 2,545,980 tons grading 0.11 opt gold for a total of 254,062 ounces of gold. The inferred resource for the Upper Zone at the same cut-off grade is 888,685 tons grading 0.04 opt for a total of 35,547 ounces of gold. The separately estimated inferred silver resource for the McLean Lode, at a cut-off grade of 0.36 opt silver, is 999,966 tons grading 1.27 opt silver for a total of 1,269,957 ounces of silver. The inferred silver resource for the upper zone is 123,948 tons grading 0.78 opt silver for a total of 96,679 ounces. Later in 2010 Gold Summit merged with Crown Minerals Inc. to form Crown Gold Inc. (Crown Gold Inc. Management Discussion and Analysis, 12/31/2010; Gold Summit Corp. Monte Cristo Project 43-101 Report, 1/25/2010)

### Goldfield District

**Goldfield.** In February of 2010, International Minerals Corp. acquired Metallic Ventures Gold Inc. for \$24 million and 8.5 million shares. With the acquisition came the Goldfield and Converse projects. Soon after the acquisition, International Minerals began a major aggressive drill program at Goldfield. By the end of the year it drilled 121 reverse circulation holes totaling 87,270 feet. The objective of the program was to expand the resource in the Goldfield Main area, one of the three current resource areas in the Goldfield district that International Minerals controls—the other two being Gemfield and McMahan Ridge. Gold mineralization in the Goldfield Main area occurs primarily as narrow, high-grade replacement veins (historically called ledges) within tabular, gently dipping, lower grade zones. The majority of Goldfield's historic production came from these veins in the Goldfield Main area. More recent open pit production from the Red Top, Jumbo, and Combination pits was sourced from near-surface lower grade zones between the mainly mined out high-grade ledges. The resource that International Minerals is trying to delineate and expand occurs in the area between the three pits. Highlights from the drilling include 115 feet grading 0.093 opt gold, 60 feet averaging 0.274 opt gold, 70 feet grading 0.201 opt gold, and 60 feet grading 0.123 opt gold. Based on drilling through 2010, International Minerals released a new resource estimate for Goldfield Main in February of 2011. At a cut-off grade of 0.012 opt, the indicated resource is 9,424,000 tons grading 0.044 opt gold, for a total of 421,000 ounces of gold. The inferred resource is 7,267,000 tons grading 0.050 opt gold for a total of 360,000 ounces. (International Minerals Corp. press releases, 2/26/2010, 8/25/2010, 10/7/2010, 12/6/2010, 2/1/2011; International Minerals Management Discussion and Analysis 12/31/2010).

**Goldfield West.** TAC Gold Corp. drilled 2 deep core holes at its Goldfield West project in 2010, one near the old Nevada Eagle mine on the north end of its claim block, and the other at the south end. Several thick intercepts averaging up to 0.019 opt gold and 0.128 opt silver were encountered. (TAC Gold Corp. Management Discussion and Analysis, 3/31/2011; TAC Gold Goldfield West 43-101 Report, 10/23/2011)

### **Palmetto District**

**Oasis.** Centerra Inc. (joint venture with Redstar Gold Corp.) drilled 16 reverse circulation holes totaling 15,890 feet on its Oasis project, a porphyry gold system with characteristics similar to the porphyry gold deposits in the Maricunga belt of northern Chile. The drilling covered a broad area with a diameter of about 3,000 feet. The holes were spaced about 900 feet apart, and results indicated mineralization was open in several directions. Eleven of the 16 holes yielded significant intercepts of gold mineralization. Highlights included 315 feet grading 0.0076 opt gold, 25 feet averaging 0.023 opt gold, and 45 feet grading 0.014 opt gold, which included 10 feet grading 0.031 opt gold. (Redstar Gold Management Discussion and Analysis, 12/31/2010).

### **Silver Peak District**

**Mineral Ridge.** Scorpio Gold Corp. (joint venture with Golden Phoenix Minerals Inc.) drilled 31 reverse circulation holes totaling 6,725 feet in 2009. Also in 2009, ten angled core holes totaling 2,026 feet were drilled. The drill program was designed to confirm previously reported mineralization at the Drinkwater, Mary, and Brodie deposits, and to build a database in compliance with standards for resource estimation. In addition, the program included condemnation holes to assess where waste rock from planned open pit mining could be placed. Based on drilling through 2009, Scorpio released a new resource estimate for the Drinkwater and Mary deposits in May of 2010. The measured and indicated resource is 4,697,000 tons grading 0.047 opt gold for a total of 221,000 ounces of gold. The inferred resource is 3,793,000 tons grading 0.036 opt gold for a total of 136,000 ounces. In March 2011, Scorpio finalized the acquisition of a 70% interest in Mineral Ridge by paying Golden Phoenix \$3.75 million in cash and the issuance of about \$5.8 million worth of common shares.

In 2010, Scorpio drilled 66 reverse-circulation holes totaling 12,444 feet. In the first round of this drilling, 28 holes were drilled at Drinkwater and 2 holes were drilled over the Mary underground mine in the area of the proposed Mary open pit. The objective was to expand and tightly define the resource at Drinkwater and Mary. Thirteen

of the Drinkwater holes intersected significant thicknesses of mineralization, ranging from 55 feet averaging 0.220 opt gold to 25 feet grading 0.040 opt. In the second round of drilling at Drinkwater, Mary, and Brodie, 16 of 33 holes encountered significant intercepts, ranging from 20 feet grading 0.096 opt gold to 40 feet averaging 0.033 opt gold. The remaining three holes were drilled in an area east of the proposed Mary pit, in an area known as Last Chance. Two holes intersected significant mineralization, including 65 feet grading 0.022 opt gold and 15 feet grading 0.041 opt gold. (Scorpio Gold Corp. Management Discussion and Analysis, 12/31/2010; Scorpio Gold Technical Report on the Initial Mineral Resource Estimate for the Mineral Ridge Deposit, 5/31/2010)

## **EUREKA COUNTY**

### **Antelope District**

**Afgan.** NV Gold Corp. drilled 25 reverse circulation holes totaling 7,726 feet. The first hole, AF10-01, had the best intercept of the program, encountering 60 feet averaging 0.12 opt gold, which included 25 feet grading 0.16 opt. This hole was sited to offset a historical hole that intersected a down-dropped structural block of higher-grade mineralization that remained open to the south. Hole AF10-02 yielded 179 feet grading 0.012 opt gold, at depths slightly greater than historic intercepts, suggesting potential at depth. Holes AF10-05, 10-06, 10-07 and 10-08 were drilled in areas where historic drilling had encountered only weak mineralization relative to the main zones of mineralization. All four holes intersected very shallow mineralization generally better than the historic holes, implying the area should be re-assessed. The Afgan project contains a semi-continuous zone of gold mineralization that lies along the contact of thinly bedded siltstones of the Webb Formation with the underlying Devils Gate Limestone. This contact dips easterly at shallow to moderate angles, with the bulk of the mineralization occurring in brecciated Webb sediments that are commonly altered to jasperoid. (NV Gold Corp. press release, 12/16/2010; NV Gold website, [www.nvgoldcorp.com](http://www.nvgoldcorp.com))

**Gold Pick/Gold Ridge/Cabin Creek.** US Gold drilled 58 holes, totaling 37,887 feet at its Gold Bar Complex. Most of the drilling focused on the extensions to the Gold Ridge and Cabin Creek mineralization. At Cabin Creek the best hole had an intercept of 90 feet that averaged 0.133 opt gold, which included 40 feet grading 0.219 opt gold. Unexpectedly, 200 feet deeper, that hole encountered a new zone. This lower zone graded 0.033 opt gold over 240 feet. Drilling to expand this zone to the east and west encountered narrower

intercepts of lower grade. Drilling at North Gold Ridge continued to expand mineralization westward. The best intercepts were 120 feet grading 0.058 opt and 125 feet grading 0.052 opt. (US Gold Corp. press releases 9/13/2010, 12/6/2010; US Gold Corp. 2010 SEC Form 10-K, 12/31/2010; US Gold website, [www.usgold.com](http://www.usgold.com))

**Pete Hanson.** Bravada Gold Corp. drilled one core hole to a depth of 1,939 feet. The hole intersected the projected host rocks with strong alteration and anomalous concentrations of gold and associated trace elements. (Bravada Gold Corp. Management Discussion and Analysis, 12/31/2011; Bravada Gold website, [www.bravadagold.com](http://www.bravadagold.com))

**Red Canyon.** Montezuma Mines Inc. (joint venture with Miranda Gold Corp.) drilled 8 reverse circulation holes totaling 11,260 feet. The objective of the drill program was to expand upon results of a 2009 core hole, MR09-05C, which intersected 119 feet grading 0.152 opt gold at the Ice prospect. The 2010 drill program tested geologic, geochemical and geophysical targets southeast of MR09-05C in an area of complex faulting and folding. The best results were in MR10-01, a vertical hole drilled 1,660 feet southeast of MR09-05C, where two 20-foot zones of 0.05 opt gold were encountered between depths of 775 to 795 feet and depths of 965 to 985 feet. The remaining seven drill holes did not intersect gold mineralization exceeding 0.01 opt gold. (Miranda Gold Corp. Management and Discussion Analysis, 11/30/2010).

#### **Cortez District**

**Red Hill/Lower Horse Canyon.** Several drill rigs were present throughout 2010 on Barrick Gold Corp.'s discovery near Red Hill in lower Horse Canyon. Drilling seemed to extend from Red Hill into the ET Blue area. No results were released in 2010.

#### **Eureka District**

**East Archimedes/Ruby Hill.** Barrick Gold Corp.'s Bullwhacker gold deposit, which was discovered in 2009, continued to grow in 2010. It is located to the west of the Archimedes open pit within the antiform that runs along Mineral Ridge. The mineralization, about 750 feet below the surface, occurs in the Hamburg Dolomite near its upper contact with the Dunderberg Shale, a contact that also hosts gold mineralization in the Lookout Mountain deposit in the southern part of the Eureka district. In 2010, the Ruby Hill mine produced 81,382 ounces of gold from ore mined from the East Archimedes deposits with an average grade of 0.038 opt gold. The total cash cost was \$535 an ounce, up from \$243 in 2009. (E.

Cope, Barrick Gold Corp., oral commun. 12/14/2010; Barrick Gold website, [www.barrick.com](http://www.barrick.com))

**Signal.** Bravada Gold Corp. drilled two deep core holes totaling 4,167 feet. The holes intersected the targeted Devonian host rocks, locally strong alteration, and anomalous concentrations of gold and associated trace elements. (Bravada Gold Corp. press release, 7/26/2011; Bravada Gold Management and Discussion Analysis, 1/31/2011; Bravada Gold website, [www.bravadagold.com](http://www.bravadagold.com))

**South Eureka.** In June, Timberline Resources Corp. acquired Staccato Gold Resources Ltd. After a Plan of Operations was approved by the Bureau of Land Management in late August 2010, Timberline embarked on an infill drill program to solidify the resources and provide further definition to the geologic model. Timberline completed 27,795 feet of reverse circulation drilling, mainly at South Lookout Mountain, to refine the geologic model and bring nominal drill spacing to 200-foot centers through Lookout Mountain and South Lookout Mountain resource areas. Better intercepts included 58 feet grading 0.35 opt gold, 330 feet averaging 0.031 opt gold and 235 feet grading 0.036 opt. Timberline also conducted a 7-hole, 7,000-foot core drilling program for metallurgical purposes. In early 2011, based on drilling through 2010, Timberline released a new resource estimate for Lookout Mountain and South Lookout Mountain—a measured and indicated resource of 13,640,000 tons grading 0.021 opt gold and containing 286,000 ounces of gold. (Timberline Resources Corp., SEC Form 10-Q, 12/31/2011; Timberline Resources Lookout Mountain Project, 43-101 Report, 2/11/2011)

#### **Gibellini District**

**Gibellini.** Rocky Mountain Resources Corp. continued to advance its Gibellini vanadium project towards feasibility. It drilled 19 reverse circulation holes, designed to twin old holes, to test the limits of the ultimate pit at Gibellini Hill, and to condemn ground for facilities, leach pads, and waste dumps. It also drilled diamond core holes and sampled existing trenches for comprehensive metallurgical testing. In September it acquired the Del Rio property, a new vanadium project located eight miles to the south of Gibellini. The vanadium-bearing shale exposed on the Del Rio property is mineralized over 1,800 feet of strike and 1,200 feet of width. In January of 2011 Rocky Mountain changed its name to American Vanadium Corp.

In August of 2011, American Vanadium released a new resource estimate based on drilling through 2010. The measured and indicated resource at Gibellini Hill is 23,050,000 tons grading 0.29% V<sub>2</sub>O<sub>5</sub>. The resource is split fairly evenly between oxide and mixed oxide-reduced transitional material

that is enriched by about 50% over the oxide material. Within the measured and indicated resource at Gibellini Hill, the estimated proven and probable reserve at is 19,970,000 tons grading 0.30% V<sub>2</sub>O<sub>5</sub> for a total of 120 million pounds of V<sub>2</sub>O<sub>5</sub>. The proposed pit limits of the north-south oval-shaped pit will be approximately 2,275 feet by 1,650 feet, with a maximum depth of 180 feet. The oxide and transitional ores lend themselves to simple heap leach processing using sulfuric acid. The recoveries are estimated to be 60% for oxide ore and 70% for transitional ore over the life of the mine. In addition, an inferred resource at Louie Hill, located about a mile southwest of Gibellini Hill, was estimated to be 14,230,000 tons grading 0.17% V<sub>2</sub>O<sub>5</sub>. The resource at Louie Hill is almost entirely composed of reduced material. (American Vanadium Corp. press releases, 9/24/2010, 1/4/2011; American Vanadium Corp. Management Discussion and Analysis 11/30/2010, 2/28/2011; American Vanadium Gibellini Vanadium Project 43-101 report, 8/31/2011)

### Huntington Creek District

**Diamond Peak.** Kokanee Minerals Inc. drilled two core holes and then abandoned its option on the Diamond Peak property, which is controlled by Max Resource. The target at Diamond Peak, which is located at the north end of the Diamond Mountains, is polymetallic mineralization hosted in Paleozoic carbonate rocks. The best drill intercept was 25 feet grading 0.017 opt gold. (Max Resource Corp. Management Discussion and Analysis, 12/31/2010; Max Resource website, [www.maxresource.com](http://www.maxresource.com))

### Lynn District

**Boulder Valley.** Evolving Gold Corp. completed one diamond drill hole in late 2010. The hole, situated a few miles southwest of the Betze-Post open pit, intersected approximately 1,300 feet of volcanic overburden (Carlin Formation?) before entering upper plate chert and shale. Lower plate rocks believed to belong to the Popovich Formation were intersected at approximately 2,493 feet. At 2,871 feet, the hole re-entered upper plate rocks in which it remained to the end of the hole at 4,368 feet. The Boulder Valley project is subject to an agreement with Newmont Mining Corp., who has back-in rights up to 70%. (Evolving Gold Corp. 2010 year-end Management and Discussion Analysis; Evolving Gold Corp. website, [www.evolvinggold.com](http://www.evolvinggold.com))

**Northern Carlin Trend.** Newmont Mining Corp. carried out a huge exploration and development program on its properties in the northern Carlin trend. \$43 million, alone, was spent on underground development at the Leeville/Turf deposit, where 1.8 million ounces of reserves and 6 million ounces of resources were added. The drilling continues to

push the deposit to the north, east, and west. Some of the better drill intercepts included 148 feet averaging 0.55 opt gold, and 82 feet grading 0.35 opt. However, the mining and development is still facing hydrology challenges.

Newmont also continued its underground development on its Exodus project, the portal of which is in the Lantern open pit. In 2010, it completed about 60,000 feet of underground drilling at Exodus, and carried out some test mining and metallurgical mining. The Exodus deposit has been known since 1996. It saw lots of surface drilling from 2000 to 2003, at which point it was deemed too deep. Drilling resumed from 2004 to 2007, at which point Newmont decided the best way to explore it would be from underground. In 2007 a decline was started. The Exodus deposit occurs along the Castle Reef fault. It consists of two zones separated by approximately 1,400 feet. The main zone contains a resource of about 250,000 ounces at a grade of 0.27 opt gold and lies about 1,000 to 1,700 feet below the surface. Mineralization is hosted primarily by steeply dipping limestones of the Devonian Popovich Formation, as well as in Jurassic to Eocene(?) dikes and sills.

Underground development and exploration drilling also were carried out at the Pete-Bajo deposit, whose portal is in the Pete open pit. The underground Deep Post deposit was closed in December of 2009 when Barrick Gold Corp.'s backfill schedule called for waste rock to cover the Deep Post portal, which is in Barrick's Betze-Post open pit. Newmont's underground Deep Star mine has been closed for a few years, but saw limited activity in 2010. Reserves that were left unmined are being re-evaluated.

Open-pit mining by Newmont on the northern Carlin trend took place in 2010 in the North Lantern, Lantern, and Pete open pits. It completed mining at North Lantern in late April. The ore from the Pete open pit is very carbonaceous and all of it is being sent to the roaster. Newmont continued to wait for final approval from the Bureau of Land Management to resume mining and greatly expand the old Genesis open pit. (Elko Daily Free Press Summer 2010 Mining Quarterly; R. Reid, Newmont Mining Corp., oral commun., 12/14/2010; E. DeJonkheere, Newmont Mining Corp., Geological Society of Nevada 2010 Symposium abstract; Newmont 2010 year-end SEC Form 10-K; Newmont website, [www.newmont.com](http://www.newmont.com))

**Goldstrike.** Production at Barrick Gold Corp.'s Goldstrike mine decreased to 1,239,937 ounces of gold in 2010, down by 13% compared to 2009, primarily as a result of the planned partial shutdown of the autoclave facility which occurred during the second half of 2009 due to a decrease in ore suitable for acidic autoclaving, as well as mine sequencing that resulted in lower grade areas being

mined in the first half of 2010. Total cash cost was \$490 per ounce. Metallurgists at Goldstrike were successful in piloting a thiosulfate leaching flow sheet after the autoclave process that enables treatment of mixed carbonaceous material previously routed to the roaster. This should extend the life of the autoclaves and help support production rates. Barrick's exploration activities once again focused on drifting and resource delineation drilling at Deep North Post in 2010. One of the better drill intercepts was 220 feet grading 0.429 opt gold. (Barrick Gold Corp. 2010 Annual Report; E. Cope, Barrick Gold Corp., oral commun.12/14/2010; Barrick Gold website, [www.barrick.com](http://www.barrick.com))

### **Maggie Creek District**

**Gold Quarry.** Newmont Mining Corp.'s Gold Quarry open pit, which had produced about 25 million ounces of gold from 1982 to 2009, did not produce an ounce in 2010, due to a giant pit wall failure that occurred in December of 2009. Despite the disruption, Newmont continued to mine the Chukar underground deposit, whose portal is in a pit wall of Gold Quarry. It also carried out a major drill program in the greater Gold Quarry area, drilling about 120,000 feet in 2010. The drilling was aimed at better defining a planned major expansion at Gold Quarry, which is awaiting approval from the Bureau of Land Management. Drilling focused on the west wall of the pit, the Dos Equis area located to the south of the pit, and the Chukar footwall. (Elko Daily Free Press Summer 2011 Mining Quarterly; R. Reid, Newmont Mining Corp., oral commun. 12/14/2010)

### **Mount Hope District**

**Mount Hope.** General Moly Inc. (joint venture with POS-Minerals) continued its efforts at permitting and financing the development of the Mount Hope porphyry molybdenum deposit. In March 2010, Hanlong, a privately owned Chinese company, announced it would purchase 25% of General Moly for \$80 million and procure from a Chinese bank a \$665 million loan. The total funding from the Hanlong transaction is anticipated to fund all remaining capital requirements for Mount Hope. General Moly has signed off-take agreements with four major molybdenum industry participants and has pre-sold 100% of Mount Hope's future production for the first five years of operations. These agreements commence once Mount Hope begins production and provide General Moly with ready customers and molybdenum price protection in the form of hard floor prices between \$12.50 and \$13.50 per pound. (General Moly Inc. website, [www.generalmoly.com](http://www.generalmoly.com))

## **Northern Simpson Park Mountains**

**Coal Canyon.** NuLegacy Gold Corp. (joint venture with Miranda Gold Corp.) drilled one reverse circulation hole down to a depth of 1,485 feet. No significant intercepts were encountered. (Miranda Gold Corp. news release, 11/4/2010; Miranda Gold website, [www.mirandagold.com](http://www.mirandagold.com))

**Red Hill.** NuLegacy Gold Corp. (joint venture with Miranda Gold Corp.) drilled nine reverse circulation holes totaling 10,180 feet. The drilling focused on the east-northeast-trending Long Fault which occurs along the southern portion of the claim block. The best intercept was 15 feet grading 0.027 opt gold, beginning at a depth of 645 feet. No drilling was done around hole BRH-013 on the northwest end of the claim block, in which 80 feet grading 0.145 opt gold was encountered by Barrick Gold Corp. in 2006 at a depth starting at 1,920 feet. (Miranda Gold Corp. news release, 11/4/2010; Miranda Gold website, [www.mirandagold.com](http://www.mirandagold.com))

**Tonkin Springs.** US Gold Corp. drilled two reverse circulation holes totaling 3,270 feet and three core holes. The best assay was 0.047 opt gold. (US Gold Corp. 2010 SEC Form 10-K, 12/31/2010; US Gold website, [www.usgold.com](http://www.usgold.com))

## **HUMBOLDT COUNTY**

### **Awakening District**

**Awakening.** Northgate Minerals Corp. (joint venture with Nevada Exploration Inc.) drilled six reverse circulation holes totaling 3,300 feet. Low concentrations of gold, up to 40 ppb, were encountered locally. (Nevada Exploration Inc. press release, 1/19/2011)

**Sleeper.** Paramount Gold and Silver Corp. acquired X-Cal Resources Ltd. and the Sleeper property in June of 2010. Paramount drilled 18 holes, mostly core holes, totaling 16,873 feet. Drilling focused on verifying resources in the West Wood and Facilities target areas. (Paramount Gold and Silver Corp. press releases, 2/15/2011, 3/7/2011).

### **Battle Mountain District**

**Marigold.** Goldcorp Inc. (2/3 Goldcorp, 1/3 Barrick Gold Corp.) produced 136,754 ounces of gold in 2010 at an average grade of 0.018 opt gold. The average gold recovery was 73%, and the total cash cost was \$678 per ounce of gold. Production was down 7% from 2009, primarily due to a 23% decrease in ore tonnage, which was similar to the grade of ore mined in 2009. The mining in 2010 was from Phase 7 of the Basalt open pit, at a strip ratio of

4.7:1. About \$13 million was spent on exploration in 2010. Drilling focused on development of the Phase 7 Basalt deposit, and the Pediment, Red Dot, Target II, and Target III areas, which are in the process of being modeled geologically. (Goldcorp Inc. 2010 Annual report; Elko Daily Free Press Fall 2010 Mining Quarterly)

### **Disaster District**

**Kings Valley.** No drilling was carried out in 2010 for uranium or precious metals. Western Lithium Corp. purchased all of Western Uranium Corp.'s unpatented claims except for claims that cover its Albisu gold target. Western Lithium's activities regarding lithium are reported in the industrial minerals portion of this Mineral Industries report. (Western Uranium Corp. press release, 12/15/2010)

### **Leonard Creek District**

**Leonard Creek.** Cantex Mine Development Corp. drilled eleven holes totaling 8,034 feet on its Leonard Creek property located about 50 miles north of the Hycroft mine in western Humboldt County. Leonard Creek is one of the few major placer areas in Nevada where a hard rock gold mine has yet to be found. No significant gold mineralization was encountered in the drill program. The thickness of alluvium was deeper than what geophysical surveys had predicted. (Cantex Mine Development Corp. Management Discussion and Analysis, 1/31/2011)

### **Potosi District**

**Turquoise Ridge.** Much of Barrick Gold Corp.'s exploration activity at its Turquoise Ridge mine (75% Barrick, 25% Newmont Mining Corp.) focused on testing the potential to develop a large-scale open pit to mine the lower grade mineralization that forms a halo around the high-grade ores that are currently being mined underground. An open-pit operation could conceptually quadruple annual production to about 800,000 ounces of gold a year. Underground development and drilling were aimed at continuing to extend the High Grade Bullion zone at the north end of Turquoise Ridge. Up to five surface and six underground drill rigs operated on the site in 2010. Approximately \$21 million was spent on exploration. The underground operation at Turquoise Ridge produced 161,579 ounces of gold in 2010 at an average grade of 0.408 opt gold. The total cash cost was \$647 per ounce. (Elko Daily Free Press Winter 2010 Mining Quarterly; E. Cope, Barrick Gold Corp., oral commun. 12/14/2010; Barrick website, [www.barrick.com](http://www.barrick.com))

**Twin Creeks.** Newmont Mining Corp. carried out a major drill program at Twin Creeks gold mine. Activity

was focused on the Fiberline deposit located adjacent and below the east highwall of the Megapit underneath stock piles and dumps. Mineralization occurs in the hinge zone of an anticline, parallel to and very similar to the Conelea anticline that hosts ore in the Megapit. There is potential for a combined underground/open-pit operation. The estimated grades are between 0.045 and 0.085 opt gold, although no resource estimate was made at the end of 2010. Drilling also took place around the Vista Pit, which Newmont plans to expand. Oxide ore would be mined in the expansion. Reserves increased by 1.4 million ounces of gold in 2010, mainly by conversion of resources. Production increased slightly in 2010 to 452,744 ounces of gold. (Elko Daily Free Press Spring 2011 Mining Quarterly; R. Reid, Newmont Mining Corp., oral commun. 12/14/2010; Newmont 2010 Annual Report; Newmont website, [www.newmont.com](http://www.newmont.com))

### **Sulphur District**

**Hycroft.** In 2010, Allied Nevada Gold Corp. successfully completed its second full year of operations at Hycroft, achieving its stated operating goals. The mine moved 26.5 million tons of material, including 9.9 million tons of ore placed on the leach pad at average grades of 0.020 opt gold and 0.246 opt silver. Allied Nevada drilled 396 holes, totaling 333,248 feet at Hycroft in 2010. The focus was on infilling existing resources. Of the total 2010 drill program, 70 holes were directed towards infill and step-out from the Vortex zone, 44 holes towards infill of the Bay zone, 150 holes at the Central zone, and 50 holes at the Brimstone zone. The remaining holes were primarily drilled to obtain material for metallurgical testing. The best intercepts were from the Vortex zone and included 564 feet grading 0.032 opt gold and 3.65 opt silver, and 1,496 feet grading 0.022 opt gold and 1.37 opt silver. That thick zone contained a higher grade intercept of 509 feet grading 0.041 opt gold and 2.71 opt silver. In early 2011, based on drilling through 2010, announced reserves and resources had doubled to 16.1 million ounces of gold and 598.1 ounces of silver. The new proven and probable heap-leach reserve is 196,000,000 tons grading 0.013 opt Au, and 0.25 opt Ag. (Allied Nevada Gold Corp. press releases, 5/7/2011, 7/12/2011, 3/31/2011; Allied Nevada Gold SEC Form 10-K, 12/31/2011)

### **Tenmile District**

**Sandman.** Newmont Mining Corp. (joint venture with Fronteer Gold Inc.) reported expenditures of approximately \$3.2 million in 2010, mainly spent on drilling over 60 holes. Early in the year, an in-fill program consisting of 19 holes was completed at the Silica Ridge, one of the four gold deposits that comprise the Sandman project. Highlights of that

program included 9.6 feet averaging 2.35 opt gold and 33.18 opt silver, and 3.6 feet grading 1.95 opt gold and 1.45 opt silver. It also completed a nine-hole PQ-diameter drill core program totaling 2,516 feet at the North Hill deposit, mainly to obtain material for metallurgical testing. The majority of the holes intersected oxide gold mineralization at depths of less than 100 feet. The best intercept was 123 feet averaging 0.04 opt gold, which included 6.5 feet grading 0.26 opt gold. (Fronteer Gold Inc. press releases, 6/21/2010; 10/13/2010, 11/2/2010, 4/6/2010; Fronteer Gold Management Discussion and Analysis, 12/30/2010)

**Table Top.** Max Resource drilled 15 core holes totaling 2,156 feet. The holes were closely spaced over 2,000 feet along a northeast-trending fault zone at the southwestern edge of Little Tabletop Mountain. Ten of the holes intersected the mineralized fault zone and contained significant gold mineralization. The best drill intercepts were 90 feet averaging 0.0136 opt gold and 10 feet grading 0.0490 opt gold. Mineralization is hosted in the Triassic Raspberry Formation and is mainly associated with jasperoid breccia. (Max Resource Corp. Management Discussion and Analysis, 12/31/2010; Max Resource website, [www.maxresource.com](http://www.maxresource.com))

#### **Vicksburg District**

**Ashdown.** Win-Eldrich Mines Ltd. produced 189,035 pounds of "saleable molybdenum" from 367,506 pounds of "molybdenum concentrate" in 2010 from its underground Ashdown mine. (Win-Eldrich Mines Ltd. Management and Discussion Analysis, 12/31/2010)

### **LANDER COUNTY**

#### **Aspen District**

**Buz.** Bravada Gold Corp. completed a drill program at its Buz project, a low-sulfidation epithermal gold-silver vein system, located a few miles northeast of its Highland mine project in the Desatoya Mountains. Results were disappointing. No further information was released. (Bravada Gold Corp. Management Discussion and Analysis, 1/31/2011; Bravada Gold website, [www.bravadagold.com](http://www.bravadagold.com))

#### **Battle Mountain District**

**BMX.** US Gold drilled eight reverse circulation holes on their large BMX claim block on the northeast end of Battle Mountain in Lander and Humboldt counties. Areas that were drilled include the Blue Bird target in the range and the Valmy target on the pediment flanking the Marigold mine. Weakly anomalous gold

was found near the bottom of only one hole. Due to the absence of favorable host rocks, along with considerable depth of alluvial cover, part of the claim block was dropped. (US Gold Corp. 2010 SEC Form 10-K, 12/31/2010)

**Copper Basin.** Newmont Mining Corp. carried out a drill program at its Copper Basin project. No results were released. (Elko Daily Free Press Spring 2011 Mining Quarterly)

**Independence Mine.** General Metals Corp. drilled at least 18 holes in 2010, mainly in the near-surface Hill resource area. Better intercepts included 145 feet grading 0.034 opt gold and 0.63 opt silver and 365 feet averaging 0.014 opt gold. (General Metals Corp. SEC Form 10-K, 4/30/2011)

**Phoenix.** Newmont Mining Corp. carried out another major drill program in and around its Phoenix gold-copper mine. No results were released. The copper leaching project was in the process of being planned and permitted in 2010. Currently the only copper being produced is from concentrates that are shipped off site for processing. Phoenix produced 19,000,818 pounds of copper, down 20% from 2009. Gold production was 214,142 ounces, about the same as 2009. Reserves increased by 0.8 million ounces of gold mainly by conversion of resources into reserves, which was a major component of the 2010 drill program. (Newmont Mining Corp. 2010 Annual Report; Newmont website, [www.newmont.com](http://www.newmont.com))

#### **Buffalo Valley District**

**Buffalo Valley.** Newmont Mining Corp. (joint venture with Fairmile Goldtech Inc.) continued to explore and drill its Buffalo Valley project. From 2006 through the end of 2010, it had completed 260 drill holes. At the end of 2010, Newmont released its first resource estimate for Buffalo Valley. The indicated resource is 18,300,000 tons grading 0.020 opt gold for a total of 366,000 ounces of gold. (R. Reid, Newmont Mining Corp., oral commun., AIPG meeting, 12/14/2010; Newmont website, [www.newmont.com](http://www.newmont.com)).

#### **Bullion District**

**Fire Creek.** Klondex Mines Ltd. drilled eight reverse circulation holes, totaling 16,045 feet, and 12 core holes, totaling 12,198 feet. The program focused on step-out drilling to begin the process of including the southern extension into Klondex's underground development plans and to add ounces to the resource. In an effort to complement the underground plans, some of the drilling was infill to define vein continuity and generate samples for further metallurgical testing. The drilling identified six previously unknown gold-bearing veins. Hole

FC1014RC discovered a new high-grade vein 500 feet south of the southern end of the Far North resource. The vein averages 0.31 opt gold over 20 feet, including 1.21 opt over four feet. New gold-bearing shears (<0.14 opt gold) were found north of Main zone and southwest of New North zone. In-fill drilling in the Main zone yielded the highest gold assays of the year. Hole FC1019 encountered 1.26 opt gold over a true width of eight feet, including 2.22 opt gold and 6.0 opt silver over four feet. In September the U.S. Bureau of Land Management (BLM) issued a Notice to Proceed, which allowed Klondex to commence surface preparation work required for its planned underground development. In October, Klondex engaged N. A. Degerstrom as the surface contractor and the work started immediately. In early 2011, Klondex released a new resource estimate. The indicated resource is 5,705,619 tons grading 0.289 opt gold, for a total of 1,647,052 ounces of gold, using a cut-off grade of 0.117 opt gold. At a cut-off grade of 0.204 opt gold, the indicated resource is estimated to be 2,364,770 tons, grading 0.513 opt gold for a total of 1,215,019 ounces of gold. (Klondex Mines Ltd. press release, 9/12/2011; Klondex Management Discussion and Analysis, 12/31/2010; Klondex website, [www.klondexmines.com](http://www.klondexmines.com))

**Gold Acres Window.** Barrick Gold Corp. carried out a major drill program around the Pipeline deposit and other targets in the Gold Acres window. No results were released.

**Robertson.** Coral Gold Resources Ltd. drilled 12 reverse circulation holes, totaling about 7,200 feet, at about 500-foot spacing at Triplet Gulch. The best intercepts were 25 feet grading 0.067 opt gold and a five-foot interval that assayed 0.418 opt gold. It also drilled 15 core holes totaling 6,700 feet at the Gold Pan and Altenburg Hill zones, mainly to verify results from reverse circulation holes drilled in 2008 and to provide material for metallurgical testing. These zones, along with the Porphyry zone, represent near-surface resources potentially amenable to an open pit/heap leach operation. The best intercept from this core program was 80 feet averaging 0.04 opt Au, which included 20 feet grading 0.109 opt gold. Also, 60 feet grading 0.032 opt gold were encountered in another hole. (Coral Gold Resources Ltd. Management Discussion and Analysis, 1/31/2011)

#### **Callaghan Ranch District**

**Callaghan.** Kinross Gold Corp. drilled about a dozen holes in the in the Skull Creek area on its large claim block that it staked in 2009 on the northeast flank of Mount Callaghan. No results were released.

#### **Cortez District**

**Cortez Hills.** Barrick Gold Corp. successfully commissioned open-pit production at Cortez Hills in early 2010. Also early in 2011, a U.S. District Court rendered a decision allowing the continuation of mining at Cortez Hills until the Bureau of Land Management completes a study of groundwater pumping and air quality. Cortez Hills accounted for most of the production at its Cortez Mine in 2010, which totaled 1,139,976 ounces of gold at a total cash cost of \$312 an ounce. Of that total, 347,998 ounces were produced from underground mining at Cortez Hills, at rate of about 1,300 tons of ore per day in a drift-and-fill operation. The remainder of the production came from the Cortez Hills, Pipeline, and Gap open pits, with the majority of the open-pit production coming from Cortez Hills. A major surface and underground drill program was completed in 2009. Drilling of the underground deposit from the surface ceased because of costs. Reserve definition drilling of the underground deposit continued to intercept higher grades than anticipated. The underground deposit remains open to extension and contains a reserve and resource of over four million ounces of gold. Further drilling will wait on more underground development, from which the deposit can be drilled out more effectively at less cost. (Barrick Gold Corp. press release, 4/14/2010; E. Cope, Barrick Gold Corp., oral commun. AIPG meeting, 12/14/2010; Barrick website, [www.barrick.com](http://www.barrick.com))

#### **McCoy District**

**Cove.** No drilling was completed by Victoria Gold Corp. in 2010. In early 2011, it announced an updated resource estimate, based on drilling through 2009. The inferred resource is 391,600 tons grading 0.59 opt gold, for a total of 231,300 ounces. The estimate was downgraded significantly from its previous estimate. The previous estimate had used old Echo Bay holes with inaccurate assay information. These holes were removed from the revised estimate. (Victoria Gold Corp. Management Discussion and Analysis, 6/24/2011; Victoria Gold website, [www.vitgoldcorp.com](http://www.vitgoldcorp.com))

**Hits.** US Gold drilled two reverse circulation holes on their claims on the pediment between the Fish Creek Mountains and Battle Mountain. Alluvium and volcanic rocks proved to be thicker than anticipated and drilling conditions were too difficult to allow their penetration. Thus, US Gold subsequently dropped the property. (US Gold Corp. 2010 SEC Form 10-K, 12/31/2010)

## Red Rock Canyon

**Red Rock.** Challenger Deep Resources Corp. drilled two reverse circulation holes totaling 2,800 feet. The first hole encountered gold mineralization at the top of the hole, the best assay being 0.005 opt gold. The mineralization, hosted in upper plate rocks, also contained elevated concentrations of silver, arsenic, molybdenum, and zinc. The second hole hit similar mineralization near the top of the hole with the best gold assay being 0.008 opt gold. (Challenger Deep Resources Corp. press release, 1/12/2011)

## Reese River District

**Apex.** AusAmerican Mining Corp. Ltd. drilled eleven core totaling 3,021 feet on its Apex uranium project, which is located on the southern margin of the Austin pluton on the west flank of the Toiyabe Range. The mineralization occurs along the contact zone between the Jurassic granitic pluton and Paleozoic meta-sedimentary rocks. The uranium mineralization is located mainly within the metasediments and consists of the uranium phosphates autunite, torbernite, and meta-torbernite. Although only limited data are available, uraninite and coffinite have been reported at depth. Based on the 2010 and previous drilling, AusAmerican released a resource estimate in early 2011. The inferred resource at a 0.01%  $U_3O_8$  cut-off grade is 1,119,928 tons grading 0.07%  $U_3O_8$ . Apex was an underground mine between 1954 and 1966 and a reported 105,926 pounds of uranium oxide were produced during that period. This production averaged a grade of 0.25%  $U_3O_8$ . (AusAmerican Mining Corp. Ltd. Quarterly Report, 1/31/2011; AusAmerican Annual Report, 6/30/2011; AusAmerican website, [www.ausamerican.com](http://www.ausamerican.com))

## Toiyabe Mine Area

**Toiyabe.** American Consolidated Minerals Corp. drilled two deep core holes and a reverse circulation hole designed to target favorable host rocks in the hanging wall and footwall of the "805 Fault", a previously identified feeder structure. Drill hole T-1002BC intersected 60 feet averaging 0.059 opt gold, starting at a depth of 973 feet. Included within this interval was 15 feet grading 0.149 opt gold. This intercept is interpreted as the 805 Fault which gives this feeder structure a shallower dip 60° than previously interpreted. After a difficult and time-consuming effort which included three lost or abandoned holes, American Consolidated was able to drill T-1001BC to 2,187 feet. Hole T-1001BC did not test the hanging wall of the 805 fault below 1,045 feet and drilled away from the structure into barren rock. Hole T-1002A, a reverse circulation pre-collar hole, deviated from the planned vertical angle and was abandoned. This hole and T-1002BC, which are

approximately 100 feet apart, had similar intercepts at depths of about 625 feet. Hole T-1002A intersected 40 feet averaging 0.054 opt gold, while hole T-1002BC encountered 20 feet grading 0.046 opt gold. (American Consolidated Minerals Corp. Management Discussion and Analysis, 6/30/2011)

## LINCOLN COUNTY

### Delamar District

**Easter.** La Quinta Resources Corp. (joint venture with Pilot Gold Inc.) drilled eleven reverse circulation holes totaling 2,290 feet, targeting a previously undrilled outcrop of the Main Vein at its Easter project. Anomalous gold, silver, arsenic, antimony, lead, and molybdenum concentrations were encountered in the drill holes. Prior to completing this drill program, La Quinta released a resource estimate based on prior exploration drilling completed by other companies between 1975 and 2004. The indicated resource is 2,640,000 tons grading 0.0386 opt gold and 0.408 opt silver for a total of 101,700 ounces of gold and 1,077,000 ounces of silver. Easter is a low-sulfidation epithermal quartz-adularia vein-stockwork system hosted by late Tertiary silicic volcanic rocks within the Caliente caldera complex. The gold-bearing system has been traced along strike for about 6,500 feet and tested down-dip to a depth of 1,700 feet. The main mineralized zone is 150 to 200 feet wide in the center of the deposit, thinning to 20-25 feet wide to the east and west. (La Quinta Resources Corp. Management Discussion and Analysis, 9/30/2011; La Quinta Resources Easter Project 43-101 report, 7/13/2010)

### Eagle Valley District

**Gold Springs.** High Desert Gold Corp. (joint venture with Pilot Gold Inc.) drilled eleven reverse circulation holes totaling 5,980 feet at its Gold Springs project located along the border with Utah. Low-sulfidation epithermal gold-silver mineralization at Gold Springs is hosted by complex sheeted veins, breccias, and stockwork veins, which consist of quartz, adularia, and bladed calcite with minor sulfides. The drill program extended previously drilled, known gold mineralization within the main Jumbo zone, which is located in Utah. The Jumbo zone is a large tabular body currently about 2,600 feet long, dipping approximately 70° east. Mineralization, which has been defined to a depth of nearly 1,000 feet, is contained within a wide envelope of 0.01 to 0.02 opt gold with a higher grade central core averaging greater than 0.02 opt gold. (High Desert Gold Corp. Management Discussion and Analysis, 11/29/2010; High Desert Gold website, [www.highdesertgoldcorp.com](http://www.highdesertgoldcorp.com))

## LYON COUNTY

### Wilson District

**Pine Grove.** Lincoln Mining Corp. drilled eleven shallow reverse-circulation holes totaling 2,015 feet. Five of the holes encountered narrow zones of gold mineralization with intercepts ranging from 5 to 15 feet grading from 0.013 to 0.035 opt gold. In early 2011, Lincoln released an updated resource estimate based on drilling through 2010. The indicated resource, at a cut-off grade of 0.010 opt gold, is 5,316,000 tons grading 0.033 opt gold for a total of 177,000 ounces, split about evenly between the Wheeler and Wilson deposits. The resource estimate is based mainly on 235 drill holes totaling 71,669 feet. Lincoln also carried out preliminary metallurgical tests. Gold recoveries from 39 bottle-roll tests ranged from 56% to 94%. Recoveries from 3 column-leach tests ranged from 62% to 88%. (Lincoln Gold Corp. Management Discussion and Analysis, 3/31/2011; Lincoln Gold Pine Grove 43-101 report, 3/16/2011)

### Yerington District

**Ann Mason.** Entrée Gold Inc., which acquired PacMag Metal Ltd. in June 2010, continued to advance several copper projects it controls in the Yerington district. At Ann Mason proper, Entrée completed one infill core hole in the central portion of the resource in 2010. The hole intersected 3,240 feet grading 0.31% copper, 0.01% molybdenum, 40 ppb gold, and 760 ppm silver. It released a new resource estimate for the Ann Mason deposit, based on work completed through 2010. The inferred resource, at a cut-off grade of 0.2% copper, is 1,409,960,000 tons grading 0.336% copper. Using a cut-off grade of 0.4%, the inferred resource is 315,220,000 tons grading 0.485% copper.

At its 100% owned Blue Hills target, located less than 2 miles northwest of the Ann Mason deposit, Entrée drilled 14 reverse circulation holes totaling 7,755 feet. Significant copper oxide mineralization extends from the surface to an average depth of 400 feet, over an area of 2,300 feet by 1,640 feet. The copper oxide minerals occur along with abundant iron oxides. Mixed oxide/sulfide mineralization with minor chalcocite is present below the oxide mineralization to depths of 600 feet. The copper oxide zone remains open to the northwest and southeast. Better intercepts in this upper zone include 540 feet grading 0.181% copper, and 495 feet averaging 0.177% copper (including 90 feet grading 0.363% copper). Copper sulfide mineralization at the bottom of seven of the holes suggests the presence of underlying primary sulfide porphyry mineralization.

At its Black Jack target (joint venture with Honey Badger Exploration Inc.), located to the

northwest of Blue Hills, Entrée also drilled seven core holes totaling 9,252 feet. Five of the holes were to test an induced polarization (IP) chargeability anomaly that suggests the mineralization at Blue Hills extends northwestward onto the Black Jack ground. Local copper oxides were encountered in the upper portions of all five holes. The best intercept was 66 feet grading 0.197% copper, starting at a depth of 446 feet. Two holes were drilled at the northeast corner of the Black Jack property, located 3 miles due north of the Ann Mason deposit. The two holes tested an IP anomaly and intersected mainly pyrite. One hole encountered coarse chalcopyrite in silicified breccias that graded 0.441% copper over 13 feet. The IP anomaly is interpreted to be separate from the Ann Mason mineralization and may represent the westward extension of the MacArthur and Gallagher zones of mineralization being explored by Quaterra Resources Inc.

At its Roulette project (option agreement with Bronco Creek Exploration Inc., a wholly owned subsidiary of Eurasian Minerals Inc.), located a few miles southwest of the Ann Mason property, Entrée drilled four wide-spaced core holes to test a broad target under 1,150 to 1,650 feet of alluvial and post-ore Tertiary volcanic cover. The holes were sited based on an updated geological and structural interpretation, the presence of a strong aeromagnetic high, and anomalous surface geochemistry. One of the holes intersected 68 feet grading 0.14% copper, starting at a depth of 1,632 feet. The mineralization occurs as chalcopyrite-pyrite in strongly altered granodiorite cut by quartz-orthoclase and quartz-chlorite veins, and is truncated by the Blue Hill fault. (Entrée Gold Inc. press releases, 9/23/2010, 11/17/2010, 11/23/2010, 2/7/2010; Entrée Gold Management Discussion and Analysis, 12/31/2010; Entrée Gold Ann Mason Property, 43-101 Report, 3/11/2011; Entrée Gold website, [www.entreegold.com](http://www.entreegold.com))

**MacArthur.** Quaterra Resources drilled 77 reverse-circulation holes totaling 38,343 feet, and 3 core holes totaling 4,550 feet. The drill program, which began in December 2009, tested the northern extension of higher grade acid-soluble copper mineralization on 500-foot centers northwest of the pit and in-filled on 500-foot centers an undrilled area west of the MacArthur pit. In the southern Gallagher area, the drilling confirmed a band of continuous near-surface oxide mineralization ranging in thickness from 15 to 60 feet over a distance of 1,900 feet. In this zone, one hole intercepted 60 feet grading 0.33% copper, starting from the surface. The deep core holes tested three of five prospective induced polarization-resistivity anomalies to the north and northwest of the pit. One hole intercepted porphyry-style chalcopyrite-bornite-chlorite veining at a depth of 1,203 feet that assayed 0.58% copper

over a thickness of 65 feet below the shallow-dipping MacArthur fault zone. Another hole intersected massive pyrite and scattered zones of secondary biotite, and the last hole failed to reach its target because of poor ground conditions. In December Quaterra released a new resource estimate. The measured and indicated resource for supergene oxide/chalcocite mineralization is 143.7 million tons averaging 0.192% copper, for a total of 551.6 million pounds of copper. An inferred oxide/chalcocite resource of 215 million tons averaging 0.197% copper contains 846.8 million pounds of copper. An inferred primary sulfide resource of 74.1 million tons grading 0.256% copper contains 379.5 million pounds of copper. (Quaterra Resources Inc. press release. 12/15/2010; Quaterra Resources Management Discussion and Analysis, 12/31/2010; Quaterra Resources MacArthur Copper Project 43-101 Report, 1/21/2011)

**Pumpkin Hollow.** Nevada Copper Corp. continued its aggressive program at Pumpkin Hollow by spending over \$6 million in 2010. It drilled 96 resource, hydrological, and geotechnical holes, mainly core holes, that totaled over 177,000 feet. The drilling confirmed continuity of high-grade mineralization in the planned underground East and E2 deposits. Some of the better intercepts included 114.5 feet grading 3.2% copper and 97.5 feet averaging 4.18% from the East deposits and 145 feet grading 2.37% copper from the E2 deposit. At the open pit North and South deposits, some of the better intercepts included 230 feet grading 1.46% copper, 215.5 feet averaging 1.47% copper, and 305 feet grading 1.02% copper at the North deposit; and 185 feet averaging 1.14% copper and 126.5 feet grading 1.38% copper at the South deposit.

Metallurgical testing indicated copper recoveries ranging from 85% to 94% from composite samples that had copper concentrate grades ranging from 23% to 31%. In October, Lyon County granted a permit that allows construction of an 18 foot by 18 foot decline tunnel to access the underground East and E2 deposits, which are located entirely on private, patented claims. In November, Nevada Copper announced it would proceed directly to completion of a Definitive Feasibility Study. In January of 2011, it released a new resource estimate based on drilling through 2010. The measured and indicated resource for the western open pit deposits at a cut-off grade of 0.3% copper is 249,155,000 tons grading 0.6% copper, 0.002 opt gold, and 0.067 opt silver. The measured and indicated resource for the eastern underground deposits at a cut-off grade of 1% copper is 33,544,000 tons grading 1.74% copper, 0.010 opt gold, and 0.244 opt silver. The iron resource in the western deposits at a cut-off grade of 20% iron is 340,898,000 tons grading 32.59% iron.

(Nevada Copper Corp. press releases, 1/21/2010, 2/16/2010, 3/3/2010, 3/23/2010, 4/23/2010, 5/6/2010, 5/18/2010, 5/27/2010, 6/16/2010, 7/8/2010, 8/4/2010, 9/8/2010, 9/30/2010, 10/5/2010, 10/19/2010, 10/26/2010, 11/1/2010, 11/9/2010, 12/2/2010, 1/11/2011, 3/31/2011; Nevada Copper Management Discussion and Analysis, 3/31/2011; Nevada Copper website, [www.nevadacopper.com](http://www.nevadacopper.com))

## MINERAL COUNTY

### Bell District

**Simon.** International Millennium Mining Corp. drilled 7 core holes targeting polymetallic mineralization near the old Simon mine. Assay results from holes S10-3 and S10-7 confirm the presence of significant silver, lead and zinc mineralization in a previously unexplored and unmined block of ground situated between the old Number 1 and Number 3 production shafts. Hole S10-3 intersected 27 feet grading 0.788 opt silver, 1.05% lead, and 1.04% zinc. Hole S10-7 intersected 29 feet grading 1.82 opt silver, 2.38% lead, and 2.00% zinc. The mineralization occurs along a shallow-dipping contact between alaskite, rhyolite breccia and limestone of the Luning Formation. (International Millennium Mining Corp. Management Discussion and Analysis, 12/31/2010; International Millennium website, [www.immc.ca](http://www.immc.ca))

### Borealis District

**Borealis.** Gryphon Gold Corp. drilled 21 reverse circulation holes totaling 5,585 feet, mainly to upgrade inferred oxide resources to the measured and indicated category. The drill program focused on four areas—Freedom Flats, East Ridge, Borealis Extension, and Middle Ridge. The best intercept was at Freedom Flats, where 60 feet grading 0.062 opt gold were encountered. Later in the year Gryphon Gold completed a program of 28 closely spaced holes to better define the distribution of gold in Leach Pad #1. The program confirmed previous results that were based on auger and sonic drilling. Based on work through 2010, Gryphon Gold released a new resource estimate in April of 2011. The *in situ* proven and probable reserve, comprised of oxidized and mixed oxide material is 14,294,000 tons grading 0.023 opt gold for a total of 325,556 ounces of gold. If the heap leach pads and dumps are included, the proven and probable reserve increases to 16,650,000 tons grading 0.023 opt gold for a total for 377,356 ounces. The *in situ* measured and indicated resource, comprised oxide, mixed oxide, and sulfide material is 35,643,000 tons grading 0.040 opt gold, for a total of 1,422,900 ounces of gold. The inferred resource is 50,225,000 tons grading 0.022 opt gold, for an additional 1,104,500 ounces. (Gryphon Gold Corp. press

releases 5/3/2010, 5/25/2010, 5/28/2010, 7/28/2010, 4/3/2011; Gryphon Gold Borealis Gold Project 43-101 Report, 4/25/2011; Gryphon Gold website, [www.gryphongold.com](http://www.gryphongold.com))

### **Masonic District**

**Dome Hill.** Golden Predator Corp. (joint venture with Nevoro Nevada Inc.) drilled 12 reverse circulation holes totaling 2,680 feet on its Dome Hill project, within the Masonic high-sulfidation epithermal system that straddles the Nevada-California border. It is not clear how many, if any, holes were drilled on the Nevada portion. The best intercept was 50 feet averaging 0.046 opt gold, which included 15 feet grading 0.136 opt. (Golden Predator Corp. Management and Discussion Analysis, 2/28/2011)

### **Marietta District.**

**Excaliber.** Star Gold Corp. drilled one hole on its Excaliber project, located on the south end of Moho Mountain. The hole targeted the Moho vein system, which had been mined in the past. The highest assay was 0.006 opt gold. Mineralization is associated with sheared and iron-stained shale and sandstone of the Triassic Excelsior Formation. (Star Gold Corp. press release, 5/10/2011; Star Gold website, [www.stargoldcorp.com](http://www.stargoldcorp.com))

### **Santa Fe District**

**New York Canyon.** Canyon Copper Corp. released the first resource estimate on its New York Canyon copper project. The indicated resource is 16,250,000 tons grading 0.43% copper for a total of 139.75 million pounds of copper. The resource estimate was based on 214 drill holes totaling 139,556 feet, both old holes and the more recent ones drilled by Canyon Copper. Canyon Copper has not carried out any exploration on the property since 2006. (Canyon Copper Corp. press release, 5/3/2010, Canyon Copper New York Canyon 43-101 Report, 4/6/2010)

**Santa Fe.** Victoria Gold Corp. (joint venture with Barrick Gold Corp.) drilled six core holes in 2012. The majority of the holes targeted sulfide-rich mineralization present in a steeply dipping post-mineral fault zone (BH zone) located near the southeast end of the existing open pit. Numerous intercepts ranging up to 100 feet, grading 0.02 to 0.07 opt gold were encountered. Notably one of the holes extended mineralization over 1,600 feet west from the main BH zone. (Victoria Gold Corp. press release 10/5/2010; Victoria Gold Corp. website, [www.vicgoldcorp.com](http://www.vicgoldcorp.com))

## **NYE COUNTY**

### **Bare Mountain District**

**Reward.** In 2010 Atna Resources Ltd. received all the necessary permits required to initiate development activities, including posting an initial reclamation bond. It also announced a new increased reserve, mainly by using a higher gold price. The proven and probable reserve is 7,709,000 tons grading 0.023 opt gold for a total of 180,900 ounces. (Atna Resources Ltd. Management and Discussion Analysis, 12/31/2010)

**Sterling.** Imperial Metals Corp. began work on the 3220 level underground access ramp in February, which will provide access to the western edge of the 3220 level of the 144 ore zone. The 3220 level was driven east along the footwall of the 144. Gold grades from face and wall sampling of the 3220 level exceeded expectations and averaged 0.120 opt gold over 368.5 feet, including several higher grade assays up to 0.480 opt gold. Extension of the underground drifts will provide additional samples to further characterize the gold mineralization, information on the limits of the 144 zone and access for additional exploration drilling. The underground development is being completed to confirm mining methods, complete further metallurgical testing and to define a reserve sufficient to justify reopening of the Sterling gold mine. (Imperial Metals Corp. Management Discussion and Analysis, 12/31/2010)

### **Bruner District**

**Bruner.** Canamex Resources Corp. drilled 11 reverse circulation holes totaling 5,000 feet. The holes were drilled on patented claims in the vicinity of the July-Duluth mines. Eight of the 11 holes had intercepts of 100-plus feet grading >0.01 opt gold. The thickest interval was 320 feet averaging 0.015 opt gold. A few higher grade veins were encountered in the thicker, lower grade zones, including five feet grading 0.289 opt gold and 4.58 opt silver and five feet averaging 0.220 opt gold and 0.81 opt silver. The mineralization occurs in a tabular body dipping about 45° to the southwest. Complete oxidation of sulfides occurs to at least 800 feet beneath the surface. (Canamex Resources Corp. press release 2/22/2011; Canamex Resources website, [www.canamex.us](http://www.canamex.us))

### **Bullfrog District**

**North Bullfrog.** Corvus Gold Inc., which bought International Tower Hills Mine Ltd's Nevada assets in August, completed 23 reverse circulation holes by the end of 2010. At the Yellowjacket target, where a high-grade, vein-type target was tested, hole NB-10-63 intersected 45 feet averaging 0.172 opt gold,

which included 20 feet grading 0.347 opt gold. The same hole also encountered 205 feet grading 0.0117 opt gold in a stratabound zone beneath the higher grade quartz-sulfide stockwork zone. Drill hole NB-10-62, drilled to the west of NB-10-63, encountered 240 feet grading of 0.0089 opt gold in the Crater Flat Tuff horizon. In the Sierra Blanca area, drill holes targeting the lateral extension of stratabound mineralization to the west and south continue to confirm widespread distribution of bulk-tonnage-style mineralization, including hole NB-10-51, which intercepted 105 feet grading 0.0146 opt gold, and hole NB-10-55, which encountered 120 feet grading 0.0117 opt gold. In the Savage Valley area, hole NB-10-64 intercepted 430 feet averaging 0.0088 opt gold, and hole NB-11-65 encountered 210 feet grading 0.0146 opt gold. (Corvus Gold Inc. Management Discussion and Analysis, 4/12/2011)

### **Golden Arrow District**

**Golden Arrow.** Animas Resources Ltd. (joint venture with Nevada Sunrise Gold Corp.) drilled four core holes, totaling 3,785 feet, and twelve reverse circulation holes totaling 10,400 feet. The holes were widely spaced over 2 square miles and were aimed at discovering new centers of mineralization. The best intercept was 30 feet averaging 0.058 opt gold, which included 10 feet grading 0.17 opt gold. In early 2011, Animas opted out of the joint venture. (Nevada Sunrise Gold Corp. press release, 12/9/2010; Animas Resources Ltd press release, 3/21/2011)

### **Manhattan District**

**Manhattan.** Kinross Gold Corp. (joint venture with Barrick Gold Corp.) had announced its intent to drill various targets in the Manhattan district, including Salisbury Peak and South Manhattan. No results were released. (Kinross Gold Corp. SEC Form 40-F, 12/31/2009)

### **Moore's Creek District**

**Longface.** Archangel Resources LLC drilled 15 holes totaling 9,325 feet at its Longface project located 5 miles north of the Gold Hill deposit that Kinross Gold Corp. is permitting to put into production. Ten of the 15 holes drilled gold mineralization, with intercepts grading from 0.02 to 0.60 opt gold. ([www.goldandsilvermines.com/longface.htm](http://www.goldandsilvermines.com/longface.htm))

### **Northumberland District**

**Northumberland.** Fronteer Gold Inc. (formerly Fronteer Development Group Inc.) spent \$6.6 million on its Northumberland gold project in 2010, mainly on metallurgical work, drilling, and the preparation of

and initial construction of an underground decline. A surface drill program to further define and extend high-grade domains in the Zanzibar area was completed, resulting in some of the highest intercepts to date for the project. The best intercept was 123 feet averaging 0.207 opt gold and 0.719 opt silver, including 9.4 feet grading 0.417 opt gold. Also very high-grade silver intercepts were encountered, including 10 feet grading 10.8 opt silver. These intercepts are similar to the high-grade silver veins that were originally mined at Northumberland in the 1800s. Site preparation work for a 920-foot-long decline to access high-grade mineralization at Zanzibar was completed and an underground contract was awarded. In April 2011, Newmont acquired Northumberland through its acquisition of Fronteer Gold. (Fronteer Gold Inc. press releases, 8/3/2011, 8/9/2010, 9/8/2010, 10/5/2010, 12/2/2010, 4/6/2010; Fronteer Gold Management Discussion and Analysis, 12/31/2010)

### **Round Mountain District**

**Round Mountain.** In July the Bureau of Land Management (BLM) approved Kinross Gold Corp.'s planned expansion for the Round Mountain gold mine (50% Kinross, 50% Barrick Gold Corp.). As part of the approved plan, Kinross will start developing the nearby Gold Hill deposit for production in 2011. In 2010, production at Round Mountain dropped 14% from 2009, to 358,614 ounces of gold, from ore with an average grade of 0.05 opt gold. \$1.4 million was spent on exploration at Round Mountain in 2010. Kinross reported at the start of 2010 its intention to drill Stibnite Hill located north of the open pit. (Kinross Gold Corp. 2010 Management Discussion and Analysis, Kinross Gold SEC Form 40-F, 12/31/2009; 12/31/2010; Elko Daily Free Press Fall 2010 Mining Quarterly)

### **San Antonio District**

**Liberty.** General Moly Inc. carried out only limited work on its Liberty molybdenum project in 2010. (General Moly Inc. new release, 1/3/2011; General Moly website, [www.generalmoly.com](http://www.generalmoly.com))

### **Tybo District**

**Guild.** Sniper Resources Ltd. (joint venture with Columbus Gold Corp.) drilled 5 reverse circulation holes totaling 2,640 feet on its Guild property located in the south end of the Hot Creek Range. The drilling targeted carbonate rocks that are Ordovician to Devonian in age. No significant gold assays resulted from the drilling. (Sniper Resources Ltd. Management and Discussion Analysis, 9/30/2010; Sniper Resources website, [www.sniperresources.com](http://www.sniperresources.com))

## PERSHING COUNTY

5/15/2009; EMC Metals website,  
[www.emcmetals.com](http://www.emcmetals.com))

### Antelope Springs District

**Relief Canyon.** Firstgold Corp. was pushed into bankruptcy court after its plan to finance the re-opening of the Relief Canyon mine with Chinese investors was disallowed by a federal agency. The Committee on Foreign Investment in the United States ruled in December that the mine is too close to facilities associated with the Naval Air Station at Fallon to justify a foreign presence. Three secured creditors of Firstgold took control of the property after Firstgold told a bankruptcy court in April that it couldn't come up with a plan to reorganize its operations. In June, Firstgold released a 43-101 report by Mine Development Associates that included an indicated resource of 6,533,000 tons grading 0.017 opt Au for 113,000 ounces of gold at a cut-off grade of 0.005 opt gold. In December, Canarc Resource Corp. agreed to purchase the mine for \$11 million, but backed out after due diligence determined major issues at Relief Canyon. Carnarc reported the main issues were that the known gold resource is only an inferred resource, it was not yet fully permitted for mining, it partly occupies the property adjacent to Firstgold, and Canarc was unable to acquire that property on commercially acceptable terms. (Northern Nevada Business Weekly, 5/24/2010; Carnarc Resource Corp. press releases, 12/21/2010, 1/31/2011).

### Imlay District

**Florida Canyon.** Jipangu Inc. produced 54,975 ounces of gold from its Florida Canyon mine in 2010. It also carried out a drilling program, but no results were released. Mining at Florida Canyon is planned to stop in early 2011, with mining shifting to Jipangu's Standard mine five miles to the south. Mining at Florida Canyon will recommence once permits to expand the open pits are secured. (Elko Daily Free Press Spring 2011 Mining Quarterly)

**Standard.** Jipangu Inc. carried out a drill program in and around its Standard open pit mine in advance of planned commencement of mining in 2011. No results were released. (Elko Daily Free Press Spring 2011 Mining Quarterly)

### Mill City District.

**Springer Mine/Mill.** In 2009 EMC Metals Corp. released a resource estimate. The indicated resource is 274,000 tons grading 0.619 wt% WO<sub>3</sub>, at a cut-off grade of 0.30 wt%. Four limestone beds containing tungsten skarn, known as the Sutton beds, constitute the resource. (EMC Metals Corp. Springer Facility–Sutton Beds, 43-101 Report,

### Rochester District

**Gold Ridge.** Rye Patch Gold Corp. drilled 13 reverse circulation holes totaling 5,814 feet at its Gold Ridge project located less than a mile north of its resource at Lincoln Hill. The drilling tested two targets: Silver Ridge (3 holes) and Red Hill (10 holes). At the Silver Ridge target, where zones of quartz veins cropped out, the drilling program intersected significant thicknesses of mineralization ranging from 0.005 to 0.01 opt gold. Two of the widely spaced holes at Red Hill intersected zones similar to grades and thicknesses at Silver Ridge. (Rye Patch Gold Corp. press release, 2/8/2011; Rye Patch website, [www.ryepatchgold.com](http://www.ryepatchgold.com))

**Lincoln Hill.** Rye Patch Gold Corp. drilled 15 reverse circulation holes totaling 7,884 feet, aimed at expanding the known resource to the northwest, southeast, and south. Drilling expanded mineralization in these directions; however it closed off mineralization to the south. Mineralization is still open to the northwest and southeast. The best intercept was 95 feet averaging 0.045 opt gold, which included 5 feet grading 0.66 opt. Also, some holes were drilled to test a new zone, known as Jefferson. The Jefferson zone was initially identified by a strong magnetic high that parallel to the main Lincoln Hill resource and is traceable for almost a mile. Five widely spaced holes were drilled to test a portion of the anomaly. One hole intersected 30 feet averaging 0.030 opt gold, and a second hole encountered 45 feet grading 0.032 opt gold. Silver grades as high 4.78 opt over 10 feet were encountered. (Rye Patch Gold Corp. press release, 1/12/2011; Rye Patch website, [www.ryepatchgold.com](http://www.ryepatchgold.com))

**Rochester.** In 2010, Coeur d'Alene Mines Corp. completed a feasibility study in November on the recommencing of open-pit mining operations at its Rochester mine, including building an additional heap-leach pad. Based on the feasibility study, a portion of the remaining mineral resource can be converted to a mineral reserve and economically extracted over a six-year mine life to recover an estimated 224,000 ounces of gold and 15.7 million ounces of silver using the same open-pit mining and heap-leach techniques used previously at the mine. As part of the study, Coeur released an updated resource estimate for Rochester. The proven and probable reserve is 48,271,000 tons grading 0.57 opt silver and 0.005 opt gold. In 2010, Coeur also completed a reverse circulation drilling program north of the Nevada Packard deposit, in which 13,960 feet were drilled in 34 holes. (Coeur d'Alene Mines Corp. Rochester 43-101 Report, 1/1/2011)

## Rosebud District

**Rosebud.** Harvest Gold Corp. drilled twelve reverse circulation holes totaling 15,005 feet. Target types included: 1) high-grade volcanic-rock-hosted stockwork and disseminated mineralization within the known bulk-tonnage mineralization surrounding the mined-out deposit, 2) extensions and definition of the bulk-tonnage halo, and 3) high-grade “feeder” veins within the underlying metamorphic Jurassic basement rocks. Hole HGR-5 hit near-surface mineralization, which extended the “bulk-tonnage halo” to the south. The hole intersected 375 feet averaging 0.014 opt gold, starting at a depth of 320 feet. The interval included 30 feet grading 0.041 opt gold. High-grade silver mineralization was also intersected near the basement unconformity. Hole HGR-3, drilled at the north end of the deposit, encountered 115 feet averaging 6.95 opt silver and 0.024 opt gold, starting at a depth of 1,035 feet. The intercept included a higher grade interval of 15 feet grading 36.0 opt silver and 0.072 opt gold. Two holes were drilled in the Valley target located a few thousand feet west of the deposit. The best intercept at the Valley target was 70 feet grading 0.0055 opt gold and 0.21 opt silver. (Harvest Gold Corp. Management Discussion and Analysis, 12/31/2010; Harvest gold website, [www.harvestgoldcorp.com](http://www.harvestgoldcorp.com))

## Spring Valley District

**Spring Valley.** In 2010, Barrick Gold Corp. (joint venture with Midway Gold Corp.) completed 30,656 feet of reverse circulation drilling in 15 holes and 30 pre-collars and 21,760 feet of core drilling in 19 holes. Barrick must spend \$30 million by the end of 2013 in order to earn a 60% interest. At the end of 2010, after two years of developing the project, Barrick had spent \$9 million. The 2010 drilling converted much of the known resource to measured and indicated status, extended the resource beyond the previous open pit designs by at least 660 feet to the north-northwest, and further demonstrated significant expansions to the east along the Black Ridge fault. Geologic mapping and surface sampling indicates this mineralized fault zone trends north-northeast for more than 2.4 miles. At the end of 2010, the mineralized zone covered an area 3,200 feet long by 1,600 feet wide, down to a depth of 1,400 feet. Highlights of the drilling included 103 feet averaging 0.097 opt gold that contained 5.2 feet grading 0.732 opt gold and 205 feet averaging 0.064 opt gold that included 5 feet grading 8.90 opt gold. Importantly, step-out drilling, nearly 6,000 feet southwest of the resource area, intersected mineralization very similar to the resource. The best intercept from this step-out was 40 feet averaging 0.035 opt gold, which included 5 feet grading 0.228 opt gold. Barrick promptly acquired the ground between the resource and this step-out intercept.

Barrick continued metallurgical tests in 2010 on 13 composite samples representing oxide, transition, and reduced ores by column-leaching, bottle-roll, and gravity methods. Grades ranged from 0.006 opt gold to 0.148 opt gold. The column-leach test, conducted over 260 days and meant to simulate heap-leach conditions, yielded gold recoveries ranging from 46% to 98%, averaging 73%. Bottle-roll tests were conducted for 96 hours on ores ground to minus 300, 150, and 75 micrometers; these recoveries were 91%, 94%, and 95%, respectively. Gravity test recoveries ranged from 78% to 97%. Barrick also conducted a hydrology study to assess dewatering requirements for possible future open pit mining and determined pump rates would be in the 650 to 1,100 gallon per minute range.

Based on work through 2010, a new resource estimate was released. The measured and indicated resource, at a cut-off grade of 0.004 opt gold, is 159,641 tons grading 0.014 opt gold for a total of 2,160,000 ounces of gold. The inferred resource is 114,567,000 tons grading 0.017 opt gold. (Midway Gold Corp. press releases, 8/26/2010, 10/6/2010, 11/30/2010, 12/8/2010, 2/24/2011, 5/2/2011; Midway Gold SEC Form 10-K, 12/31/2010)

## Willard District

**Wilco.** Rye Patch Gold Corp. completed eleven reverse circulation drill holes totaling 12,660 feet. The drilling continued to outline a high-grade gold zone, known as North Basin. The best intercept was 50 feet averaging 0.060 opt gold, which included 10 feet grading 0.172 opt gold and 0.750 opt silver. The zone has coarse gold associated with high-angle faults cutting a siltstone-claystone contact. It measures 330 feet by 660 feet, and it is open to the west-southwest. Metallic screen assays were as high as 1.58 opt Au over 50 feet. The location and orientation of the high-grade zone suggest the westerly oriented structures are the feeder system to the Section Line resource. Rye Patch also leased the geothermal rights of its Wilco project to Wilco Energy LLC, a non-related company. (Rye Patch Gold Corp. press releases, 6/7/2010, 10/26/2010; Rye Patch website, [www.ryepatchgold.com](http://www.ryepatchgold.com))

## STOREY COUNTY

### Silver City District

**Comstock.** Comstock Mining Inc. (formerly known as Goldspring Inc.) drilled 159 reverse circulation holes on its Comstock project. The initial program, completed in the spring, comprised 51 holes totaling 29,913 feet. It focused on select locations in the Lucerne resource area along Highway 342

northwest of the town of Silver City, including Lucerne-Woodville, Hartford, Justice-Keystone, and the East Side targets. Much of the drilling confirmed a new conceptual model for the Silver City fault zone that Comstock geologists used to design the drill program. Significant intercepts of 20 or more feet were encountered in 42 of the 51 holes, and 100 or more feet in 16 of the holes. Nineteen of the holes were completed in the Lucerne-Woodville area that extends northeastward from the previously mined Lucerne open cut across Highway 342 to the historic Woodville bonanza. The drilling defined several sub-parallel faults constituting the north-northwest-trending Silver City fault zone. The best intercepts in three separate holes were 200 feet grading 0.110 opt gold and 0.575 opt silver, 195 feet averaging 0.079 opt gold and 0.197 opt silver, and 145 feet grading 0.052 opt gold and 0.227 opt silver. The East Side target is an intersection zone between northeast faults projecting out from the south end of the Lucerne open cut and the Gold Canyon fault, the easternmost strand of the Silver City fault zone. Drilling there encountered 100 feet averaging 0.072 opt gold and 0.362 opt silver, and 135 feet grading 0.043 opt gold and 0.601 opt silver. In the Hartford area on the west high wall of the Lucerne open cut, the best intercept was 115 feet grading 0.018 opt gold and 0.390 opt silver. In the Justice-Keystone area, drilling along the northern projection of the Silver City encountered 25 feet grading 0.163 opt gold and 1.786 opt silver. All the drilling extended the length of the Lucerne resource area to 5,000 feet, with an average width of 600 feet. Based on the drilling, Comstock released a resource estimate in August, which also included its smaller Dayton resource located to the southeast of Silver City in Lyon County. The measured and indicated resource is 31,520,000 tons grading 0.029 opt gold and 0.336 opt silver for a total of 899,000 ounces of gold and 10,590,000 ounces of silver. The Dayton resource was acquired by Comstock in July for \$1,025,000. Previously it had been leased and drilled by Comstock.

Beginning in late October, Comstock carried out an infill and condemnation drill program to support the Lucerne starter mine planning and the planned expansion of the heap leaching capacity in American Flat, located adjacent to the west. By the end of 2010, 108 reverse circulation holes totaling 26,490 feet had been completed. Some of the better intercepts were 25 feet grading 0.264 opt gold and 1.012 opt silver and 120 feet averaging 0.037 opt gold and 0.536 opt silver. Comstock drilled one hole of a planned larger program at Dayton to test whether the known shallow resource has any depth extent. The best intercept was 130 feet grading 0.030 opt gold, starting at a depth of 245 feet. (Comstock Mining Inc. press releases, 7/20/2010, 7/21/2010, 8/13/2010, 1/18/2011; Comstock Mining

Technical Report on the Comstock Mine Project, 8/31/2010)

## WASHOE COUNTY

### Leadville District

**Hog Ranch.** In the past, Hog Ranch produced gold from low-sulfidation epithermal mineralization hosted in Miocene age rhyolites. The ore was mined from several open pits from 1986 to 1995. In December 2009, ICN Resources Ltd. drilled 13 reverse circulation holes totaling 9,370 feet and 5 cores totaling 4,682 feet. The drill program was designed to test for steeply dipping, high-grade “feeder structures” lying beneath and around the open pits. The most significant results of the program were from core hole HR09-11, which was drilled beneath the old 139 open pit, where assays as high as 5.66 opt gold were encountered in old drill holes. Hole HR09-11 intercepted 5 feet grading 0.216 opt gold starting at a downhole depth of 74 feet, and 6.9 feet averaging 0.271 opt gold, starting at a downhole depth of 578 feet. Additionally, many of the drill holes intercepted long, low-grade intervals, such as 220 feet grading 0.018 opt gold in one hole. (ICN Resources Ltd. press release, 3/9/2010; ICN Resources website, [www.icnresources.com](http://www.icnresources.com))

## WHITE PINE COUNTY

### Bald Mountain District

**Bald Mountain.** The Bureau of Land Management (BLM) approved Barrick Gold Corp.’s plans to expand its Bald Mountain gold mine. The permit allows the mine to expand current open pits, build and expand leach pads and waste dumps, construct a new shop, expand exploration activities, and combine plans for the Mooney Basin area and the Bald Mountain site into one plan. The plan allows expansions of the Numbers, LJ Ridge, Rat, Top, Sage Flat, Saga, East Bida and Belmont open pits. Barrick will spend approximately \$200 million on the expansion project over the next five years. By fall it had expanded the West Wing leach pad at Mooney Basin. Production was down in 2010, mainly due to all the stripping activity associated with the expansion of the open pits. Production at Bald Mountain in 2010 was 60,333 ounces of gold at an average grade of 0.021 opt gold and an average total cash cost of \$722 per ounce. Exploration was again very active in 2010 with at least three drill rigs operating throughout most of the year. Exploration sites that were approved by the BLM were mostly in the north area and Mooney Basin, but also several sites south of the Vantage pit at Alligator Ridge. The Redbird deposit, located adjacent and southwest of

the RBM open pit, continued to grow based on drilling in 2010. No specific drill results were released. (Elko Daily Free Press article, 2/17/2010; Elko Daily Free Press Fall 2010 Mining Quarterly; E. Cope Barrick Gold Corp., oral commun. AIPG meeting, 12/14/2010; Barrick Gold website, [www.barrick.com](http://www.barrick.com))

**Long Valley.** Golden Touch Resource Corp. (joint venture with New World Resources Corp.) drilled 4 reverse circulation holes totaling approximately 4,000 feet at its Long Valley project located south of the old Yankee open pits, which were mined for gold. No significant mineralization was encountered. (New World Resource Corp. Management Discussion and Analysis, 12/31/2011)

### **Butte Valley District**

**Limousine Butte (Limo).** US Gold drilled 15 core holes (2,712 feet) and 13 reverse circulation holes (10,195 feet) at its Limo project. The drilling focused on two new target areas, Cadillac and Continental, located outside known mineralization. The drilling at Cadillac targeted an area where gold was found beneath thick alluvial cover. This new zone was intersected in six holes. The best intercepts in 3 separate holes were 125 feet grading 0.034 opt gold, 160 feet averaging 0.040 opt gold, and 310 feet averaging 0.038 opt gold, which included 15 feet grading 0.144 opt. The mineralization is contained within an extensive zone of jasperoid, developed where favorable Pilot Shale lies along northeast-trending faults. Drilling at Continental, which is the south end of the claim block, targeted a northeast-trending outcropping vein containing high concentrations of silver and gold. Core holes drilled to intersect the vein resulted in several mineralized intercepts. The best intercept was 21.1 feet averaging 0.052 opt gold and 24.9 opt silver, which included 3.2 feet grading 0.149 opt gold and 107.9 opt silver. (US Gold Corp. 2010 SEC Form 10-K, 12/31/2010)

### **Pancake District**

**Pan.** In July 2010 Midway Gold Corp. released a preliminary economic assessment. The measured and indicated resource stands at 42,750,352 tons containing 682,248 ounces of gold at a grade of 0.016 opt gold, using a cut-off grade of 0.004 opt. As an open-pit mine with heap-leach processing, the forecasted mine life is 9 years with a total of 327,000 ounces of gold recovered. Initial capital costs are estimated to be \$45 million. Later in the year Midway Gold drilled 14 core holes totaling 5,764 feet, mainly for metallurgical and geotechnical testing. The drilling intercepted relatively high-grade zones for Pan, including 152 feet grading 0.042 opt gold. Gold grades in the core holes tended to be higher than

expected based on results from previously drilled, nearby reverse circulation holes. The core drilling also discovered a new gold zone to the east and below previously drilled gold mineralization. The best intercepts were 170 feet averaging 0.017 opt gold and 76 feet grading 0.028 opt gold. (Midway Gold Corp. press releases, 10/13/2010, 10/28/2010, 11/8/2010; Midway Gold SEC Form 10-K, 12/31/2010)

**Reef.** In late 2010, Golden Dory Resources Corp. (joint venture with Renaissance Gold Inc.) completed six reverse circulation holes totaling 4,723 feet at its Reef project located three miles south of Midway Gold Corp.'s Pan project. The objectives of the program were to test for Carlin-type mineralization at the contact of the Pilot Shale and underlying Devil's Gate Limestone and to test for polymetallic lead-zinc-silver-gold mineralization along the east-west striking Black Horse fault zone. Shallow angle drill holes across the Black Horse fault failed to intersect extensions to depth of surface mineralization. Only one hole encountered anomalous gold mineralization, containing 47 to 155 ppb gold. (Renaissance Gold Inc. press release, 1/13/2011; Golden Dory Resources Corp. website, [www.goldendoryresources.com](http://www.goldendoryresources.com))

### **Robinson District**

**Robinson.** In 2010, Quadra Mining Ltd. mined ore from both the Veteran and Ruth pits, producing 109 million pounds of copper and 73,000 ounces of gold. Both copper and gold productions in 2010 were lower than in 2009 due mainly to anticipated lower head grade in the Ruth pit ore and the impact of unexpected, historic underground workings, which affected production in the second quarter of 2010. Mining from the lower benches of the Veteran pit was completed in December 2010 and mining in the Wedge pit ended in the first half of 2010. Quadra also carried out a drill program at its Robinson copper mine, but no results were released. (Quadra Mining Ltd. Management Discussion and Analysis, 12/31/2010)

### **Taylor District**

**Taylor.** In 2010 Silver Predator Mines Inc. purchased the silver assets, including the Taylor mine, from Golden Predator Royalty and Development Corp., Strategic Metals Ltd., Rockhaven Resources Ltd., and Platoro West Holdings Inc. No drilling was completed in 2010. (Silver Predator Mines Inc. Taylor Silver Project 43-101 Report, 12/14/2010)

# Major Precious-Metal Deposits

by John L. Muntean

The information in this compilation was obtained from the Nevada Division of Minerals and from published reports, articles in mining newsletters, and company websites, annual reports, and press releases. Locations of most of these deposits are shown on NBMG Map 149, and most active mines are shown on page 2 of this publication.

opt = troy ounces per short ton.

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>CHURCHILL COUNTY</b>				
<b>Bell Mountain (Bell Mountain district)</b>	1982: 1 million tons, 0.055 opt Au, 1.4 opt Ag 1989: reserves-30,000 oz Au, 125,000 oz Ag 1997: 2.5 million tons, 0.059 opt Au equiv. oz 2011 (May): 10,760,000 tons, 0.015 opt Au, 0.514 opt Ag (measured and indicated resource) 2,255,000 tons, 0.013 opt Au, 0.387 opt Ag (inferred resource)		rhyolitic tuff	Miocene
<b>Buffalo Valley gold property (Eastgate district)</b>	1996: 96,000 oz Au		rhyolitic ash-flow tuff	Tertiary
<b>Dixie Comstock (Dixie Valley district)</b>	1991: 2.4 million tons, 0.049 opt Au 1995: 100,000 oz Au		Tertiary rhyolite	Miocene?
<b>Fondaway Canyon (Shady Run district)</b>	1988: 400,000 tons, 0.06 opt Au 1990: 400,000 tons, 0.06 opt Au 2001: 396,000 tons, 0.428 opt Au (indicated resource) 372,849 tons, 0.409 opt Au (inferred resource)	1989: 1,065 oz Au, 87 oz Ag 1990: 12,000 oz Au	Triassic slate and phyllite	
<b>Jessup (Jessup district)</b>	1998: 8,376,564 tons, 0.024 opt Au, 0.25 opt Ag ("global resource") 2007: 5,432,000 tons, 0.022 opt Au, 0.31 opt Ag (indicated resource); 1,265,000 tons, 0.017 opt Au, 0.23 opt Ag (inferred resource) 2009: 8,571,000 tons, 0.015 opt Au, 0.255 opt Ag (measured resource); 13,936,000 tons, 0.012 opt Au 0.209 opt Ag (indicated resource); 4,954,000 tons, 0.016 opt Au, 0.231 opt Ag (inferred resource)			
<b>New Pass property (New Pass district)</b>	1994: 3.4 million tons, 0.042 opt Au 1997: 3.1 million tons, 0.055 opt Au 2006: 11.5 million tons, 0.0226 opt Au, 0.0041 opt Ag (inferred resource) 2009: 11,142,000 tons, 0.028 opt Au, 0.24 opt Ag (measured and indicated resource)		Triassic siltstone	
<b>CLARK COUNTY</b>				
<b>Crescent property (Crescent district)</b>	1992: 390,000 tons, 0.05 opt Au; 3.3 million tons, 0.022 opt Au			
<b>Keystone (Goodsprings district)</b>	1990: <i>estimated geologic resource</i> - 64 million tons, 0.05 opt Au 1992: 110,000 tons, 0.11 opt Au	1990: ~1,000 oz Au 1993: idle	lower Paleozoic carbonate rocks	Triassic
<b>ELKO COUNTY</b>				
<b>Big Springs (Independence Mountains district)</b>	1987: 3.76 million tons, 0.148 opt Au 1989: 1.55 million tons, 0.172 opt Au 2005 (inferred resource, 0.025 opt Au cut-off): 15.145 million tons, 0.078 opt Au 2005 (inferred resource, 0.3 opt Au cut-off): 468,000 tons, 0.45 opt Au	1987-88: ~106,000 oz Au 1989-92: 274,000 oz Au, 48,000 oz Ag 1993: 52,752 oz Au 1994-95: 30,095 oz Au, 2,877 oz Ag	Mississippian to Permian overlap assemblage clastic and carbonate rocks	Eocene

## MAJOR PRECIOUS-METAL DEPOSITS, ELKO COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Bootstrap/Capstone/ Tara (Bootstrap district)</b>	1989: <i>geologic resource</i> -25.1 million tons, 0.039 opt Au 1996: 20.2 million tons, 0.046 opt Au proven and probable reserves; 1 million tons, 0.086 opt Au mineralized material	1988-90: included in Newmont Gold production at the end of this section 1996: 19,800 oz Au 1999: 147,088 oz Au, 28,395 oz Ag 2000: 131,979 oz Au, 13,402 oz Ag 2001: 92,775 oz Au, 21,093 oz Au  2002: 23,415 oz Au, 4,717 oz Ag 2003: 29,742 oz Au, 5,480 oz Ag 2004: 154,521 oz Au, 43,566 oz Ag 2005: 3,849 oz Au, 322 oz Ag 2006: 2,019 oz Au, 436 oz Ag	dacitic dikes, Paleozoic siltstone and laminated limestone/chert	Eocene
<b>Burns Basin (Jerritt Canyon, Independence Mountains district)</b>	2005-2007: 29,700 tons, 0.134 opt Au (open pit indicated resource) 30,700 tons, 0.194 opt Au (underground indicated resource), 50,600 tons, 0.23 opt Au (underground inferred resource)		Hanson Creek and Roberts Mountains Formations	
<b>California Mountain (Jerritt Canyon, Independence Mountains district)</b>	2005-2007: 8,000 tons, 0.11 opt Au (open pit indicated resource) 32,100 tons, 0.38 opt Au (underground indicated resource), 9,400 tons, 0.33 opt Au (underground inferred resource)		Hanson Creek and Roberts Mountains Formations	
<b>Coyote Zone (Jerritt Canyon, Independence Mountains district)</b>	2005-2007: 45,200 tons, 0.21 opt Au (underground indicated resource) 2,700 tons, 0.18 opt Au (underground inferred resource) 2006-2007: 20,100 tons, 0.104 opt Au (open pit inferred resource)		Hanson Creek and Roberts Mountains Formations	
<b>Cobb Creek (Mountain City district)</b>	1988: <i>geologic resource</i> -3.2 million tons, 0.045 opt Au			
<b>Cord Ranch (Robinson Mountain district)</b>	1991: 3.5 million tons, 0.037 opt Au 1994: 350,000 oz Au in 3 deposits (see Piñon)		Webb Formation Devils Gate Formation Tomera Formation Diamond Peak Formation	
<b>Dee (Bootstrap district)</b>	1982: 2.5 million tons, 0.12 opt Au 1990: 4.5 million tons, 0.059 opt Au 1999: 1.4 million tons, 0.157 opt Au, proven and probable reserves	1985-88: 189,983 oz Au 1989-92: 172,745 oz Au, 142,000 oz Ag 1993-95: 97,860 oz Au 1996: 45,070 oz Au, 50,322 oz Ag 1997-98: 72,595 oz Au 1999: 36,329 oz Au, 68,400 oz Ag 2000: 61,171 oz Au, 110,900 oz Ag 2001: 2,351 oz Au, 6,028 oz Ag	Vinini Formation, Devonian carbonate rocks, dacitic dikes	Eocene
<b>Doby George (Aura district)</b>	1995: 3.7 million tons, 0.060 opt Au 1997: 250,000 oz Au		Schoonover	

## MAJOR PRECIOUS-METAL DEPOSITS, ELKO COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Hollister (Ivanhoe district)</b>	<p>1989: oxide-18.4 million tons, 0.035 opt Au; estimated mineral inventory 83.5 million tons, 0.034 opt Au, with 52.8 million tons of oxide and 30.7 million tons of sulfide</p> <p>1995: 1,300,000 oz Au; 42 million tons of 0.031 opt Au (geologic resource, combined oxide and sulfide)</p> <p>2001: 719,000 tons, 1.29 opt Au, 7 opt Ag</p> <p>2007 (May, 0.25 opt Au cut-off grade): 903,000 tons, 1.03 opt Au, 5.71 opt Ag (measured and indicated resource)</p> <p>805,000 tons, 1.08 opt Au, 3.94 opt Ag (inferred resource)</p> <p>2008 (June, 0.25 opt Au cut-off grade): 1,615,000 tons, 0.87 opt Au, 4.57 opt Ag (measured and indicated resource)</p> <p>1,252,000 tons, 0.51 opt Au, 1.43 opt Ag (inferred resource)</p> <p>2009 (June, 0.25 opt Au cut-off grade): 1,111,200 tons, 1.167 opt Au, 8.59 opt Ag (measured and indicated resource, includes reserves)</p> <p>1,035,300 tons, 1.340 opt Au, 2.72 opt Ag (inferred resource)</p> <p>2010 (August, 0.25 opt Au cut-off grade): 1,121,000 tons, 1.305 opt Au, 10.35 opt Ag (measured and indicated resource, includes reserves)</p> <p>1,487,000 tons, 0.690 opt Au, 11.1 opt Ag (inferred resource)</p>	<p>1990: 6,000 oz Au</p> <p>1991: 60,000 oz Au</p> <p>2007: 4,066 oz Au, 38,885 oz Ag</p> <p>2008: 41,890 oz Au, 192,000 oz Ag</p> <p>2009: 31,174 oz Au, 243,148 oz Ag</p> <p>2010: 105,144 oz Au, 578,855 oz Ag</p>	rhyolitic tuff, flows	Miocene
<b>Jerritt Canyon Property (Independence Mountains district)</b>	<p>1981: 12.5 million tons 0.231 opt Au</p> <p>1989: 21.6 million tons, 0.143 opt Au mill ore; 6.5 million tons, 0.043 opt Au leachable</p> <p>1999: 1.5 million oz Au, proven and probable reserves; 3.8 million oz Au other</p> <p>2000: 1.3 million oz Au proven and probable; 3.7 million oz Au other mineralized material</p> <p>2001: 2.058 million oz Au proven and probable; 893,000 oz Au other</p> <p>2002: 580,913 oz Au, proven and probable reserves; 1.296 million oz Au measured and indicated resource; 1.035 million oz Au inferred resource</p> <p>2003: 820,104 oz Au, proven and probable reserves; 2.295 million oz Au measured and indicated resource; 1.034 million oz Au inferred resource</p> <p>2004: 9.988 million tons, 0.241 opt Au measured and indicated resource; 4.1 million tons, 0.219 opt Au inferred resource</p> <p>2005: 3.723 million tons, 0.24 opt Au (proven and probable reserves); 8.812 million tons, 0.24 opt Au (measured and indicated resource, includes proven and probable reserves), 2.6465 million tons, 0.23 opt Au (inferred resource)</p> <p>2006: 1.9849 million tons, 0.245 opt Au (proven and probable reserves); 8.2032 million tons, 0.232 opt Au (measured and indicated resource, includes proven and probable reserves), 2.4148 million tons, 0.226 opt Au (inferred resource)</p> <p>2007: 3.1552 million tons, 0.227 opt Au (proven and probable reserves); 8.1969 million tons, 0.239 opt Au (measured and indicated resource, includes proven and probable reserves); 2.3197million tons, 0.224 opt Au (inferred resource)</p> <p>2010: 4.3658 million tons, 0.164 opt Au (proven and probable reserves); 11.6923 million tons, 0.217 opt Au (measured and indicated resource, includes proven and probable reserves); 4.4901 million tons, 0.198 opt Au (inferred resource)</p>	<p>1981: ~2.6 million oz Au</p> <p>1991: 1,380,000 oz Au, 25,000 oz Ag</p> <p>1995: 1,296,492 oz Au</p> <p>1999: 363,000 oz Au</p> <p>2000: 334,747 oz Au</p> <p>2001: 295,328 oz Au, 7,752 oz Ag</p> <p>2002: 338,660 oz Au, 8,154 oz Ag</p> <p>2003: 302,095 oz Au</p> <p>2004: 243,333 oz Au</p> <p>2005: 202,911 oz Au, 6,322 oz Ag</p> <p>2006: 169,862 oz Au, 7,154 oz Ag</p> <p>2007: 121,700 oz Au, 17,560 oz Ag</p> <p>2008: 35,936 oz Au, 4,620 oz Ag</p> <p>2009: 9,770 oz Au</p> <p>2010: 65,104 oz Au</p>	Hanson Creek and Roberts Mountains Formations	Eocene

## MAJOR PRECIOUS-METAL DEPOSITS, ELKO COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Kinsley Mountain (Kinsley district)</b>	1988: 2.1 million tons, 0.048 opt Au 1996: 3.4 million tons, 0.032 opt Au	1993: evaluation 1995-97: 127,065 oz Au, 24,452 oz Ag 1998: 9,543 oz Au 1999: 1,543 oz Au	upper Paleozoic carbonate rocks	Oligocene?
<b>Long Canyon (Pequop district)</b>	2009 (March, 0.012 opt Au cut-off grade): 5,300,000 tons, 0.069 opt Au (indicated resource) 9,678,000 tons, 0.048 opt au (inferred resource) 2010 (May, 0.006 opt Au cut-off grade): 13,492,000 tons, 0.050 opt Au (measured and indicated resource) 11,457,000 tons, 0.048 opt au (inferred resource) 2010 (year-end, 0.006 opt Au cut-off grade): 20,250,000 tons, 0.069 opt Au (measured and indicated resource) 12,313,000 tons, 0.056 opt au (inferred resource)			
<b>Maverick Springs (Maverick Springs area)</b>	2002: 350,000 oz Au, 32.3 million oz Ag, indicated resource; 747,000 oz Au, 68.8 million oz Ag, inferred resource 2004: 69.63 million tons, 0.01 opt Au, indicated resource; 85.55 million tons, 0.008 opt Au, inferred resource			
<b>Meikle (Lynn district)</b>	1992: 7.9 million tons, 0.613 opt Au (geologic resource) 1999: 5.9 million tons, 0.647 opt Au proven and probable reserves; 3.3 million tons, 0.457 opt Au mineralized material 2000: 4.9 million tons, 0.540 opt Au proven and probable reserves; 2.9 million tons, 0.450 opt Au mineral resource 2001: 9 million tons, 0.439 opt Au proven and probable reserves; 13.5 million tons, 0.433 opt Au mineral resource 2002: 9.8 million tons, 0.398 opt Au proven and probable reserves; 12.9 million tons, 0.396 opt Au mineral resource 2003: 3,316,000 tons, 0.467 opt Au proven reserves 5,862,000 tons, 0.326 opt Au probable reserves 1,580,000 tons, 0.435 opt Au measured resource 4,261,000 tons, 0.423 opt Au indicated resource 7,725,000 tons, 0.366 opt Au inferred resource 2004: 7,575,000 tons, 0.392 opt Au proven and probable reserves; 6,268,000 tons, 0.379 opt Au mineral resource 2005 (includes all underground resources at Goldstrike): 7.319 million tons, 0.379 opt Au proven and probable reserves; 3.234 million tons, 0.386 opt Au measured and indicated resource; 3.034 million tons, 0.386 opt Au inferred resource 2006 (includes all underground resources at Goldstrike): 7.662 million tons, 0.370 opt Au proven and probable reserves; 4.143 million tons, 0.338 opt Au measured and indicated resource; 2.159 million tons, 0.301 opt Au inferred resource 2007 (includes all underground resources at Goldstrike): 7.423 million tons, 0.364 opt Au proven and probable reserves; 4.129 million tons, 0.329 opt Au measured and indicated resource; 2.747 million tons, 0.371 opt Au inferred resource 2008 (includes all underground resources at Goldstrike): 6,923 million tons, 0.368 opt Au proven and probable reserves; 4.467 million tons, 0.323 opt Au measured and indicated resource; 3.424 million tons, 0.393 opt Au inferred resource 2009 (includes all underground resources at Goldstrike): 8.998 million tons, 0.318 opt Au proven and probable reserves; 4.436 million tons, 0.334 opt Au measured and indicated resource; 1.858 million tons, 0.341 opt Au inferred resource	1996: 78,442 oz Au 1997-98: 1,421,621 oz Au, 426,030 oz Ag 1999: 977,356 oz Au, 263,225 oz Ag 2000: 805,718 oz Au, 205,000 oz Ag 2001: 712,688 oz Au, 213,370 oz Ag 2002: 640,337 oz Au, 203,574 oz Ag 2003: 551,664 oz Au, 99,614 oz Ag 2004: 561,345 oz Au, 129,520 oz Ag 2005 (includes all underground production at Goldstrike): 509,568 oz Au, 133,979 oz Ag 2006 (includes all underground production at Goldstrike): 477,035 oz Au, 58,345 oz Ag 2007 (includes all underground production at Goldstrike): 413,186 oz Au, 74,000 oz Ag 2008 (includes all underground production at Goldstrike): 424,687 oz Au, 51,434 oz Ag 2009 (includes all underground production at Goldstrike): 388,548 oz Au, 30,198 oz Ag 2010 (includes all underground production at Goldstrike): 281,308 oz Au, 22,628 oz Ag	Popovich and Roberts Mountains Formations	Eocene

## MAJOR PRECIOUS-METAL DEPOSITS, ELKO COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Meikle (cont.) (Lynn district)</b>	2010 (includes all underground resources at Goldstrike): 10,872,000 tons, 0.272 opt Au (proven and probable reserves) 6,771,000 tons, 0.298 opt Au (measured and indicated resource) 3,047,000 tons, 0.298 opt Au (inferred resource)			
<b>MCE (Jerritt Canyon, Independence Mountains district)</b>	2005-2007: 4,400 tons, 0.20 opt Au (underground measured and indicated resource) 7,800 tons, 0.19 opt Au (underground inferred resource)		Hanson Creek and Roberts Mountains Formations	
<b>Midas (Ken Snyder) Mine (Gold Circle district)</b>	1995: 13 million tons, 0.16 opt Au, 2.7 opt Ag, announced resource, proven Au reserves<500,000 oz 1996: 1.1 million tons, 1.324 opt Au, 14.95 opt Ag 1999: 3.0 million tons, 0.816 opt Au, 9.835 opt Ag proven and probable reserves 2000: 3.4 million tons, 0.63 opt Au, 7.77 opt Ag proven and probable reserves 2002: 3.4 million tons, 0.65 opt Au proven and probable reserves; 400,000 tons 0.46 opt Au measured and indicated mineralized material; 200,000 tons 0.55 opt Au inferred mineralized material 2003: 700,000 tons, 0.83 opt Au proven reserves; 2,700,000 tons, 0.51 opt Au probable reserves; 900,000 tons 0.42 opt Au indicated material 2004: 2.9 million tons, 0.510 opt Au proven and probable reserves; 200,000 tons, 0.58 opt Au indicated resource; 700,000 tons, 0.31 opt Au inferred resource 2005: 1.5 million tons, 0.58 opt Au, proven and probable reserves; 600,000 tons, 0.42 opt Au, inferred resource 2006: 1.2 million tons, 0.47 opt Au, proven and probable reserves (which includes 6,800,000 oz Ag); 800,000 tons, 0.33 opt Au, inferred resource 2007: 1.0 million tons, 0.493 opt Au, proven and probable reserves (which includes 7,500,000 oz Ag); 200,000 tons, 0.345 opt Au, measured and indicated resource; 100,000 tons, 0.3013 opt Au, inferred resource 2008: 900,000 tons, 0.436 opt Au, proven and probable reserves 200,000 tons, 0.186 opt Au, measured and indicated resource; 100,000 tons, 0.321 opt Au, inferred resource 2009: 700,000 tons, 0.425 opt Au, proven and probable reserves (also includes 4.6 Moz Ag) 100,000 tons, 0.193 opt Au, measured and indicated resource; 100,000 tons, 0.248 opt Au, inferred resource 2010: 500,000 tons, 0.319 opt Au (proven and probable reserves, 95% recovery, also includes 2.8 Moz Ag) 120,000 tons, 0.167 opt Au (measured and indicated resource)	1998: 4,357 oz Au, 55,329 oz Ag 1999: 189,081 oz Au, 1,938,470 oz Ag 2000: 197,800 oz Au, 1,941,989 oz Ag 2001: 198,518 oz Au, 2,393,246 oz Ag 2002: 232,949 oz Au, 2,870,164 oz Ag 2003: 218,966 oz Au, 2,647,374 oz Ag 2004: 219,778 oz Au, 2,471,135 oz Ag 2005: 167,297 oz Au, 2,166,396 oz Ag 2006: 140,884 oz Au, 1,694,060 oz Ag 2007: 79,133 oz Au, 1,040,059 oz Ag 2008: 150,608 oz Au, 1,872,883 oz Ag 2009: 123,621 oz Au, 1,634,601 oz Ag 2010: 127,196 oz Au, 1,710,318 oz Ag	Tertiary volcanic rocks	Miocene
<b>Mill Creek (Jerritt Canyon, Independence Mountains district)</b>	2005-2007: 78,400 tons, 0.12 opt Au (measured and indicated resource)		Hanson Creek and Roberts Mountains Formations	
<b>Murray (incl. Zone 9) (Jerritt Canyon, Independence Mountains district)</b>	2005: 243,300 tons, 0.26 opt Au (proven and probable reserves) 789,200 tons, 0.29 opt Au (measured and indicated resource, includes reserves) 2006: 18,400 tons, 0.266 opt Au (proven and probable reserves); 393,300 tons, 0.290 opt Au (measured and indicated resource, includes reserves); 152,000 tons, 0.220 opt Au (inferred resource)		Hanson Creek and Roberts Mountains Formations	

## MAJOR PRECIOUS-METAL DEPOSITS, ELKO COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Murray (incl. Zone 9) (cont.)</b>	2007: 393,300 tons, 0.290 opt Au (measured and indicated resource); 152,000 tons, 0.220 opt Au (inferred resource)			
<b>Pie Creek (Jerritt Canyon, Independence Mountains district)</b>	2005-2007: 190,200 tons, 0.16 opt Au (measured and indicated resource) 28,300 tons, 0.14 opt Au (inferred resource)		Hanson Creek and Roberts Mountains Formations	
<b>Piñon (South Bullion and Dark Star) (Robinson Mountain district)</b>	1996: 38.3 million tons, 0.026 opt Au geologic mineral inventory 2002: 30.6 million tons, 0.026 opt Au, measured, indicated, and inferred resource		Webb Formation siltstone Devils Gate Limestone	
<b>Pony Creek (Robinson Mountain district)</b>	1994: 1.1 million tons, 0.057 opt Au (geologic resource) 2004: 32.41 million tons, 0.044 opt Au (inferred resource)			
<b>Railroad Property (POD zone) (Railroad district)</b>	1997: 1.5 million tons, 0.085 opt Au drill-indicated resource			
<b>Rain Property (Carlin district)</b>	1982: 3.4 million tons, 0.147 opt Au and 8.3 million tons, 0.083 opt Au			
<b>Gnome deposit</b>	1988: 2.7 million tons, 0.048 opt Au		Webb Formation	Eocene
<b>Emigrant Springs deposit</b>	2005: 1,531,165 oz Au (proven and probable reserves)		Webb Formation	Eocene
<b>Rain deposit</b>	1999: 13,467,000 tons, 0.026 opt Au proven and probable open-pit ore, 411,000 tons, 0.316 proven and probable underground ore	1999: 23,477 oz Au 2000: 25,004 oz Au, 2,539 oz Ag 2001: 43,488 oz Au, 9,887 oz Ag 2002: 20,065 oz Au, 4,042 oz Ag 2003: 5,039 oz Au, 928 oz Ag 2004: 1,956 oz Au, 551 oz Ag 2005: 404 oz Au, 90 oz Ag		
<b>SMZ deposit</b>	1989: 1.6 million tons, 0.019 opt Au (geologic resource)			
<b>Rain district</b>	2000: 13.5 million tons, 0.026 opt Au proven and probable open-pit ore; 308,000 tons, 0.267 opt Au proven and probable underground ore 2001: 13.5 million tons, 0.026 opt Au proven and probable open-pit ore; 21,000 tons, 0.024 opt Au proven and probable underground ore; 1.3 million tons, 0.048 opt Au mineralized material			
<b>REN (Bootstrap district)</b>	2003: 2.1 million tons, 0.43 opt Au (inferred resource) 2005: 2.1 million tons, 0.38 opt Au (indicated resource); 1.4 million tons, 0.37 opt Au (inferred resource) 2006: 2,713,000 tons, 0.37 opt Au (indicated resource); 758,000 tons, 0.47 opt Au (inferred resource) 2007: 2,991,000 tons, 0.37 opt Au (indicated resource); 835,000 tons, 0.47 opt Au (inferred resource)			
<b>Road Canyon (Jerritt Canyon, Independence Mountains district)</b>	2005-2007: 148,600 tons, 0.14 opt Au (measured and indicated resource); 74,300 tons, 0.13 opt Au (inferred resource)		Hanson Creek and Roberts Mountains Formations	

## MAJOR PRECIOUS-METAL DEPOSITS, ELKO COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Storm Mine (Rossi) (Bootstrap district)</b>	1998: 3.1 million tons, 0.371 opt Au resource 2000: 2.7 million tons, 0.345 opt Au resource 2002: 1.9 million tons, 0.335 opt Au measured and indicated resource; 1 million tons, 0.0335 opt Au inferred resource 2005 and 2006: 500,000 tons, 0.449 opt Au (measured and indicated resource) 800,000 tons, 0.376 opt Au, inferred resource	2008: 52,000 oz Au 2009: 64,558 oz Au 50,069 oz Ag 2010: 74,429 oz Au 63,309 oz Ag	Popovich Formation Bootstrap Limestone Rodeo Creek Formation	
<b>SSX-Steer (Jerritt Canyon, Independence Mountains district)</b>	2005: 1,333,300 tons, 0.25 opt Au (proven and probable reserves) 2,597,500 tons, 0.28 opt Au (measured and indicated resource, includes reserves) 1,052,200 tons, 0.23 opt Au (inferred resource) 2006: 739,400 tons, 0.266 opt Au (proven and probable reserves); 2,332,500 tons, 0.266 opt Au (measured and indicated resource, includes reserves); 929,700 tons, 0.23 opt Au (inferred resource) 2007: 900,000 tons, 0.226 opt Au (proven and probable reserves); 2,561,400 tons, 0.259 opt Au (measured and indicated resource, includes reserves); 959,200 tons, 0.236 opt Au (inferred resource) 2010: 1,215,400 tons, 0.189 opt Au (proven and probable reserves, underground) 4,012,200 tons, 0.224 opt Au (measured and indicated resource, includes reserves) 479,100 tons, 0.194 opt Au (inferred resource)		Hanson Creek and Roberts Mountains Formations	
<b>West Pequop (Pequop district)</b>	2010: 1,349,700 tons, 0.0475 opt Au (measured and indicated resource) 6,055,500 tons, 0.0411 opt Au (inferred resource)			
<b>Saval (Jerritt Canyon, Independence Mountains district)</b>	2005: 104,400 tons, 0.23 opt Au (proven and probable reserves) 460,500 tons, 0.25 opt Au (measured and indicated resource, includes reserves) 270,000 tons, 0.25 opt Au (inferred resource) 2006: 120,200 tons, 0.246 opt Au (proven and probable reserves); 369,300 tons, 0.254 opt Au (measured and indicated resource, includes reserves); 191,200 tons, 0.238 opt Au (inferred resource) 2007: 120,200 tons, 0.246 opt Au (proven and probable reserves); 379,800 tons, 0.252 opt Au (measured and indicated resource, includes reserves); 107,400 tons, 0.206 opt Au (inferred resource) 2010: 169,100 tons, 0.210 opt Au (proven and probable reserves, underground) 656,000 tons, 0.227 opt Au (measured and indicated resource, includes reserves) 201,700 tons, 0.209 opt Au (inferred resource)		Hanson Creek and Roberts Mountains Formations	
<b>Smith (Jerritt Canyon, Independence Mountains district)</b>	2005: 949,300 tons, 0.29 opt Au (proven and probable reserves) 1,863,300 tons, 0.28 opt Au (measured and indicated resource, includes reserves) 677,000 tons, 0.24 opt Au (inferred resource) 2006: 269,000 tons, 0.332 opt Au (proven and probable reserves); 1,064,400 tons, 0.290 opt Au (measured and indicated resource, includes reserves); 541,600 tons, 0.231 opt Au (inferred resource)		Hanson Creek and Roberts Mountains Formations	

## MAJOR PRECIOUS-METAL DEPOSITS, ELKO COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Smith (cont.)</b>	2007: 954,100 tons, 0.282 opt Au (proven and probable reserves); 1,236,900 tons, 0.278 opt Au (measured and indicated resource, includes reserves); 534,000 tons, 0.221 opt Au (inferred resource) 2010: 1,631,700 tons, 0.172 opt Au (proven and probable reserves, underground) 4,186,200 tons, 0.235 opt Au (measured and indicated resource, includes reserves) 1,157,300 tons, 0.195 opt Au \ (inferred resource)			
<b>Smith East (Jerritt Canyon, Independence Mountains district)</b>	2006: 997,400 tons, 0.281 opt Au (measured and indicated resource, includes reserves) 120,400 tons, 0.264 opt Au (inferred resource) 2007: 1,065,500 tons, 0.287 opt Au (measured and indicated resource); 125,200 tons, 0.280 opt Au (inferred resource)		Hanson Creek and Roberts Mountains Formations	
<b>South Arturo (Bootstrap district)</b>	2006: 21,073,000 tons, 0.060 opt Au (indicated resource) 1,310,000 tons, 0.053 opt Au (inferred resource) 2007: 29,880,000 tons, 0.070 opt Au (indicated resource); 1,020,000 tons, 0.022 opt Au (inferred resource) 2008: 36,857,000 tons, 0.045 opt Au (indicated resource); 3,253,000 tons, 0.013 opt Au (inferred resource) 2009: 43,857,000 tons, 0.051 opt Au (proven and probable reserve) 5,628,000 tons, 0.048 opt Au (indicated resource) 4,232,000 tons, 0.018 opt Au (inferred resource) 2010: 45,597,000 tons, 0.051 opt Au (proven and probable reserve) 26,735,000 tons, 0.043 opt Au (indicated resource) 11,623,000 tons, 0.018 opt Au (inferred resource)		Popovich Formation Bootstrap Limestone Rodeo Creek Formation	
<b>Starvation Canyon (Jerritt Canyon, Independence Mountains district)</b>	2005: 400,500 tons, 0.30 opt Au (probable reserves) 676,400 tons, 0.28 opt Au (measured and indicated resource, includes reserves) 51,400 tons, 0.31 opt Au (inferred resource) 2006: 369,600 tons, 0.305 opt Au (probable reserves); 636,500 tons, 0.290 opt Au (measured and indicated resource, includes reserves); 51,200 tons, 0.278 opt Au (inferred resource) 2007: 571,600 tons, 0.282 opt Au (probable reserves); 697,300 tons, 0.287 opt Au (measured and indicated resource, includes reserves) 25,500 tons, 0.252 opt Au (inferred resource) 2010: 363,000 tons, 0.264 opt Au (proven and probable reserves, underground) 502,400 tons, 0.285 opt Au (measured and indicated resource, includes reserves) 256,300 tons, 0.276 opt Au \ (inferred resource)		Hanson Creek and Roberts Mountains Formations	
<b>Trout Creek (Contact district)</b>	1988: 1.5 million tons, 0.04 opt Au	1988: exploration	Miocene sedimentary rocks	
<b>Tuscarora (Dexter) (Tuscarora district)</b>	1987: 2 million tons, 0.039 opt Au, 1.9 opt Ag 1988: 1.8 million tons, 0.037 opt Au, 0.74 opt Ag	1896-1902: 29,940 oz Au, 28,543 oz Ag 1987-90: 34,163 oz Au, 189,865 oz Ag	Eocene rhyolitic ignimbrite and andesite	Eocene

## MAJOR PRECIOUS-METAL DEPOSITS, ELKO COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Waterpipe II (Jerritt Canyon, Independence Mountains district)</b>	2005-2007: 37,400 tons, 0.21 opt Au (underground inferred resource)		Roberts Mountains Formation	
<b>West Mahala (Jerritt Canyon, Independence Mountains district)</b>	2005 and 2006: 368,100 tons, 0.22 opt Au (underground measured and indicated resource); 141,900 tons, 0.21 opt Au underground inferred resource) 2007: 197,500 tons, 0.218 opt Au (underground indicated resource); 129,600 tons, 0.206 opt Au (inferred resource) 2010: 225,800 tons, 0.189 opt Au (measured and indicated resource, underground); 1,956,900 tons, 0.191 opt Au (inferred resource)		Hanson Creek and Roberts Mountains Formations	
<b>Winters Creek (Jerritt Canyon, Independence Mountains district)</b>	1986: 1.4 million tons, 0.146 opt Au 2005-2007: 148,900 tons, 0.22 opt Au underground measured and indicated resource; 37,200 tons, 0.2 opt Au, underground inferred resource		lower Paleozoic carbonate rocks	Eocene
<b>Wright Window (Jerritt Canyon, Independence Mountains district)</b>	1986: 1.3 million tons, 0.095 opt Au 2005-2007: 32,600 tons, 0.226 opt Au, (probable reserves); 97,800 tons, 0.16 opt Au, (measured and indicated resource, includes reserves); 19,000 tons, 0.23 opt Au (inferred resource) 2010: 84,500 tons, 0.127 opt Au (probable reserve, open pit) 97,800 tons, 0.156 opt Au (measured and indicated resource, includes reserves); 19,000 tons, 0.229 opt Au (inferred resource)	1992: 3,500 oz Au	lower Paleozoic carbonate rocks	Eocene
<b>ESMERALDA COUNTY</b>				
<b>Boss (Gilbert district)</b>	1987: 500,000 tons, 0.07 opt Au 1990: reserves-637,500 tons, 0.023 opt Au <i>geologic resource</i> -31,000 oz Au 1996: see Castle		Ordovician sedimentary rocks	Miocene?
<b>Castle (includes Boss) (Gilbert district)</b>	1996: 3.7 million tons, 0.03 opt Au 1997: 10 million tons, 0.03 opt Au resource 2000: 215,000 oz Au indicated resource and 93,000 oz Au inferred resource		Ordovician Palmetto Formation	
<b>Gemfield (Goldfield district)</b>	1996: 9.5 million tons, 0.04 opt Au 1998: 500,000 oz, 0.04 opt Au 2003: see Goldfield project 2004: 16,853,000 tons, 0.032 opt Au (measured and indicated resource); 1,001,000 tons, 0.022 opt Au (inferred resource) 2006: 12,459,000 tons, 0.031 opt Au (measured and indicated resource); 88,000 tons, 0.116 opt Au (inferred resource)		Sandstorm Rhyolite	21 Ma?
<b>Goldfield Project (Goldfield district) (see Gemfield, Goldfield Main, and McMahon Ridge)</b>	1983: 1.75 million tons, 0.087 opt Au 1994: 3.48 million tons, 0.071 opt Au 2003: 23,410,200 tons, 0.031 opt Au (measured and indicated resource) 10,239,100 tons 0.024 opt Au inferred resource (includes Goldfield Main, McMahon Ridge, and Gemfield) 2006: 16,856,000 tons, 0.034 opt Au (measured, indicated, and inferred resource, includes McMahon Ridge and Gemfield)	1903-45: 4.19 million oz Au, 1.45 million oz Ag 1989-97: 28,373 oz Au	andesite, rhyodacite, rhyolite	21 Ma
<b>Goldfield Main (Goldfield district)</b>	2004: 6,651,000 tons, 0.036 opt Au measured and indicated resource; 2,129,000 tons, 0.038 opt Au inferred resource			

## MAJOR PRECIOUS-METAL DEPOSITS, ESMERALDA COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Goldfield Main (cont.)</b>	2010 (Goldfield Main, 0.012 opt cut-off grade) 9,424,000 tons, 0.044 opt Au (indicated resource) 7,267,000 tons, 0.050 opt Au (inferred resource)			
<b>Hasbrouck (Divide district)</b>	1982: 5 million tons 0.06 opt Au, 1.5 opt Ag 1986: 12.9 million tons, 0.0291 opt Au, 0.59 opt Ag 1998: 7.7 million tons, 0.036 opt Au, 0.7 opt Ag 2003: 26,036,00 tons, 0.023 opt Au (indicated resource); 8,200,000 tons, 0.021 opt Au (inferred resource)		Siebert Formation tuff and volcaniclastic rocks	16 Ma
<b>Hill of Gold deposit (Divide district)</b>	1988: 500,000 tons, 0.04 opt Au, 0.40 opt Ag 1996: 1.6 million tons, 0.026 opt Au		Miocene silicic tuff	16 Ma
<b>Mary-Drinkwater (Silver Peak district)</b>	1991: 531,300 tons, 0.124 opt Au	1991: 25,000 oz Au, 8,000 oz Ag	Wyman Formation	Mesozoic?
<b>McMahon Ridge (Goldfield district)</b>	2004: 8,200,000 tons, 0.035 opt Au (measured and indicated resource) 171,000 tons, 0.019 opt Au (inferred resource) 2006: 4,138,000 tons, 0.042 opt Au (measured and indicated resource); 172,000 tons, 0.038 opt Au (inferred resource)			
<b>Mineral Ridge (Silver Peak district)</b>	1995: 5.2 million tons, 0.068 opt Au proven and probable reserves (includes Mary-Drinkwater) 1998: 4 million tons, 0.06 opt Au; 241,000 oz Au 2000: 2.84 million tons, 0.074 opt Au minable reserves 2002: 2.66 million tons, 0.079 opt Au total reserves 2003: 8.3 million tons, 0.061 opt Au resource (includes 2.66 million tons, 0.079 opt Au reserves) 2010 (May): 4,697,000 tons, 0.047 opt Au (measured and indicated resource Drinkwater and Mary deposits) 2010 (May): 3,793,000 tons, 0.036 opt Au (inferred resource, Drinkwater and Mary deposits)	1997: 13,793 oz Au, 7,907 oz Ag 1998: 8,582 oz Au, 4,877 oz Ag 1999: 27,145 oz Au, 19,915 oz Ag 2000: 2,200 oz Au, 1,000 oz Ag 2001: 1,399 oz Au, 424 oz Ag 2002: 397 oz Au, 396 oz Ag 2003: 675 oz Au, 704 oz Ag 2004: 3,638 oz Au, 3,062 oz Ag 2005: 1,589 oz Au, 1,073 oz Ag	Wyman Formation	Mesozoic?
<b>Monte Cristo (Gilbert district)</b>	2006: 363,760 tons, 0.190 opt Au, 0.583 opt Ag (inferred resource) 2010: 2,545,980 tons, 0.11 opt Au (inferred resource, McLean Lode, 0.02 opt cut-off grade) 888,685 tons, 0.04 opt Au (inferred resource, Upper Zone, 0.02 opt cut-off grade) 999,966 tons, 1.27 opt Ag (inferred silver resource, McLean Lode, 0.36 opt cut-off grade) 123,948 tons, 0.78 opt Ag (inferred silver resource, Upper Zone, 0.36 opt cut-off grade)	late 1980s: 300,000 tons, 0.072 opt Au	Tertiary andesite, lithic tuff	Tertiary
<b>Tip Top (Fish Lake Valley district)</b>	1997: 109,000 tons, 0.103 opt Au, 0.88 opt Ag indicated resource 1998: 168,000 tons, 0.088 opt Au inferred geologic resource 2009: 388,920 tons, 0.096 opt Au (indicated resource) 323,230 tons, 0.072 opt Au (inferred resource)		Tertiary quartz latite	
<b>Three Hills (Tonopah district)</b>	1996: 3.2 million tons, 0.036 opt Au 1997: 6.3 million tons, 0.023 opt Au 2003: 5,736,000 tons, 0.023 opt Au (indicated resource)		Miocene Siebert Formation and Oddie Rhyolite	

## MAJOR PRECIOUS-METAL DEPOSITS, ESMERALDA COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Weepah (Weepah district)</b>	1986: 200,000 tons, 0.1 opt Au, 0.4 opt Ag	1986-87: 58,000 oz Au	Wyman Formation	Cretaceous
<b>EUREKA COUNTY</b>				
<b>Afgan (Antelope district)</b>	1996: 80,000 oz Au drill-indicated resource 1999: 2.8 million tons, 0.037 opt Au oxide resource 2004: 1.85 million tons, 0.027 opt Au (indicated resource) 1.29 million tons, 0.026 opt Au (inferred resource)		Webb Formation	
<b>Betze-Post (Lynn district)</b>	1988: 128.4 million tons, 0.095 opt Au 1999: 135.6 million tons, 0.153 opt Au proven and probable reserves; 23.3 million tons, 0.099 opt Au mineralized material 2000: 116.4 million tons, 0.155 opt Au proven and probable; 55.9 million tons, 0.063 opt Au mineral resource 2001: 108.9 million tons, 0.151 opt Au proven and probable; 49.9 million tons, 0.069 opt Au mineral resource 2002: 107.1 million tons, 0.150 opt Au proven and probable reserves; 47.6 million tons, 0.070 opt Au mineral resource 2003: 61,551,000 tons, 0.128 opt Au proven reserves; 48,191,000 tons, 0.162 opt Au probable reserves; 14,077,000 tons, 0.059 opt Au measured resource; 23,326,000 tons, 0.061 opt Au indicated resource; 323,000 tons, 0.065 opt Au inferred resource 2004: 123,334,000 tons, 0.131 opt Au proven and probable reserves; 22,318,000 tons, 0.050 opt Au mineral resource 2005: 114,512,000 tons, 0.128 opt Au (proven and probable reserves); 21,115,000 tons, 0.050 opt Au (measured and indicated resource); 417,000 tons, 0.089 opt Au (inferred resource) 2006: 105,206,000 tons, 0.125 opt Au (proven and probable reserves); 20,184,000 tons, 0.050 opt Au (measured and indicated resource); 489,000 tons, 0.078 opt Au (inferred resource) 2007: 94,914,000 tons, 0.128 opt Au (proven and probable reserves); 34,532,000 tons, 0.052 opt Au (measured and indicated resource); 5,014,000 tons, 0.064 opt Au (inferred resource) 2008: 86,254,000 tons, 0.119 opt Au (proven and probable reserves); 15,751,000 tons, 0.055 opt Au (measured and indicated resource); 479,000 tons, 0.092 opt Au (inferred resource) 2009: 82,902,000 tons, 0.112 opt Au (proven and probable reserves); 16,687,000 tons, 0.052 opt Au (measured and indicated resource); 3,568,000 tons, 0.116 opt Au (inferred resource) 2010: 95,865,000 tons, 0.101 opt Au (proven and probable reserves) 4,694,000 tons, 0.037 opt Au (measured and indicated resource) 1,344,000 tons, 0.065 opt Au (inferred resource)	1974: 302,807 oz Au 1980-88: 440,000 oz Au 1989-92: 2,214,508 oz Au, 92,347 oz Ag 1993: 1,439,929 oz Au 1994-98: 8,920,871 oz Au, 372,403 oz Ag 1999: 1,130,094 oz Au, 65,804 oz Ag 2000: 1,646,640 oz Au, 52,000 oz Ag 2001: 1,549,975 oz Au, 261,261 oz Ag 2002: 1,409,984 oz Au, 135,716 oz Ag 2003: 1,559,401 oz Au, 115,473 oz Ag 2004: 1,381,315 oz Au, 130,609 oz Ag 2005: 1,514,320 oz Au, 114,248 oz Ag 2006: 1,432,698 oz Au, 121,032 oz Ag 2007: 1,215,447 oz Au, 140,923 oz Ag 2008: 1,281,450 oz Au, 152,886 oz Ag 2009: 901,002 oz Au 120,736 oz Au 2010: 884,200 oz Au 138,931 oz Ag		Eocene
<b>Buckhorn property (Buckhorn district)</b>	1984: 5 million tons, 0.044 opt Au, 0.585 opt Ag 1990: 700,000 tons, 0.05 opt Au; <i>geologic resource</i> -200,350 oz Au 1993: <i>geologic resource</i> -1.1 million tons, 0.11 opt Au	1988-93: 109,422 oz Au, 409,887 oz Ag	basaltic andesite, sinter, silicified sedimentary rocks	14.6 Ma
<b>Buckhorn South/ Zeke deposit (Buckhorn district)</b>	1989: 2 million tons, 0.056 opt Au, 0.224 opt Ag 1998: 2.4 million tons, 0.046 opt Au		lower Paleozoic rocks	
<b>Cabin Creek (Antelope district)</b>	2009-2010 (Feb., 0.012 opt Au cut-off grade) 3.2 million tons, 0.024 opt Au (indicated resource) 0.1 million tons, 0.015 opt Au (inferred resource)			

## MAJOR PRECIOUS-METAL DEPOSITS, EUREKA COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Carlin North, Newmont (Lynn district)</b>				
<b>Blue Star</b>	1987: 1.95 million tons, 0.066 opt Au 1989: <i>geologic resource</i> -22.2 million tons, 0.030 opt Au	1974-84: intermittent 1988-2010: included in Newmont Gold production at the end of this section	lower Paleozoic sandy siltstone and carbonate rocks, granodiorite	Eocene
<b>Bobcat</b>	1988: <i>geologic resource</i> -17.7 million tons, 0.029 opt Au		lower Paleozoic rocks	Eocene
<b>Bullion Monarch</b>	1987: 1 million tons, 0.10 opt Au	1977-84: 17,779 oz Au	lower Paleozoic sedimentary rocks	Eocene
<b>Deep Star</b>	1996: 1.4 million tons, 0.8765 opt Au proven and probable reserves	1995: 2,800 oz Au 1996: 93,400 oz Au 1997-2008: included in Newmont Gold production at the end of this section	Popovich Formation	Eocene
<b>Genesis</b>	1989: <i>geologic resource</i> -35.8 million tons, 0.044 opt Au 1990: 32 million tons, 0.047 opt (includes Blue Star) 2004: 1,065,000 oz Au (proven and probable reserves)	1986: production commenced 1988-2010: included in Newmont Gold production at the end of this section	Ordovician-Devonian limestone, argillite, chert	Eocene
<b>Genesis/North Star</b>	1996: 22.7 million tons, 0.034 opt Au proven and probable reserves; 11 million	1994-95: 684,600 oz Au 1996-2010: included in Newmont Gold production at the end of this section	Ordovician-Devonian limestone, argillite, chert	Eocene
<b>Genesis Complex</b>	2000: 14.1 million tons, 0.026 opt Au proven and probable open-pit reserves 2004: 1,065,000 oz Au (proven and probable reserves) 2005: 1,193,058 oz Au (proven and probable reserves)			
<b>Leeville</b>	2004: 2,612,000 oz Au (proven and probable reserves) 2005: 2,433,000 oz Au (proven and probable reserves)	2005-2010: included in Newmont Gold production at the end of this section	Roberts Mountains Formation	Eocene
<b>North Lantern</b>	2004: 199,940 oz Au			
<b>North Star</b>	1989: <i>geologic resource</i> -6.9 million tons, 0.052 opt Au 1990: 3.9 million tons, 0.052 opt Au	1988: 4,250 oz Au 1989-2010: included in Newmont Gold production at the end of this section	lower Paleozoic sedimentary rocks	Eocene
<b>Post/Golddug</b>	1996: 25.6 million tons, 0.190 opt Au proven and probable reserves; 43.6 million tons, 0.079 opt Au mineralized material	1999-2010: included in Newmont Gold production at the end of this section	lower Paleozoic sedimentary rocks	Eocene
<b>Deep Post</b>	2000: 3.1 million tons, 0.814 opt Au proven and probable underground reserves 2004 (includes Deep Star) 1,462,000 oz Au (proven and probable reserves) 2005 (includes Deep Star) 942,000 oz Au (proven and probable reserves)	included in Newmont Gold production at the end of this section		
<b>Turf</b>	1996: 2.5 million tons, 0.367 opt Au mineralized material	included in Newmont Gold production at the end of this section	Roberts Mountains Formation	Eocene
<b>West Leeville (Newmont)</b>	1996: 2 million tons, 0.377 opt Au proven and probable reserves; 581,000 tons 0.354 opt Au mineralized material	1995-96: 272,000 oz Au 1997-2010: included in Newmont Gold production at the end of this section	Roberts Mountains Formation	Eocene
<b>West Leeville (Newmont-Barrick)</b>	1996: 7.1 million tons, 0.425 opt Au proven and probable reserves; 500,000 tons 0.328 opt Au mineralized material		Roberts Mountains Formation	Eocene
<b>Carlin Mine</b>	1965: 11 million tons, 0.32 opt Au	1965-86: 3.8 million oz Au		

## MAJOR PRECIOUS-METAL DEPOSITS, EUREKA COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Carlin/Pete/Lantern</b>	1995: 14.8 million tons, 0.031 opt Au 1996: 13.7 million tons, 0.046 opt Au proven and probable reserves; 14.7 million tons, 0.046 opt Au mineralized material 2004: 940,040 oz Au (proven and probable reserves) 2005: 1,044,841 oz Au (proven and probable reserves)	1994-96: 68,700 oz Au 1997-2010: included in Newmont Gold production at the end of this section	Roberts Mountains Formation	Eocene
<b>Carlin Underground</b>	2004: 163,000 oz Au 2005: 123,000 oz Au (proven and probable reserves)			
<b>Carlin North-other</b>	2000: 19.8 million tons, 0.052 opt Au, proven and probable open-pit reserves			
<b>Carlin North area total</b>	2000: 8.2 million tons, 0.495 opt Au, proven and probable underground reserves			
<b>Carlin North area, total open-pit</b>	2001: 32.6 million tons, 0.044 opt Au, proven and probable reserves; 13.0 million tons, 0.039 opt Au mineralized material			
<b>Carlin North area, total underground</b>	2001: 10.9 million tons, 0.56 opt Au, proven and probable reserves; 2.1 million tons, 0.55 opt Au mineralized material			
<b>Carlin South, Newmont (Maggie Creek district)</b>				
<b>Gold Quarry/Mac/Tusc</b>	1982: 25.1 million tons, 0.106 opt Au and 150 million tons, 0.036 opt Au 1987: 197.8 million tons, 0.042 opt Au 1990: 212.6 million tons, 0.042 opt Au, <i>geologic resource</i> -534.3 million tons, 0.037 opt Au 1996: 174.8 million tons, 0.046 opt Au proven and probable reserves; 51.9 million tons, 0.058 opt Au mineralized material 2004: 5,984,000 oz (proven and probable reserves) 2005: 6,554,297 oz (proven and probable reserves)	1981: 6,000 oz Au 1982: 19,000 oz Au 1983: 74,000 oz Au 1984: 68,200 oz Au 1985: 136,200 oz Au 1986: 309,800 oz Au 1987: 446,600 oz Au 1988-93: included in Newmont Gold production 1994-96: 2,978,000 oz Au 1997-2010: included in Newmont Gold production at the end of this section	Ordovician to Devonian chert, shale, siltstone, and impure carbonate rocks; in part, Vinini Formation	Eocene
<b>Mike</b>	1999: 408,000,00 tons, .006 opt Au 151,000,000 tons, 0.10 % Cu 19,000,000 tons, 1.00 % Zn (drill-indicated mineral inventory)			
<b>Tusc</b>	1988: <i>geologic resource</i> -15.8 million tons, 0.059 opt Au 1990: 13.3 million tons, 0.062 opt Au	included in Newmont Gold production at the end of this section	lower Paleozoic sedimentary rocks	Eocene
<b>Carlin South area</b>	2000: 75.2 million tons, 0.059 opt Au proven and probable open-pit reserves			
<b>Carlin South open-pit</b>	2001: 61.3 million tons, 0.062 opt Au proven and probable reserves; 24.6 million tons, 0.028 opt Au mineralized material			
<b>Chukar Footwall underground</b>	2001: 278,000 tons, 0.49 opt Au proven and probable reserves; 115,000 tons, 0.46 opt Au mineralized material 2004: 172,000 oz Au (proven and probable reserves) 2005: 256,000 oz Au (proven and probable reserves)			

## MAJOR PRECIOUS-METAL DEPOSITS, EUREKA COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Carlin North and South combined (includes all Newmont's Carlin properties)</b>				
<b>Carlin open pit</b>	<p>2002: 181.8 million tons, 0.042 opt Au proven and probable reserves; 9.5 million tons, 0.028 opt Au measured and indicated mineralized material; 9.3 million tons, 0.035 opt Au inferred mineralized material</p> <p>2003: 17,500,000 tons, 0.052 opt Au proven reserves 203,300,000 tons, 0.044 probable reserves 1,000,000 tons 0.035 measured material; 11,200,000 tons 0.024 indicated material; 10,400,000 tons 0.034 opt Au inferred material</p> <p>2004: 201,600,000 tons, 0.047 opt Au proven and probable reserves; 13,200,000 tons, 0.022 opt Au indicated material; 7,700,000 tons, 0.034 opt Au inferred material</p> <p>2005: 238.3 million tons, 0.043 opt Au (proven and probable reserves); 28.1 million tons, 0.04 opt Au (measured and indicated resource); 4.2 million tons, 0.024 opt Au (inferred resource)</p> <p>2006: 271.6 million tons, 0.042 opt Au (proven and probable reserves); 35.1 million tons, 0.035 opt Au (measured and indicated resource); 6.3 million tons, 0.022 opt Au (inferred resource)</p> <p>2007: 213.5 million tons, 0.045 opt Au (proven and probable reserves); 14.6 million tons, 0.020 opt Au (measured and indicated resource); 3.7 million tons, 0.037 opt Au (inferred resource)</p> <p>2008: 202.4 million tons, 0.045 opt Au (proven and probable reserves); 88.4 million tons, 0.040 opt Au (measured and indicated resource); 21.1 million tons, 0.023 opt Au (inferred resource)</p> <p>2009: 259.3 million tons, 0.044 opt Au (proven and probable reserves); 28.8 million tons, 0.021 opt Au (measured and indicated resource); 10.4 million tons, 0.034 opt Au (inferred resource)</p> <p>2010: 263,500,000 tons, 0.043 opt Au (proven and probable reserve, 75% recovery) 91,800,000 million tons, 0.020 opt Au (measured and indicated resource) 22,100,000 million tons, 0.034 opt Au (inferred resource)</p>	2004-2010: included in Newmont Gold production at the end of this section		Eocene
<b>Carlin underground</b>	<p>2002: 10 million tons, 0.57 opt Au proven and probable reserves; 2.6 million tons, 0.50 opt Au measured and indicated mineralized material; 200,000 tons, 0.53 opt Au inferred mineralized material</p> <p>2003: 2,700,000 tons, 0.670 opt Au proven reserves; 6,100,000 tons, 0.500 opt Au probable reserves; 3,700,000 tons 0.480 opt Au inferred material</p> <p>2004: 8,700,000 tons, 0.510 opt Au proven and probable reserves; 100,000 tons, 0.260 opt Au indicated material; 3,900,000 tons, 0.470 opt Au inferred material</p> <p>2005: 7.7 million tons, 0.49 opt Au (proven and probable reserves); 300,000 tons, 0.33 opt Au (measured and indicated resource); 3.7 million tons, 0.46 opt Au (inferred resource)</p> <p>2006: 7.4 million tons, 0.44 opt Au (proven and probable reserves); 1.1 million tons, 0.28 opt Au (measured and indicated resource); 3.0 million tons, 0.47 opt Au (inferred resource)</p> <p>2007: 7.2 million tons, 0.388 opt Au (proven and probable reserves); 110,000 tons, 0.482 opt Au (measured and indicated resource); 2.6 million tons, 0.480 opt Au (inferred resource)</p> <p>2008: 11.7 million tons, 0.313 opt Au (proven and probable reserves); 340,000 tons, 0.330 opt Au (measured and indicated resource); 3.1 million tons, 0.327 opt Au (inferred resource)</p> <p>2009: 9.7 million tons, 0.311 opt Au (proven and probable reserves); 810,000 tons, 0.180 opt Au (measured and indicated resource); 7.4 million tons, 0.289 opt Au (inferred resource)</p> <p>2010: 14,600,000 tons, 0.307 opt Au (proven and probable reserve, 88% recovery) 4,200,000 million tons, 0.290 opt Au (measured and indicated resource) 1,300,000 million tons, 0.345 opt Au (inferred resource)</p>	2004-2010: included in Newmont Gold gold production at the end of this section		Eocene

## MAJOR PRECIOUS-METAL DEPOSITS, EUREKA COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Gold Bar (Antelope district)</b>	1984: 2.8 million tons, 0.09 opt Au 1990: mined out in December 1994: 240,000 oz Au 1995: 190,000 oz Au 2001: 473,000 oz Au in 6 deposits 2002: 3.6 million tons, 0.100 opt Au resource	1987-90: 238,262 oz Au 1991: 80,727 oz Au, 3,000 oz Ag 1992-94: 155,080 oz Au	Devonian Nevada Formation	Eocene?
<b>Gold Canyon (Antelope district)</b>	1992: reserves-86,500 oz Au, <i>geologic resource</i> -131,000 oz Au 1993: 770,000 tons, 0.080 opt Au 2001: see Gold Bar 2002: 2.5 million tons, 0.056 opt Au resource	reported with Gold Bar	Devonian Upper Denay Limestone Formation	Eocene?
<b>Gold Pick (Antelope district)</b>	1988: 10 million tons, 0.06 opt Au 1993: 1.4 million tons, 0.079 opt Au 2001: see Gold Bar 2002: 5 million tons, 0.057 opt Au measured mineral resource 2005: 7,874,000 tons, 0.041 opt Au (indicated resource)	reported with Gold Bar	Devonian McColley Canyon Formation	Eocene?
<b>Gold Ridge (Antelope district)</b>	1988: 4 million tons, 0.06 opt Au 1993: 426,000 tons, 0.059 opt Au 2001: see Gold Bar 2002: 584,164 tons, 0.046 opt Au resource	reported with Gold Bar	Devonian McColley Canyon Formation	Eocene?
<b>Gold Pick and Gold Ridge (combined) (Antelope district)</b>	2009 (Feb, 0.012 opt Au cut-off grade): 21.5 million tons, 0.032 opt Au (measured and indicated resource) 8.7 million tons, 0.021 opt Au 2010 (0.012 opt Au cut-off grade): 33.3 million tons, 0.027 opt Au (measured and indicated and resource) 1.2 million tons, 0.016 opt Au (inferred resource)			
<b>Goldstone (Antelope district)</b>	1988: 1.7 million tons, 0.08 opt Au 1993: 130,928 tons, 0.104 opt Au 2001: see Gold Bar	reported with Gold Bar	Devonian Upper Denay Limestone Formation	Eocene?
<b>Horse Canyon (Cortez district)</b>	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	Wenban Limestone	35 Ma?
<b>Hunter (Antelope district)</b>	2009 (Feb., 0.013 opt Au cut-off grade) 0.5 million tons, 0.031 opt Au (indicated resource) 0.1 million tons, 0.015 opt Au (inferred resource)			
<b>Ratto Canyon (Lookout Mountain) (Eureka district)</b>	1984: ~200,000 oz Au (entire Ratto Ridge area): 2006: 836,000 tons, 0.24 opt Au (measured and indicated resource) 2010: 13,640,000 tons, 0.021 opt Au (measured and indicated resource) 16,420,000 tons, 0.012 opt Au (inferred resource)	1987-88: 17,000 oz Au	Dunderberg Shale, Hamburg Dolomite	Eocene
<b>Rock Creek (Eureka-Lander Co. line)</b>	1997: 800,000 tons, 0.045 opt Au		Tertiary latite tuff	
<b>Rodeo Projects (Rodeo, Griffin, Goldbug, North Betze) (Lynn district)</b>	1998: 2.9 million tons, 0.487 opt Au proven and probable reserves; 5.8 million tons, 0.302 opt Au mineralized material 1999: 5.8 million tons, 0.466 opt Au, proven and probable reserves; 13.0 million tons, 0.270 opt Au mineralized material 2000: 9.2 million tons, 0.414 opt Au proven and probable; 7.4 million tons, 0.333 opt Au mineral resource 2005-2010: reserves are combined with Meikle reserves	included with Meikle production, Elko County		Eocene

## MAJOR PRECIOUS-METAL DEPOSITS, EUREKA COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Ruby Hill (Eureka district)</b>	1994: <i>geologic resource</i> -20 million tons, 0.08 opt Au 1995: 7.62 million tons, 0.099 opt Au 1999: 3.77 million tons, 0.110 opt Au proven and probable; 7.33 million tons, 0.072 opt Au mineralized material 2000: 2.7 million tons, 0.105 opt Au proven and probable reserves; 7.3 million tons, 0.072 opt Au mineralized material 2004: (East Archimedes) 17,093,000 tons, 0.059 opt Au proven and probable reserves; 3,049,000 tons, 0.061 opt Au mineral resource 2006: (East Archimedes) 19,479,000 tons, 0.055 opt Au (proven and probable reserves); 601,000 tons, 0.088 opt Au (measured and indicated resource) 2007: (East Archimedes) 18,763,000 tons, 0.055 opt Au (proven and probable reserves); 3,202,000 tons, 0.076 opt Au (measured and indicated resource); 6,000 tons, 0.333 opt Au, (inferred resource) 2008: (East Archimedes) 18,844,000 tons, 0.044 opt Au (proven and probable reserves); 11,919,000 tons, 0.04 opt Au (measured and indicated resource); 3,495,000 tons, 0.037 opt Au, (inferred resource) 2009: 13,933,000 tons, 0.050 opt Au (proven and probable reserves); 8,960,000 tons, 0.057 opt Au (measured and indicated resource); 2,928,000 tons, 0.051 opt Au, (inferred resource) 2010: 17,182,000 tons, 0.065 opt Au (proven and probable reserves) 61,530,000 tons, 0.023 opt Au (measured and indicated resource); 12,885,000 tons, 0.024 opt Au (inferred resource)	1997-98: 133,100 oz Au, 8,686 oz Ag 2000: 125,193 oz Au, 7,984 oz Ag 1999: 123,841 oz Au, 7,688 oz Ag 2001: 134,737 oz Au, 9,315 oz Ag 2002: 135,448 oz Au, 9,750 oz Ag 2003: 18,134 oz Au, 2,441 oz Ag 2004: 6,057 oz Au, 1,868 oz Ag 2007: 142,856 oz Au, 8,368 oz Ag 2008: 102,553 oz Au, 7,572 oz Ag 2009: 103,523 oz Au, 39,110 oz Ag 2010: 81,382 oz Au, 43,276 oz Ag	Goodwin Limestone	
<b>Tonkin Springs (Antelope district)</b>	1983: 1.84 million tons, 0.089 opt Au, 0.204 opt Ag 1987: <i>oxide</i> -1.5 million tons, 0.05 opt Au; <i>sulfide</i> -2.5 million tons, 0.09 opt Au 1991: 9 million tons, 0.05 opt Au 1999: 30.7 million tons, 0.045 opt Au resource 2006: 29,672,000 tons, 0.043 opt Au (measured and indicated resource); 3,466,000 tons, 0.044 opt Au, (inferred resource) 2008 (May): 35,584,000 tons, 0.041 opt Au (measured and indicated resource) 9,290,000 tons, 0.033 opt Au, (inferred resource)	1987-88: 10,265 oz Au 1989-90: 3,821 oz Au, 1,872 oz Ag	Vinini Formation	Eocene?
<b>Windfall (Eureka district)</b>	1988: 3 million tons, 0.03 opt Au 1995: mined out	1908-16: 24,000 oz Au 1975-84: 90,000 oz Au 1988: 6,380 oz Au, 59 oz Ag	Hamburg Dolomite	Eocene or Oligocene
<b>HUMBOLDT COUNTY</b>				
<b>Adelaide Crown (Gold Run district)</b>	1989: south pit-585,000 tons, 1.313 opt Ag, 0.043 opt Au; additional area: 165,000 tons, 0.015 opt Au, 1.10 opt Ag	1990-91: 4,917 oz Au, 53,474 oz Ag	Preble Formation	Tertiary
<b>Ashdown (Vicksburg district)</b>	1987: 1.16 million tons, 0.125 opt Au 1992: 1.1 million tons, 0.12 opt Au 2002: 100,000 oz Au		Mesozoic granite	Mesozoic
<b>Buckskin (National district)</b>	1997: 50,221 oz Au, 466,243 oz Ag estimated resource		Miocene rhyolite flows and flow breccias	16 Ma
<b>Chimney Creek (Potosi district)</b>	1988: proven, probable-26.9 million tons, 0.068 opt Au; inferred in south pit-2.1 million oz Au 1993: see Twin Creeks	1987-88: 300,000 oz Au 1989: 222,556 oz Au, 55,953 oz Ag 1990: 220,000 oz Au 1991-92: 476,034 oz Au, 213,463 oz Ag 1993: see Twin Creeks	upper Paleozoic sedimentary rocks	

## MAJOR PRECIOUS-METAL DEPOSITS, HUMBOLDT COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Converse/Redline (Buffalo Valley district)</b>	2003: 77,459,000 tons, 0.020 opt Au measured and indicated resource 2004: 263 million tons, 0.0150 opt Au, 0.0582 opt Ag (measured and indicated resource) 35 million tons, 0.0143 opt Au, 0.0524 opt Ag		Havallah Formation, granodiorite	Tertiary
<b>Getchell (Potosi district)</b>	1989: 8.1 million tons, 0.154 opt Au mill grade and 1.43 million tons, 0.049 opt Au heap-leach ore; additional geologic resource: 5.7 million tons, 0.092 opt Au sulfide and 2.6 million tons, 0.055 opt Au oxide 1999: 18.1 million tons, 0.359 opt Au 2000: 2.8 million oz Au measured resource, 5.5 million oz Au indicated resource, and 6.7 million oz inferred resource 2002: 2.69 million oz Au proven and probable reserves; 1.51 million oz Au measured and indicated mineral resource 2003: (Turquoise Ridge) 6,000,000 tons, 0.570 opt Au proven reserves; 2,400,000 tons, 0.620 opt Au probable reserves; 4,400,000 tons, 0.300 opt Au measured material; 2,800,000 tons, 0.400 opt Au indicated material; 4,800,000 tons, 0.490 opt Au inferred material 2005: Turquoise Ridge Mine (included Turquoise Ridge and Getchell Footwall deposits) 7.6 million tons, 0.56 opt Au (proven and probable reserves); 5.6 million tons, 0.42 opt Au (measured and indicated resource); 400,000 tons, 0.54 opt (inferred resource) 2006: Turquoise Ridge Mine (included Turquoise Ridge and Getchell Footwall deposits) 8.436 million tons, 0.544 opt Au (proven and probable reserves); 4.801 million tons, 0.432 opt Au (measured and indicated resource); 1.961 million tons, 0.493 opt (inferred resource) 2007: Turquoise Ridge Mine (included Turquoise Ridge and Getchell Footwall deposits) 11.239 million tons, 0.458 opt Au (proven and probable reserves); 3.291 million tons, 0.409 opt Au (measured and indicated resource); 2.000 million tons, 0.444 opt (inferred resource) 2008: Turquoise Ridge Mine 10.614 million tons, 0.501 opt Au (proven and probable reserves); 3.289 million tons, 0.435 opt Au (measured and indicated resource); 4.440 million tons, 0.505 opt (inferred resource) 2009: Turquoise Ridge Mine 10.680 million tons, 0.507 opt Au (proven and probable reserves); 2.307 million tons, 0.431 opt Au (measured and indicated resource); 5.033 million tons, 0.456 opt (inferred resource) 2010: Turquoise Ridge Mine 12,339,000 tons, 0.456 opt Au (proven and probable reserve, 92% recovery) 85,625,000 tons, 0.131 opt Au (measured and indicated resource) 43,427,000 tons, 0.160 opt Au (inferred resource)	1938-50, 1962-67: 788,875 oz Au 1987-88: ~35,000 oz Au 1989: 120,730 oz Au, 9,407 oz Ag 1990-91: 372,987 oz Au 1992-95: 790,600 oz Au, 258,700 oz Ag 1996-97: 348,517 oz Au 1998: 175,302 oz Au, 52,490 oz Ag 1999: 111,000 oz Au 2002: 54,600 oz Au, 5,400 oz Ag 2003: 93,337 oz Au 2004: 162,637 oz Au 2005: 208,492 oz Au, 54,419 oz Ag 2006: 233,127 oz Au, 30,473 oz Ag 2007: 251,133 oz Au 2008: 168,808 oz Au 2009: 177,333 oz Au 2010: 161,579 oz Au	Comus and Preble Formations, dikes, granodiorite	37-41 Ma
<b>Hycroft formerly Crofoot/Lewis (Sulphur district)</b>	1988: 25 million tons, 0.025 opt Au 1999: 23.8 million tons, 0.0204 opt Au proven and probable reserves; 2.3 million tons, 0.0177 opt Au indicated reserves 2000: 41.9 million tons, 0.0196 opt Au measured and indicated resource; 14.1 million tons, 0.0152 opt Au inferred resource 2004: 47,479,000 tons, 0.016 opt Au measured and indicated; 12,029,000 tons, 0.011 opt Au inferred resource 2005: 33.32 million tons, 0.02 opt Au (proven and probable reserves) 52.7 million tons, 0.019 opt Au (measured and indicated resource) 8.7 million tons, 0.015 opt Au (inferred resource) 2007: 33.320 million tons, 0.020 opt Au (proven and probable reserves, January 2008);	1988: 75,800 oz Au 1989-98: 868,544 oz Au, 2,717,170 oz Ag 1999: 40,075 oz Au, 183,190 oz Ag 2000: 13,493 oz Au, 38,418 oz Ag 2001: 3,232 oz Au, 2,000 Ag 2002: 1,771 oz Au, 217 oz Ag 2003: 644 oz Au, 100 oz Ag 2004: 61 oz Au 2008: 1,000 oz Au, 3,000 oz Ag 2009: 53,189 oz Au, 65,753 oz Ag 2010: 102,483 oz Au, 233,974 oz Ag	Camel conglomerate, rhyolite dikes	1-2 Ma

## MAJOR PRECIOUS-METAL DEPOSITS, HUMBOLDT COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age	
<b>Hycroft (cont.)</b>	<p>19.780 million tons, 0.018 opt Au (measured and indicated resource, January 2008);                      283.392 million tons, 0.019 opt Au (inferred resource, May 2008)                      2008 (October 2008): 73,159,508 tons, 0.016 opt Au (proven and probable reserves;                      141.3 million tons, 0.014 opt Au (measured and indicated resource, 0.005 opt Au cut-off grade);                      180.2 million tons, 0.012 opt Au (oxide inferred resource, 0.005 opt Au cut-off grade)                      199.4 million tons, 0.20 opt Au (sulfide inferred resource, 0.013 opt Au cut-off grade)                      2010: 177,228,000 tons, 0.014 opt Au, 0.18 opt Ag (proven and probable oxide reserves)                      366,991,000 tons, 0.013 opt Au, 0.22 opt Ag (measured and indicated oxide resource)                      143,927,000 tons, 0.018 opt Au, 0.72 opt Ag (measured and indicated sulfide resource)                      95,510,000 tons, 0.011 opt Au, 0.33 opt Ag (inferred oxide resource)                      148,804,000 tons, 0.017 opt Au, 0.85 opt Ag (inferred sulfide resource)                      2010 (year-end): 196,000,000 tons, 0.013 opt Au, 0.25 opt Ag (proven and probable oxide heap leach reserves)                      720,000,000 tons, 0.007 opt Au, 0.15 opt Ag (measured and indicated oxide and transitional heap leach resource)                      620,000,000 tons, 0.014 opt Au, 0.71 opt Ag (measured and indicated oxide, transitional and sulfide mill resource)                      181,000,000 tons, 0.015 opt Au, 0.56 opt Ag (inferred oxide, transitional and sulfide resource)</p>				
<b>Lone Tree (Buffalo Mountain district)</b>	<p>1990: 5.4 million tons oxide mill ore, 0.159 opt Au, 5.7 million tons heap-leach ore, 0.025 opt Au and 1.2 million oz Au in sulfide ore                      1994: 4 million oz Au                      2000: 40.8 million tons, 0.060 opt Au proven and probable reserves (Lone Tree Complex)                      2001: 29.2 million tons, 0.065 opt Au proven and probable reserves; 7.9 million tons, 0.032 opt Au mineralized material                      2002: 21 million tons, 0.069 opt Au proven and probable reserves; 2 million tons, 0.057 opt Au measured and indicated mineralized material; 1 million tons, 0.047 opt Au inferred mineralized material                      2003: 3,300,000 tons, 0.092 opt Au proven reserves; 13,000,000 tons, 0.084 opt Au probable reserves; 2,100,000 tons, 0.054 opt Au indicated material; 600,000 tons, 0.054 opt Au inferred material                      2004: 14,000,000 tons, 0.063 opt Au proven And probable reserves; 3,400,000 tons, 0.044 opt Au indicated material; 200,000 tons, 0.116 opt Au inferred material                      2005: 4 million tons, 0.080 opt Au (proven and probable reserves); 3 million tons, 0.032 opt Au (measured and indicated resource);                      2007: 4.200 million tons, 0.022 opt Au (measured and indicated resource)</p>	<p>1991-99: 546,335 oz Au                      1995: 240,000 oz Au, 11,000 oz Ag                      1996-97: 536,820 oz Au                      1998: 257,702 oz Au, 27,484 oz Ag                      1999: 191,975 oz Au, 35,617 oz Ag                      2000: 281,022 oz Au, 38,346 oz Ag                      2001: 260,518 oz Au, 29,974 oz Ag                      2002: 327,160 oz Au, 65,905 oz Ag                      2003: 434,704 oz Au, 80,094 oz Ag                      2004: 497,065 oz Au, 140,144 oz Ag                      2005: 339,187 oz Au, 46,934 oz Ag                      2006: 357,787 oz Au, 26,601 oz Ag                      2007: 182,768 oz Au, 37,172 oz Ag                      2008: 16,775 oz Au, 1,897 oz Ag                      2009: 12,011 oz Au, 2,309 oz Ag</p>	<p>Havallah Formation, Antler sequence, and dacite porphyry</p>	<p>38 Ma</p>	
<b>Marigold (Battle Mountain district)</b>	<p>1987: 8 million tons, 0.0935 opt Au                      1990: 4.3 million tons, 0.105 opt Au mill ore, 7.6 million tons, 0.026 opt Au heap-leach ore                      1999: 19.09 million tons, 0.032 opt Au                      2000: 30.2 million tons, 0.035 opt Au proven and probable reserves; 20.7 million tons, 0.029 opt Au measured and indicated resource                      2001: 75.5 million tons, 0.027 opt Au proven and probable reserves; 109.9 million tons, 0.014 opt Au measured and indicated resource                      2002: 79.1 million tons, 0.026 opt Au proven and probable reserves; 129.7 million tons, 0.014 opt Au mineral resource</p>	<p>1989-93: 322,219 oz Au, 9,784 oz Ag                      1994-98: 363,771 oz Au                      1999: 74,000 oz Au                      2000: 68,000 oz Au                      2001: 84,784 oz Au, 401 oz Ag                      2002: 83,321 oz Au, 1,281 oz Ag                      2003: 142,100 oz Au, 2,080 oz Ag                      2004: 141,304 oz Au, 2,354 oz Ag                      2005: 205,663 oz Au, 1,723 oz Ag</p>	<p>Paleozoic chert, argillite, and carbonate rocks</p>		

## MAJOR PRECIOUS-METAL DEPOSITS, HUMBOLDT COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Marigold (cont.)</b>	2003: 9,366,000 tons, 0.031 opt Au proven reserves; 83,909,000 tons, 0.023 opt Au probable reserves; 19,937,000 tons, 0.020 opt Au measured reserves; 20,069,000 tons, 0.020 opt Au indicated resource; 177,450,000 tons, 0.014 opt Au inferred resource 2004: 71,218,500 tons, 0.023 opt Au proven and probable reserves; 18,043,500 tons, 0.022 opt Au measured and indicated resource; 21,000,000 tons, 0.014 opt Au inferred resource 2005: 98.21 million tons, 0.021 opt Au (proven and probable reserves); 157.48 million tons, 0.020 opt Au (measured and indicated resource, includes reserves); 163.23 million tons, 0.013 opt Au (inferred resource) 2006: 102.87 million tons, 0.021 opt Au (proven and probable reserves); 94.587 million tons, 0.018 opt Au (measured and indicated resource); 88.212 million tons, 0.011 opt Au (inferred resource) 2007: 84.66 million tons, 0.020 opt Au (proven and probable reserves); 46.41 million tons, 0.020 opt Au (measured and indicated resource); 122.53 million tons, 0.013 opt Au (inferred resource) 2008: 69.6 million tons, 0.020 opt Au (proven and probable reserves); 42.66 million tons, 0.016 opt Au (measured and indicated resource); 44.81 million tons, 0.013 opt Au (inferred resource) 2009: 150 million tons, 0.016 opt Au (proven and probable reserves) 42.19 million tons, 0.015 opt Au (indicated resource); 75 million tons, 0.015 opt Au (inferred resource) 2010: 143,529,000 tons, 0.016 opt Au (proven and probable reserves) 80,526,000 tons, 0.014 opt Au (indicated resource); 46,638,000 tons, 0.014 opt Au (inferred resource)	2006: 149,805 oz Au, 1,986 oz Ag 2007: 140,840 oz Au, 2,233 oz Ag 2008: 144,106 oz Au, 5,037 oz Ag 2009: 146,842 oz Au, 4,239 oz Ag 2010: 136,754 oz Au, 3,729 oz Ag		
<b>North Stonehouse (Buffalo Mountain district)</b>	1991: 2.5 million tons, 0.103 oz Au mill ore		Havallah Formation and porphyry dikes	39 Ma
<b>Pinson (Potosi district)</b>	1980: 3.245 million tons, 0.119 opt Au 1989: 480,000 oz Au 1996: 2.6 million tons, 0.072 opt Au 2005: 1,692,000 tons, 0.421 opt Au (measured and indicated resource) 3,097,000 tons, 0.34 opt Au (inferred resource) 2006: (includes Range Front, Ogee and CX-West zones) 2,505,000 tons, 0.454 opt Au (measured and indicated resource) 3,374,500 tons, 0.340 opt Au (inferred resource)	1980: 56,000 oz Au 1986-88: 189,864 oz Au 1989: 72,489 oz Au (includes Preble) 1990-91: 112,022 oz Au 1992-94: 145,210 oz Au, 12,700 oz Ag 1995: 44,854 oz Au 1996-98: 128,935 oz Au, 7,990 oz Ag 1999: 11,975 oz Au, 442 oz Ag 2000: 1,116 oz Au, 31 oz Ag 2001: 679 oz Au	Comus Formation	Eocene?
<b>Preble (Potosi district)</b>	1985: 1.8 million tons, 0.062 opt Au 1986: 3.16 million tons, 0.093 opt Au heap leach, 80,000 tons, 0.242 opt Au mill grade 1989: 15,110 oz Au	1985: 17,000 oz Au 1987: 28,000 oz Au 1988: 18,828 oz Au 1989: included with Pinson 1990: 1,161 oz Au	Preble Formation	Eocene?
<b>Rabbit Creek (Potosi district)</b>	1989: 4.1 million oz Au (additional geologic resource of 1 million Au in refractory material) 1992: reserves-3.26 million oz Au 1993: see Twin Creeks	1990-92: 296,000 oz Au 1993: see Twin Creeks	Ordovician	Eocene?
<b>Sandman (Tenmile district)</b>	2007: 8.033 million tons, 0.034 opt Au (measured and indicated resource) 1,418,000 million tons, 0.027 opt Au (inferred resource)			
<b>Sleeper (Awakening district)</b>	1985: 4.2 million tons, 0.13 opt Au, 0.73 opt Ag 1989: 1,975,000 oz Au 1990: 44.1 million tons, 0.038 opt Au, 0.152 opt Ag	1986: 128,000 oz Au, 94,000 oz Ag 1987-88: 389,106 oz Au 1989-96: 1,149,054 oz Au,	Miocene "latite" flows and dikes, silicic ash-flow tuff, Triassic slate and	16.1 Ma

## MAJOR PRECIOUS-METAL DEPOSITS, HUMBOLDT COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Sleeper (cont.)</b>	1999: 2.1 million oz Au at average grade of 0.025 opt Au; 18.1 million oz Ag at average grade of 0.208 opt Ag 2008: 29,718,000 tons, 0.025 opt Au (indicated resource) 22,046,000 tons, 0.017 opt Au	1,838,791 oz Ag 2001: 90 oz Au, 197 oz Ag 2002: 130 oz Au, 263 oz Ag	phyllite	
<b>Trenton Canyon (includes Valmy and North Peak) (Buffalo Valley district)</b>	1994 oxide resource: 14.6 million tons, 0.035 opt Au, (517,000 oz Au) 1999: 995,000 tons, 0.021 opt Au (North Peak); 10.8 million tons, 0.022 opt Au (Valmy)	2000: included with Lone Tree 2001: 24,228 oz Au, 2,996 oz Ag 2002: 3,685 oz Au, 742 oz Ag 2006: 1,937 oz Au, 38 oz Ag 2007: 1,768 oz Au, 360 oz Ag		
<b>Trout Creek (Battle Mountain district)</b>	1989: 50,000 oz Au			
<b>Twin Creeks (Chimney and Rabbit Creeks) (Potosi district)</b>	1993: 5.7 million oz Au 1999: 87.1 million tons, 0.079 opt Au proven and probable 2000: 75.2 million tons, 0.086 opt Au proven and probable 2002: 47.6 million tons, 0.081 opt Au proven and probable reserves; 55 million tons, 0.057 opt Au measured and indicated mineralized material; 1.8 million tons, 0.046 opt Au inferred mineralized material 2003: 14,000,000 tons, 0.085 opt Au proven reserves; 48,200,000 tons, 0.074 opt Au probable reserves; 8,000,000 tons, 0.051 opt Au measured material; 34,800,000 tons, 0.051 opt Au indicated material; 1,700,000 tons, 0.041 opt Au inferred material; 2004: 61,800,000 tons, 0.075 opt Au proven and probable reserves; 15,300,000 tons, 0.077 opt Au indicated material; 800,000 tons, 0.043 opt Au inferred material 2005: 61.2 million tons, 0.074 opt Au (proven and probable reserves); 19.9 million tons, 0.049 opt Au (measured and indicated resource); 3.1 million tons, 0.033 opt Au (inferred resource) 2006: 64.8 million tons, 0.077 opt Au (proven and probable reserves); 25.0 million tons, 0.058 opt Au (measured and indicated resource); 3.1 million tons, 0.033 opt Au (inferred resource) 2007: 52.1 million tons, 0.078 opt Au (proven and probable reserves); 21.0 million tons, 0.063 opt Au (measured and indicated resource); 2.6 million tons, 0.030 opt Au (inferred resource) 2008: 51.7 million tons, 0.077 opt Au (proven and probable reserves); 31.1 million tons, 0.051 opt Au (measured and indicated resource); 10.8 million tons, 0.018 opt Au (inferred resource) 2009: 50.2 million tons, 0.077 opt Au (proven and probable reserves); 35.0 million tons, 0.050 opt Au (measured and indicated resource); 11.3 million tons, 0.018 opt Au (inferred resource) 2010: 57,800,000 tons, 0.076 opt Au (proven and probable reserve, 79% recovery) 37,900,000 tons, 0.039 opt Au (measured and indicated resource); 12,000,000 tons, 0.0194 opt Au (inferred resource)	1993-98: 3,338,026 oz Au, 1,317,456 oz Ag 1999: 879,453 oz Au, 119,191 oz Ag 2000: 779,075 oz Au, 103,909 oz Ag 2001: 831,962 oz Au, 95,721 oz Ag 2002: 786,313 oz Au, 158,401 oz Ag 2003: 697,607 oz Au, 128,535 oz Ag 2004: 352,810 oz Au, 99,472 oz Ag 2005: 267,620 oz Au, 144,172 oz Ag 2006: 354,484 oz Au, 43,467 oz Ag 2007: 488,457 oz Au, 99,344 oz Ag 2008: 512,190 oz Au, 57,913 oz Ag 2009: 437,830 oz Au, 84,159 oz Ag 2010: 452,744 oz Au, 211,935 oz Ag	Paleozoic	41-43 Ma
<b>Winnemucca Mountain (Winnemucca district)</b>	1998: 130,000 to 140,000 oz Au proven, 300,000 oz Au indicated			

### LANDER COUNTY

<b>Austin Gold Venture (Birch Creek district)</b>	1986: 1.75 million tons, 0.16 opt Au 1989: mined out 1999: 154,000 oz Au resource	1986-88: 141,000 oz Au 1989: 50,000 oz Au	Antelope Valley Limestone	Cretaceous or Tertiary
---	---	--	---------------------------	------------------------

## MAJOR PRECIOUS-METAL DEPOSITS, LANDER COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Battle Mountain Complex (Battle Mountain district)</b>	1992: 500,000 oz Au 1995: resource (overall Battle Mountain complex)-60.2 million tons, 0.036 opt Au, including reserves-46.6 million tons, 0.040 opt Au 1999 (Phoenix): 5,680,000 oz Au proven and probable; 1.5 million oz Au additional mineralization 2000: 175.2 million tons, 0.034 opt Au proven and probable reserves	1994-98: 274,741 oz Au, 632,739 oz Ag 1999: 8,322 oz Au, 19,526 oz Ag 2000: 1,509 oz Au, 1,756 oz Ag 2001: see Phoenix		Eocene
<b>Buffalo Valley Gold Project (Buffalo Valley district)</b>	1988: 1.5 million tons, 0.05 opt Au 1994: 4.8 million tons, 0.07 opt Au 1997: 600,106 oz Au resource; 100,797 oz Au, other mineralized material 2010: 18,300,000 tons, 0.020 opt Au (indicated resource) 900,000 tons, 0.017 opt Au (inferred resource)	1988-90: 39,668 oz Au		Eocene?
<b>Cortez Joint Venture (Bullion district) CJV includes original Cortez Mine, Pipeline, South Pipeline, Gold Acres (2007 and on includes Cortez Hills)</b>	1968: 3.6 million tons, 0.279 opt Au (Cortez deposit) 1987: 4.8 million tons, 0.105 opt Au 1999: 189.4 million tons, 0.050 opt Au proven and probable; 119.1 million tons, 2000: 151.3 million tons, 0.047 opt Au proven and probable; 60.0 million tons, 0.047 opt Au mineralized material 2001: 191.1 million tons, 0.044 opt Au proven and probable; 76.6 million tons, 0.040 opt Au resource 2002: 229.3 million tons, 0.034 opt Au proven and probable reserves; 281.7 million tons, 0.025 opt Au measured and indicated mineral resource 2003: 88,131,000 tons, 0.061 opt Au proven reserves; 49,623,000 tons, 0.045 opt Au probable reserves; 44,617,000 tons, 0.046 opt Au measured resource; 130,580,000 tons, 0.027 opt Au indicated resource; 18,023,000 tons, 0.047 opt Au inferred resource 2004: 193,560,000 tons, 0.046 opt Au proven and probable reserves; 188,860,000 tons, 0.028 opt Au measured and indicated; 20,500,000 tons, 0.024 opt Au inferred resource 2005 (Sept 1): 275.8 million tons, 0.040 opt Au (proven and probable reserves); 309 million tons, 0.033 opt Au (measured and indicated resource); 39.2 million tons, 0.058 opt Au (inferred resource) 2006: 184.0 million tons, 0.061 opt Au (proven and probable reserves); 44.47 million tons, 0.041 opt Au (measured and indicated resource); 6.54 million tons, 0.131 opt Au (inferred resource) 2007: 144.09 million tons, 0.080 opt Au (proven and probable reserves); 76.24 million tons, 0.045 opt Au (measured and indicated resource); 19.34 million tons, 0.153 opt Au (inferred resource) 2008: 222,125,000 tons, 0.060 opt Au (proven and probable reserves); 81,088,000 million tons, 0.046 opt Au (measured and indicated resource); 29,912,000 million tons, 0.129 opt Au (inferred resource) 2009: 243,669,000 tons, 0.058 opt Au (proven and probable reserves); 46,622,000 million tons, 0.074 opt Au (measured and indicated resource); 30,128,000 million tons, 0.144 opt Au (inferred resource)	1942-84: 2.4 million tons, 0.13 opt Au; 2 million tons, 0.041 opt Au leached. Little Gold Acres: 0.124 opt Au 1988: 42,322 oz Au (includes Horse Canyon) 1989: 39,993 oz Au, 12,234 oz Ag (includes Horse Canyon) 1990-91: 107,445 oz Au, 16,750 oz Ag 1992-93: 141,850 oz Au 1995-98: 1,817,273 oz Au, 31,332 oz Ag 1999: 1,328,525 oz Au 2000: 1,009,992 oz Au 2001: 1,184,732 oz Au 2002: 1,081,677 oz Au 2003: 1,065,402 oz Au 2004: 1,051,197 oz Au 2005: 915,889 oz Au, 52,160 oz Ag 2006: 408,255 oz Au, 25,065 oz Ag 2007: 534,173 oz Au, 47,240 oz Ag 2008: 464,253 oz Au (6,804 oz Au from Cortez Hills), 69,278 oz Ag 2009: 517,512 oz Au, 74,080 oz Ag 2010 (open pits): 791,978 oz Au, 45,477 oz Ag 2010 (underground, Cortez Hills): 347,988 oz Au	Roberts Mountains Formation, Wenban Limestone, Valmy Formation, quartz porphyry dikes	

## MAJOR PRECIOUS-METAL DEPOSITS, LANDER COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Cortez Joint Venture (cont.)</b>	2010: 317,081,000 tons, 0.046 opt Au (proven and probable reserves); 60,463,000 million tons, 0.072 opt Au (measured and indicated resource); 50,337,000 million tons, 0.103 opt Au (inferred resource)			
<b>Cortez Hills</b>	2005 (Sept 1): 71.3 million tons, 0.079 opt Au, 5,545,000 oz Au (proven and probable reserves); 5.75 million tons, 0.42 opt Au, 2,421,667 oz Au (measured and indicated resource, underground); 13.8 million tons, 0.13 opt Au, 1,856,667 oz Au (inferred resource, open pit and underground) 2006: 8.5 million oz Au (proven and probable reserves) 2008 (Nov.): 15,620,000 tons, 0.127 opt Au, 1,983,740 oz Au (proven reserve) 128,150,000 tons, 0.074 opt Au, 9,483,000 oz Au (probable reserve) 2010 (open pit): 31,531,000 tons, 0.139 opt Au (proven and probable reserve) 2010 (underground, breccia zone): 2,251,000 tons, 0.595 opt Au (proven and probable reserve) 2010 (underground, middle zone): 3,173,000 tons, 0.370 opt Au (proven and probable reserve)			
<b>Crescent Pit</b>	1994: 1.97 million tons mill grade, 0.125 opt Au, 2.2 million tons heap-leach, 0.029 opt Au 1997: included in Cortez Joint Venture			
<b>Crescent Valley (Bullion district)</b>	1994: placer reserves-8 million cu yd, 0.031 oz Au/cu yd 1995: placer resource-6 million cu yd, 0.03 oz Au/cu yd			
<b>Crossroads (Bullion district)</b>	2010: 125,842,000 tons, 0.027 opt Au (proven and probable reserve)			
<b>Dean (Lewis district)</b>	1995: proven reserves-11,000 oz Au possible to probable resource-240,000 oz Au			
<b>Elder Creek Project/Shoshone (Lewis district)</b>	1989: 91,500 oz Au 1990: 1.5 million tons, 0.041 opt Au	1990-91: 20,102 oz Au	Valmy Formation	Cretaceous or Eocene
<b>Fire Creek (northeast of Bullion district)</b>	1982: 350,000 tons, 0.06 opt Au 2005 (May): 1,779,196 tons, 0.328 opt Au (indicated resource) 2006: 1,961,195 tons, 0.576 opt Au (indicated resource) 2008 (April): 2,654,650 tons, 0.479 opt Au (indicated resource, 0.233 opt Au cut-off grade) 1,184,202 tons, 0.396 opt Au (inferred resource, 0.233 opt Au cut-off grade) 2011 (May, 0.204 opt cut-off grade): 2,364,770 tons, 0.513 opt Au (indicated resource) 611,830 tons, 0.366 opt Au (inferred resource) 2011 (May, 0.117 opt Au cut-off grade): 5,705,619 tons, 0.289 opt Au (indicated resource,) 1,910,096 tons, 0.240 opt Au (inferred resource)	1983-84: 767 oz Au	basaltic andesite	Miocene
<b>Fortitude Complex (Battle Mountain district)</b>	1984: 16 million tons, 0.15 opt Au, 0.57 opt Ag	1986: 253,000 oz Au, 902,000 oz Ag 1987: 255,000 oz Au 1988-93: 985,616 oz Au, 1,707,992 oz Ag (includes Surprise) 1994: 50,000 oz Au, 95,000 Ag (Reona Mine) 1995: see Battle Mountain Complex 2001: see Phoenix	Battle Formation, Antler Peak Limestone Pumpnickel Formation	37 Ma

## MAJOR PRECIOUS-METAL DEPOSITS, LANDER COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Fortitude Extension (Battle Mountain district)</b>	1992: 500,000 oz Au 1993: <i>geologic resource</i> -900,000 oz Au 1996: included in Battle Mountain Complex			
<b>Independence Battle Mountain district)</b>	2010: 14,802,000 tons, 0.014 opt Au, 0.27 opt Ag (measured and indicated oxide resource) 5,997,000 tons, 0.011 opt Au, 0.066 opt Ag (inferred oxide resource) 4,182,000 tons, 0.19 opt Au (inferred sulfide resource, 0.25 opt Au cut-off grade, skarn mineralization)			
<b>Fortitude Extension (Battle Mountain district)</b>	1992: 500,000 oz Au 1993: <i>geologic resource</i> -900,000 oz Au 1996: included in Battle Mountain Complex			
<b>Gap (Bullion district)</b>	1984: 2010: 53,571,000 tons, 0.015 opt Au (proven and probable reserve)			
<b>Hilltop (Hilltop district)</b>	1984: 10.3 million tons, 0.073 opt Au 1989: 10 million tons, 0.049 opt Au 2005: 121 million tons, 0.019 opt Au (measured and indicated resource)		Valmy Formation	Oligocene?
<b>Klondike property</b>	1989: 100,000 oz Au equivalent			
<b>McCoy/Cove (McCoy district)</b>	1981: 2.5 million tons, 0.08 opt Au, 1 opt Ag (McCoy) 1987: 14 million tons, 0.05 opt Au (McCoy); 4 million oz Au, 250 million oz Ag (Cove) 1989: proven and probable reserves 2.9 million oz Au, 128 million oz Ag <i>geologic resource</i> -3.5 million oz Au, 1.50 million oz Ag 1999: 11.8 million tons, 0.043 opt Au, 2.387 opt Ag proven and probable reserves; 100,000 tons, 0.350 opt Au, 2.0 opt Ag other mineralization 2000: 4.7 million tons, 0.034 opt Au, 2.309 opt Ag proven and probable reserves 2001: 430,000 tons, 0.031 opt Au, 2.624 opt Ag proven and probable reserves 2010 (Helen Zone): 684,855 tons, 0.77 opt Au (inferred resource) 2011 (Helen Zone): 391,600 tons, 0.59 opt Au (inferred resource)	1986: 50,000 oz Au 1987-98: 3,046,660 oz Au, 85.79 million oz Ag 1999: 124,500 oz Au, 8.43 million oz Ag 2000: 162,784 oz Au, 12,328,297 oz Ag 2001: 94,633 oz Au, 6,451,425 oz Ag 2002: 33,142 oz Au, 1,987,421 oz Ag 2003: 4,699 oz Au, 706 oz Ag 2004: 8,454 oz Au, 64,335 oz Ag 2005: 2,740 oz Au, 776 oz Ag 2006: 2,939 oz Au, 596 oz Ag	Panther Canyon Formation (conglomerate, sandstone), Augusta Mountain Formation (limestone), granodiorite	39.5 Ma
<b>Mud Springs (Bald Mtn. Zone) (Bullion district)</b>	1993: <i>geologic resource</i> -42,000 oz Au			
<b>Mule Canyon (Argenta district)</b>	1992: 8.5 million tons, 0.136 opt Au 1996: 9 million tons, 0.112 opt Au	1996: 6,743 oz Au 1999: 55,392 oz Au, 10,022 oz Ag 2000: 40,027 oz Au, 5,856 oz Ag 2001: 33,616 oz Au, 3,100 oz Ag 2002: 13,444 oz Au, 2,708 oz Ag 2003: 8,086 oz Au, 1,490 oz Ag 2004: 2,289 oz Au, 645 oz Ag 2005: 47,896 oz Au, 5,449 oz Ag 2006: 30,732 oz Au, 3,248 oz Ag 2007: 22,466 oz Au, 4,565 oz Ag	basalt and basaltic andesite	15-16 Ma
<b>Pediment (Cortez district)</b>	2010: 47,316,000 tons, 0.024 opt Au (proven and probable reserve)			

## MAJOR PRECIOUS-METAL DEPOSITS, LANDER COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Phoenix (Battle Mountain district)</b>	<p>2001: 174.2 million tons, 0.034 opt Au proven and probable reserves; 156.3 million tons, 0.17% Cu proven and probable reserves; 73.8 million tons, 0.026 opt Au mineralized material; 99.6 million tons, 0.14% Cu mineralized material</p> <p>2002: 174.2 million tons, 0.034 opt Au probable reserves; 156.3 million tons, 0.16 % Cu probable reserves; 1.5 million tons, 0.033 opt Au measured and indicated mineralized material; 72.3 million tons, 0.026 opt Au inferred mineralized material; 63.5 million tons, 0.14 % Cu inferred mineralized material</p> <p>2003: 175,700,000 tons, 0.035 opt Au probable reserves; 94,700,000 tons, 0.022 opt Au indicated material; 18,900,000 tons, 0.029 opt Au inferred material; 85,200 tons, 0.12% Cu indicated material; 14,300 tons, 0.11% Cu inferred material</p> <p>2004: 248,000,000 tons, 0.034 opt Au proven and probable reserves; 33,900,000 tons, 0.022 opt Au indicated material; 34,900,000 tons, 0.028 opt Au inferred material; 216,700,000 tons, 0.15% Cu probable; 32,000,000 tons, 0.21% Cu indicated; 29,800,000 tons, 0.17% Cu inferred</p> <p>2005: 308.4 million tons, 0.029 opt Au (proven and probable reserves); 22.2 million tons, 0.023 opt Au (measured and indicated resource); 16.5 million tons, 0.026 opt Au (inferred resource)</p> <p>2006: 295.2 million tons, 0.027 opt Au (proven and probable reserves); 92.8 million tons, 0.017 opt Au (measured and indicated resource) 23.2 million tons, 0.022 opt Au (inferred resource)</p> <p>2007: 278.1 million tons, 0.027 opt Au (proven and probable reserves); 92.8 million tons, 0.017 opt Au (measured and indicated resource); 22.9 million tons, 0.022 opt Au (inferred resource)</p> <p>2008: 299.8 million tons, 0.021 opt Au (proven and probable reserves); 61.6 million tons, 0.015 opt Au (indicated resource); 34.0 million tons, 0.019 opt Au (inferred resource)</p> <p>2009: 285.0 million tons, 0.020 opt Au (probable reserves); 158.4 million tons, 0.013 opt Au (indicated resource); 35.4 million tons, 0.015 opt Au (inferred resource)</p> <p>2010: 329,800,000 tons, 0.018 opt Au (probable reserve, 73% recovery) 150,900,000 tons, 0.013 opt Au (indicated resource); 54,300,000 tons, 0.015 opt Au (inferred resource)</p>	<p>2001: 5,641 oz Au, 6,468 oz Ag</p> <p>2002: 6,134 oz Au, 1,236 oz Ag</p> <p>2003: 5,444 oz Au, 1,003 oz Ag</p> <p>2004: 7,887 oz Au, 2,224 oz Ag</p> <p>2005: 6,406 oz Au, 1,156 oz Ag</p> <p>2006: 67,394 oz Au, 38,112 oz Ag, 6,235,096 lbs Cu</p> <p>2007: 181,313 oz Au, 664,787 oz Ag, 10,808,206 lbs Cu</p> <p>2008: 175,259 oz Au, 1,040,563 oz Ag 15,853,706 lbs Cu</p> <p>2009: 218,732 oz Au 1,212,153 oz Ag</p> <p>2010: 214,142 oz Au 23,733,389 lbs Cu</p> <p>921,350 oz Ag</p> <p>19,008,818 lbs Cu</p>	<p>Roberts Mountains Formation</p>	Eocene
<b>Pipeline (Bullion district)</b>	<p>1991: <i>geologic resource</i>-11.3 million tons, 0.237 opt Au</p> <p>1996: 136.7 million tons, 8.7 million oz Au measured resource, includes South Pipeline</p> <p>1997: included in Cortez Joint Venture</p> <p>2010: 41,453,000 tons, 0.017 opt Au (proven and probable reserve)</p>	<p>included in Cortez Joint Venture</p>	<p>Roberts Mountains Formation</p>	Eocene?
<b>Robertson (Bullion district)</b>	<p>1988: 11 million tons, 0.04 opt Au</p> <p>1999: Porphyry zone, 254,678 oz Au proven and probable reserves; Lucky Boy, 33,000 oz Au measured; Altenburg Hill, 21,300 oz Au measured; Widows Mine, 37,300 oz Au inferred; Gold Pan, 91,400 oz Au measured</p> <p>2005-2006: 22.9 million tons, 0.031 opt Au (measured and indicated resource) 9,408,000 tons, 0.046 opt Au (inferred resource)</p> <p>2007: 91.3 million tons, 0.025 opt Au (inferred resource)</p>	<p>1989: 3,700 oz Au</p>	<p>Valmy Formation</p>	early Oligocene

## MAJOR PRECIOUS-METAL DEPOSITS, LANDER COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Robertson (cont.)</b>	2009: 178,924,188 million tons, 0.0189 opt Au (inferred resource, used higher gold price than in 2007)			
<b>Slaven Canyon property (Bateman Canyon district)</b>	1994: 50,000 oz Au 2002: 1.6 million tons, 0.043 opt Au			
<b>South Pipeline (Bullion district)</b>	1992: 9 million tons, 0.082 opt Au 1994: <i>geologic resource</i> -76.5 million tons, 0.048 opt Au 1996: <i>see</i> Pipeline 1997: included in Cortez Joint Venture		Roberts Mountains Formation	Eocene?
<b>Surprise (Battle Mountain district)</b>	1987: 225,000 oz Au 1988-91: production and reserves included in Fortitude figures 1994: mined out	1987: 2,000 oz Au	skarn	37 Ma
<b>Toiyabe</b>	1988: 813,400 tons, 0.066 opt Au 2009: 4,975,000 tons, 0.035 opt Au (indicated resource)	1988: 32,000 oz Au, 10,300 oz Ag 1990-91: 20,480 oz Au, 15,125 oz Ag	lower Paleozoic calcareous siltstone	Eocene?
<b>Victorine (Kingston district)</b>	1992: 915,000 tons, 0.304 opt Au 1995: proven and probable reserves- 256,000 tons, 0.36 opt Au, plus <i>additional geologic resource</i> -31,160 oz Au 2000: 120,000 oz Au proven and probable reserves; 200,000 oz Au possible reserves		Cambrian to Ordovician Broad Canyon sequence	
<b>LINCOLN COUNTY</b>				
<b>Atlanta gold property (Atlanta district)</b>	1980: 1.1 million tons, 0.08 opt Au, 1.6 opt Ag 1996: 300,000 oz Au, 3 million oz Ag	1980: 88,000 oz Au, 1,710,000 oz Ag	Pogonip Group, Ely Springs and Laketown Dolomites, Oligocene silicic tuff, dacite dikes	early Miocene
<b>Caliente property (Pennsylvania district)</b>	1997: <i>geologic reserves</i> -50,000 tons, 0.03 opt Au, 0.80 opt Ag; <i>geologic</i>		Tertiary diorite Tertiary andesite	
<b>Easter and Delamar Project (Delamar district)</b>	1994: <i>geologic resource</i> -3.36 million tons, 0.069 opt Au 1995: 1.5 million tons, 0.069 opt Au 2010 (Easter project): 2,640,000 tons, 0.0386 opt Au, 0.408 opt Ag (indicated resource) 200,000 tons, 0.0333 opt Au, 0.350 opt Ag (inferred resource)		Cambrian quartzite	Miocene
<b>LYON COUNTY</b>				
<b>Dayton (Silver City district)</b>	2010: 4,970,000 tons, 0.034 opt Au, 0.244 opt Ag (measured and indicated resource) 1,210,000 tons, 0.026 opt Au, 0.298 opt Ag (inferred resource)			
<b>Fire Angel (Como district)</b>	1989: 5,600 oz Au, <i>geologic resource</i> - 148,500 oz Au			
<b>Hydra-Hercules (Como district)</b>	1997: 259,329 oz Au, 1,956,511 oz Ag		Tertiary andesite	

## MAJOR PRECIOUS-METAL DEPOSITS, LYON COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Pine Grove (Wilson district)</b>	1994: 2.5 million tons, 0.061 opt Au 2008 (0.010 opt Au cut-off grade): 2,738,000 tons, 0.25 opt Au (inferred resource, Wilson deposit) 3,321,000 tons, 0.075 opt Au (inferred resource, Wheeler deposit) 2011 (0.010 opt Au cut-off grade, Wilson and Wheeler deposits): 5,316,000 tons, 0.033 opt Au (indicated resource) 4,136,000 tons, 0.028 opt Au (inferred resource)			
<b>South Comstock Joint Venture (Silver City district)</b>	1994: 3 million tons, 0.05 opt Au 1995: 100,000 oz Au			
<b>Talapoosa (Talapoosa district)</b>	1988: 2.5 million tons, 0.041 opt Au, 0.53 opt Ag oxide 14.9 million tons, 0.03 opt Au, 0.49 opt Ag sulfide 1995: <i>geologic resource</i> -45 million tons, 0.025 opt Au and 0.33 opt Ag, including proven and probable reserves of 29.9 million tons, 0.026 opt Au and 0.4 opt Ag		Kate Peak Formation	Miocene
<b>MINERAL COUNTY</b>				
<b>Aurora Mine (Aurora district)</b>	1989: 347,000 tons, 0.253 opt Au 1996: 900,000 tons, 0.1 opt Au 2003: <i>see</i> Esmeralda	1989-90: 25,656 oz Au, 34,562 oz Ag 1991: 15,000 oz Au 1992-93: 23,600 oz Au, 52,200 oz Ag 1995: 15,000 oz Au, 35,000 oz Ag 1996: 10,374 oz Au 1997-98: 15,414 oz Au, 7,287 oz Ag	andesite, rhyolite	10 Ma
<b>Aurora Partnership (Aurora district)</b>	1983: 1.5 million tons, 0.129 opt Au, 0.3 opt Ag 1995: 230,000 tons, 0.208 opt Au (in portion of Humboldt vein system) 2003: <i>see</i> Esmeralda	1930s: 100,000 oz Au 1983: 10,000 oz Au 1988: 10,302 oz Au 1989: 27,825 oz Au, 26,000 oz Ag 1991-96: 157,796 oz Au, 318,933 oz Ag	andesite, rhyolite	10 Ma
<b>Borealis (Borealis district)</b>	1981: 2.1 million tons, 0.08 opt Au, 0.5 opt Ag 1988: 1.792 million tons, 0.046 oz Au/ton 2000: 33.4 million tons, 0.044 opt Au, 0.22 opt Ag cumulative resource 2005 (May): 44.7 million tons, 0.03 opt Au (measured and indicated resource) 34.8 million tons, 0.02 opt Au (inferred resource) 2006: 8.235 million tons, 0.022 opt Au, 0.158 opt Ag (measured and indicated resource, oxide) 35.157 million tons, 0.032 opt Au, 0.164 opt Ag (measured and indicated resource, oxide, partially oxidized, sulfides) 16.909 million tons, 0.028 opt Au, 0.106 opt Ag (inferred resource, oxide, partially oxidized, and sulfides) 2008: 29,560,000 tons, 0.045 opt Au, 0.273 opt Ag (measured and indicated resource, combined sulfide, partially oxidized and oxide) 36,161,000 tons, 0.027 opt Au, 0.196 opt Ag (inferred resource, combined sulfide, partially oxidized and oxide) 8,546,000, 0.028 opt Au, 0.222 opt Ag (measured and indicated resource, oxide and partially oxidized, 13,706,000 tons, 0.018 opt Au, 0.096 opt Ag (inferred resource, oxide and partially oxidized, 2009: 16,650,000 tons, 0.023 opt Au, 0.19 opt Ag (measured and indicated resource, oxide, partially oxidized)	1981-84: 170,000 oz Au 1986-88: 116,256 oz Au 1989-90: 107,495 oz Au 52,401 oz Ag	rhyolite flow dome, andesite flows, breccias, volcaniclastic rocks	5 Ma

## MAJOR PRECIOUS-METAL DEPOSITS, MINERAL COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Borealis (cont.)</b>	2010: 14,294,000 tons, 0.023 Au (proven and probable reserve, in situ, oxide, partially oxidized) 16,650,000 tons, 0.023 Au (proven and probable reserve, in situ+leach pads and dumps, oxide, partially oxidized) 35,643,000 tons, 0.040 opt Au (measured and indicated resource, in situ+leach pads and dumps, oxide, partially oxidized, and sulfide) 50,225,000 tons, 0.022 opt Au (inferred resource, in situ+leach pads and dumps, oxide, partially oxidized, and sulfide)			
<b>Candelaria Mine (Candelaria district)</b>	1982: 18.5 million tons, 1.09 opt Ag, 0.009 opt Au 1988: 24 million tons, 1.267 opt Ag, 0.011 opt Au 1999: 27.3 million tons, 3.4 opt Ag unmined resource; additional 8 million oz Ag in low-grade stockpile 2000: 48,000 oz Au and 45.4 million oz Ag indicated reserves	1982: 1.7 million oz Ag, 9,000 oz Au 1987: total production was 10 million oz Ag as of June 1987 1988-98: 30.67 million oz Ag, 95,218 oz Au 1999: 96,896 oz Ag, 237 oz Au	Candelaria Formation serpentine, granitic dikes	Cretaceous
<b>Denton-Rawhide (Rawhide district)</b>	1986: 24.1 million tons 0.045 opt Au, 0.47 opt Ag 1989: reserves-29.4 million tons, 0.040 oz Au and 0.368 opt Ag; <i>geologic resource</i> -59.3 million tons, 0.0274 opt Au, 0.298 opt Ag 1997: 447,000 oz Au, 3.9 million oz Ag	1990-98: 916,800 oz Au, 7,438,000 oz Ag 1999: 115,900 oz Au, 665,000 oz Ag 2000: 104,349 oz Au, 817,787 oz Ag 2001: 100,747 oz Au, 727,095 oz Ag 2002: 82,584 oz Au, 695,248 oz Ag 2003: 63,283 oz Au, 525,809 oz Ag 2004: 43,390 oz Au, 446,000 oz Ag 2005: 33,820 oz Au, 311,760 oz Ag 2006: 26,334 oz Au, 235,870 oz Ag 2007: 19,597 oz Au, 160,964 oz Ag 2008: 17,731 oz Au, 150,493 oz Ag 2009: 19,370 oz Au, 209,528 oz Ag 2010: 20,159 oz Au, 342,382 oz Ag	rhyolite plugs, flows, tuffs, breccias	16 Ma
<b>Esmeralda (Aurora district)</b>	2003: 30,710,500 tons, 0.031 opt Au bulk-minable measured and indicated resource 9,206,300 tons, 0.025 opt Au bulk-minable inferred resource 192,152 tons, 0.50 opt Au underground-minable resource	2009: 5,212 oz Au, 24,980 oz Ag (no new mining)	andesite rhyolite	10 Ma
<b>Mina Gold (Bell district)</b>	1997: 1.77 million tons, 0.055 opt Au <i>geologic resource</i>	1997: exploration	Tertiary feldspar porphyry	
<b>Mindora (Garfield district)</b>	1988: 1.0 million tons, 0.037 opt Au and 1.78 opt Ag	1988: exploration		
<b>Santa Fe (Santa Fe district)</b>	1984: 8 million tons, 0.032 opt Au, 0.26 opt Ag 1990: 6.8 million tons, 0.035 opt Au and 0.241 opt Ag	1989-95: 345,499 oz Au, 710,629 oz Ag	Luning Formation	Miocene
<b>NYE COUNTY</b>				
<b>Baxter Springs (Manhattan district)</b>	1988: 1 million tons, 0.050 opt Au 1990: <i>geologic resource</i> -5 million tons 0.050 opt Au			
<b>Bruner property, Duluth zone (Bruner district)</b>	1992: <i>geologic resource</i> -15 million tons, 0.026 opt Au	1993: exploration	Tertiary volcanic rocks	Miocene
<b>Bullfrog (Bullfrog district)</b>	1989: 18.6 million tons, 0.097 opt Au 1996: 10.2 million tons, 0.062 opt Au proven and probable reserves; 3.7 million tons, 0.040 opt Au mineralized material	1989-98: 2,237,484 oz Au, 2,935,484 oz Ag 1999: 76,159 oz Au, 90,967 oz Ag	rhyolitic ash-flow tuff	9.5 Ma
<b>Cimmaron (San Antone district)</b>	2004: 1,730,600 tons, 0.035 opt Au inferred material			

## MAJOR PRECIOUS-METAL DEPOSITS, NYE COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Corcoran Canyon (Barcelona district)</b>	2004: 1,774,700 tons, 0.025 opt Au, 5.11 opt Ag indicated and inferred material		rhyolitic ash-flow tuff	
<b>Daisy (Bare Mountain district)</b>	1993: 4.7 million tons, 0.024 opt Au <i>geologic resource</i> -430,000 oz Au 1998: 4.2 million tons, 0.033 opt Au proven and probable reserves	1997-98: 64,504 oz Au 1999: 30,660 oz Au 2000: 8,740 oz Au 2001: 347 oz Au	Cambrian Bonanza King, Nopah, and Carrara Formations	11-13 Ma(?)
<b>Gold Bar (Bullfrog district)</b>	1987: 1.23 million tons Au ore 1993: idle		silicic volcanic rocks	Miocene
<b>Golden Arrow (Golden Arrow district)</b>	1997: 12.4 million tons, 0.039 opt Au resource 2009: 12,172,000 tons, 0.024 opt Au, 0.33 opt Ag (measured and indicated resource, oxide+sulfide) 3,790,000 tons, 0.013 opt Au, 0.33 opt Ag (inferred resource, oxide+sulfide) 6,736,000 tons, 0.019 opt Au, 0.23 opt Ag (measured and indicated resource, oxide) 2,040,000 tons, 0.009 opt Au, 0.25 opt Ag (inferred resource, oxide)		Tertiary rhyolite tuff	
<b>Gold Hill property (Round Mt. district)</b>	1998: 306,620 oz Au, 4,871,890 oz Ag potential resource 2003: (included in Round Mt.)		rhyolite ash-flow tuff	26 Ma(?)
<b>Gold Wedge property (Manhattan district)</b>	2002: 104,706 oz Au, 0.494 opt Au measured resource; 47,052 oz Au, 0.583 opt Au indicated resource; 394,626 oz Au, 0.494 opt Au inferred resource 2005: 333,000 tons, 0.310 opt Au (measured and indicated resource)	2008: 406 oz dore		
<b>Longstreet property (Longstreet district)</b>	1989: 4 million tons, 0.024 opt Au, <i>geologic resource</i> -9.6 million tons, 0.024 opt Au		rhyolitic volcanic rocks	Oligocene
<b>Manhattan property (Manhattan district)</b>	1989: <i>geologic resource</i> -100,000 tons, 0.50 opt Au 1997: 1.7 million tons, 0.13 opt Au proven and probable		Cambrian Gold Hill Formation	
<b>Midway (Rye Patch district)</b>	1997: 270,000 oz Au preliminary resource 2005: 5,526,000 tons, 0.039 opt Au (inferred resource)		Ordovician Palmetto Formation Tertiary volcanic rocks	
<b>Montgomery Shoshone (Bullfrog district)</b>	1988: 3.1 million tons, 0.072 opt Au, 0.240 opt Ag		rhyolitic ash-flow tuff	9.5 Ma
<b>Nevada Mercury (Bare Mountain district)</b>	1994: <i>geologic resource</i> -50,000 oz Au			
<b>North Bullfrog (Bullfrog district)</b>	2008 :2,226,600 tons, 0.026 opt Au (indicated resource) 1,047,200 tons, 0.023 opt Au (inferred resource)			
<b>Northumberland (Northumberland district)</b>	1988: 12 million tons, 0.06 opt Au 2005 (July): 30,910,000 tons, 0.067 opt Au (measured and indicated resource) 4,381,000 tons, 0.091 opt Au (inferred resource) 2008 (June): 36.518 million tons, 0.06 opt Au (measured and indicated resource); 7.418 million tons, 0.10 opt Au (inferred resource)	1939-42: 32,700 oz Au 1981-84: 950,000 tons/year 1988: 29,667 oz Au, 130,394 oz Ag 1981-1990: ~230,000 oz Au, 485,000 oz Ag	Roberts Mountains and Hanson Creek Formations, granodiorite, tonalite, quartz porphyry dikes	

## MAJOR PRECIOUS-METAL DEPOSITS, NYE COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Paradise Peak/ Ketchup Flats pit (Fairplay district)</b>	1984: 10 million tons, 0.1 opt Au, 3 opt Ag 1989: 5.22 million tons, 0.09 opt Au, 3.62 opt Ag, mill ore; 11.52 million tons, 0.036 opt Au, 0.445 opt Ag, leachable 1996: 5 million tons, 0.022 opt Au, 0.2 opt Ag (Ketchup Flats)	1986-88: 560,000 oz Au, 8.5 million oz Ag 1989-94: 1,054,084 oz Au, 15.6 million oz Ag	rhyolite and andesite flows, ash-flow and air-fall tuffs	Miocene
<b>Reward property (Bare Mountain district)</b>	1998: 77,500 oz Au 2007: 5,181,340 tons, 0.0266 opt Au (proven and probable reserves); 6,423,571 tons, 0.0245 opt Au (measured and indicated resource) 2009: 7,147,721 tons, 0.0243 opt Au (proven and probable reserves) 2010: 7,709,000 tons, 0.023 opt Au (proven and probable reserves)		Cambrian Wood Canyon Formation	
<b>Round Mountain (Smoky Valley) (Round Mountain district)</b>	1977: 12 million tons, 0.061 opt Au, 0.07 opt Ag 1989: <i>geologic resource</i> -271 million tons, 0.032 opt Au 1999: 320 million tons, 0.018 opt Au proven and probable reserves; 126 million tons, 0.016 opt Au mineralized material 2000: 273.2 million tons, 0.019 opt Au proven and probable reserves; 18.7 million tons, 0.022 opt Au mineralized material 2002: 192.1 million tons, 0.020 opt Au proven and probable reserves; 54.6 million tons, 0.012 opt Au mineral resource 2003: 129,866,000 tons, 0.017 opt Au proven reserves; 49,838,000 tons, 0.020 opt Au probable reserves; 21,000,000 tons, 0.013 opt Au measured resource; 54,440,000 tons, 0.018 opt Au indicated resource; 19,580,000 tons, 0.018 opt Au inferred resource (includes Gold Hill) 2004: 433,400,000 tons, 0.018 opt Au proven and probable reserves; 64,000,000 tons, 0.015 opt Au mineral resource 2005: 275,608,000 tons, 0.017 opt Au (proven and probable reserves); 35,412,000 tons, 0.017 opt Au (measured and indicated resource); 35,374,000 tons, 0.013 opt Au (inferred resource) 2006: 226,084,000 tons, 0.017 opt Au (proven and probable reserves); 26,134,000 tons, 0.019 opt Au (measured and indicated resource); 32,898,000 tons, 0.013 opt Au (inferred resource) 2007: 141,736,000 tons, 0.018 opt Au (proven and probable reserves); 30,632,000 tons, 0.022 opt Au (measured and indicated resource); no released inferred resource 2008: 185,162,000 tons, 0.018 opt Au (proven and probable reserves); 57,140,000 tons, 0.019 opt Au (measured and indicated resource); 12,982,000 tons, 0.012 opt Au (inferred resource) 2009: 157,614,000 tons, 0.019 opt Au (proven and probable reserves); 87,824,000 tons, 0.021 opt Au (measured and indicated resource); 57,208,000 tons, 0.017 opt Au (inferred resource) 2010: 146,034,000 tons, 0.018 opt Au (proven and probable reserves) 101,736,000 tons, 0.022 opt Au (measured and indicated resource); 49,740,000 tons, 0.018 opt Au (inferred resource)	1977-84: 313,480 oz Au, 160,419 oz Ag 1987-88: 424,300 oz Au 1989: 386,227 oz Au, 211,297 oz Ag 1990: 483,192 oz Au, 236,600 oz Ag (includes Manhattan) 1991-98: 3,248,946 oz Au, 2,607,892 oz Ag 1999: 541,808 oz Au, 464,415 oz Ag 2000: 640,133 oz Au, 424,530 oz Ag 2001: 746,949 oz Au, 509,121 oz Ag 2002: 755,493 oz Au, 627,579 oz Ag 2003: 784,587 oz Au, 761,333 oz Ag 2004: 762,966 oz Au, 773,950 oz Ag 2005: 736,886 oz Au, 636,361 oz Ag 2006: 657,911 oz Au, 644,017 oz Ag 2007: 587,445 oz Au, 955,681 oz Ag 2008: 477,499 oz Au 931,368 oz Ag 2009: 414,941 oz Au, 850,878 oz Ag 2010: 358,614 oz Au, 651,457 oz Ag	rhyolite ash-flow tuff	26 Ma
<b>Sterling (Bare Mountain district)</b>	1983: 200,000 tons, 0.20 opt Au 1989: 469,000 tons, 0.21 opt Au 1996: 129,000 tons, 0.245 opt Au 2006: 214,554 tons, 0.216 opt Au	1983-88: 75,900 oz Au 1990-91: 24,841 oz Au 1995-98: 36,811 oz Au 1999: 3,093 oz Au	Wood Canyon and Bonanza King Formations	14 Ma
<b>South Monitor (west of Ellendale district)</b>	1996: 250,000 oz Au 1997: 14 million tons, 0.026 opt Au, 0.12 opt Ag		Tertiary volcanic rock	

## MAJOR PRECIOUS-METAL DEPOSITS, NYE COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Sullivan (Fairplay district)</b>	1987: 10.2 million tons, 0.039 opt Au, 0.086 opt Ag and 0.37% Cu 1995: proven and possible-17 million tons of 0.34% Cu, 0.0255 opt Au, + 8.5 million tons of 0.32% Cu		Mesozoic granodiorite and metavolcanic rocks	Mesozoic
<b>PERSHING COUNTY</b>				
<b>Bunce (Velvet district)</b>	1989: <i>geologic reserves</i> -600,000 tons, 0.04 opt Au 1990: 500,000 tons, 0.04 opt Au		rhyolite	Miocene?
<b>Colado Gold (Willard district)</b>	1997: 15 million tons, 0.022 opt Au resource 2007 (May 2008): 22,707,000 tons, 0.012 opt Au (oxide, measured and indicated resource); 594,000 tons, 0.070 opt Au (sulfide, measured and indicated resource); 79,129,000 tons, 0.015 opt Au (inferred resource)		Triassic-Jurassic metasedimentary rocks	
<b>Florida Canyon/ Standard (Imlay district)</b>	1987: 22 million tons, 0.023 opt Au 1988: 37 million tons, 0.023 opt Au 1997: reserves-45.5 million tons, 0.024 opt Au proven and probable mineralized material, 122.8 million tons, 0.022 opt Au 2002: 20 million tons, 0.017 opt Au proven and probable reserves 2003: 374,393 oz Au proven and probable reserves 2004: 16,792,000 tons, 0.016 opt Au proven and probable reserves 2010 (Florida Canyon): 832,000 oz Au ("reserve") 746,700 oz Au ("resource") 2010 (Standard) 292,000 oz Au ("reserve") 14,300 oz Au ("resource")	1987-88: 109,300 oz Au 1989-98: 1,146,148 oz Au, 610,326 oz Ag 1999: 139,590 oz Au, 111,232 oz Ag 2000: 173,623 oz Au, 129,361 oz Ag 2001: 121,206 oz Au, 98,645 oz Ag 2002: 121,516 oz Au, 72,567 oz Ag 2003: 101,811 oz Au, 60,065 oz Ag 2004: 73,082 oz Au, 60,405 oz Ag (includes Standard) 2005 (Florida Canyon): 29,186 oz Au, 7,571 oz Ag 2005 (Standard): 21,522 oz Au, 51,751 oz Ag 2006 (Florida Canyon): 16,061 oz Au, 12,423 oz Ag 2006 (Standard): 46,070 oz Au, 64,497 oz Ag 2007 (Florida Canyon): 31,916 oz Au, 28,152 oz Ag 2007 (Standard): 11,814 oz Au, 24,735 oz Ag 2008 (Florida Canyon): 47,095 oz Au, 40,745 oz Ag 2008 (Standard): 2,625 oz Au, 3,644 oz Ag 2009 (Florida Canyon): 44,814 oz Au, 39,760 oz Ag 2009 (Standard): 1,510 oz Au, 3,270 oz Ag 2010 (Florida Canyon): 54,975 oz Au, 39,903 oz Ag	Grass Valley Formation	2 Ma
<b>Goldbanks Project (Goldbanks district)</b>	1994: 900,000 oz Au 1996: 80.8 million tons, 0.019 opt Au proven and probable reserves; 7.4 million tons, 0.014 opt Au possible reserves; 106.8 million tons, 0.028 opt Au drill indicated resource 2000: 569,000 oz Au and 1.7 million oz Ag indicated reserves 2006: 28,310,000 tons, 0.02 opt Au (inferred resource, Main and KW zones)			
<b>Lincoln Hill (Rochester district)</b>	2010: 17,215,000 tons, 0.02 opt Au, 0.5 opt Ag			
<b>Relief Canyon (Antelope Springs district)</b>	1983: 9 million tons, 0.032 opt Au 1988: ~ 1.3 million tons, 0.03 opt Au 1996: 8.6 million tons, 0.022 opt Au	1984: 24,500 oz Au 1987-88: 82,000 oz Au 1989-90: 34,266 oz Au, 39,235 oz Ag 2009: 92 oz Au, 342 oz Ag	Natchez Pass Limestone, Grass Valley Formation	Tertiary
<b>Rochester (Rochester district)</b>	1981: 75 million tons, 1.5 opt Ag 1989: <i>geologic resource</i> -94.5 million tons, 0.012 opt Au, 1.40 opt Ag 1997: 74.2 million oz Ag, 603,000 oz Au 2000: 50 million oz Ag, 410,000 oz Au (includes Nevada Packard)	1986-98: 810,329 oz Au, 59.3 million oz Ag 1999: 70,396 oz Au, 6.2 million oz Ag 2000: 75,886 oz Au, 6,678,274 oz Ag 2001: 81,200 oz Au,	Koipato Group, Weaver Rhyolite, Rochester Rhyolite	Late Cretaceous

## MAJOR PRECIOUS-METAL DEPOSITS, PERSHING COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age	
<b>Rochester (cont.)</b>	2001: 51.4 million tons, 0.85 opt Ag, 0.007 opt Au proven and probable reserves; 61.8 million tons, 0.75 opt Ag, 0.005 opt Au mineralized material 2002: 46.9 million tons, 0.008 opt Au, 0.85 opt Ag proven and probable reserves; 33.8 million tons, 0.009 opt Au, 0.77 opt Ag mineralized material (includes Nevada Packard) 2003: 32.7 million tons, 0.01 opt Au, 0.91 opt Ag proven and probable reserves; 40.3 million tons, 0.01 opt Au, 0.77 opt Ag mineralized material 2004: 21,453,000 tons, 0.010 opt Au, 0.87 opt Ag proven reserves; 2,545,000 tons, 0.010 opt Au, 0.81 opt Ag probable reserves; 26,205,000 tons, 0.010 opt Au, 0.81 opt Ag measured resource; 8,551,000 tons, 0.010 opt Au, 0.96 opt Ag indicated resource; 308,000 tons, 0.003 opt Au, 1.73 opt Ag inferred resources 2005: 10,168,000 tons, 0.011 opt Au, 0.86 opt Ag (probable reserves) 15,646,000 tons, 0.010 opt Au, 1.03 opt Ag (measured and indicated resource) 2006: 3,720,000 tons, 0.007 opt Au, 0.66 opt Ag (proven reserves) 15,235,000 tons, 0.010 opt Au, 0.94 opt Ag (measured and indicated resource) 2007: 32,664,000 tons, 0.010 opt Au, 0.86 opt Ag (measured and indicated resource) 2008: 114,058,000 tons, 0.005 opt Au, 0.54 opt Ag (measured and indicated resource) 2010: 48,271,000 tons, 0.005 opt Au, 0.57 opt Ag (proven and probable reserve) 215,602,900 tons, 0.003 opt Au, 0.44 opt Ag (measured and indicated resource) 21,984,300 tons, 0.003 opt Au, 0.65 opt Ag (inferred resource)	6,478,916 oz Ag 2002: 71,905 oz Au, 6,417,792 oz Ag 2003: 52,363 oz Au, 5,585,385 oz Ag 2004: 69,456 oz Au, 5,669,073 oz Ag 2005: 70,298 oz Au, 5,720,489 oz Ag 2006: 71,891 oz Au, 5,113,504 oz Ag 2007: 50,408 oz Au, 4,614,779 oz Ag 2008: 21,041 oz Au, 3,033,720 oz Ag 2009: 12,633 oz Au, 2,181,788 oz Ag 2010: 9,641 oz Au, 2,023,423 oz Ag			
<b>Rosebud Project (Rosebud district)</b>	1992: 570,000 oz Au (0.362 opt), 5.5 million oz Ag (5.5 opt) 1999: 216,000 tons, 0.323 opt Au	1997-98: 225,651 oz Au, 815,123 oz Ag 1999: 112,652 oz Au, 247,900 oz Ag 2000: 47,944 oz Au, 191,919 oz Ag	Tertiary volcanic rocks	Miocene	
<b>Spring Valley (Spring Valley district)</b>	2005-2006: 10,030,000 tons, 0.024 opt Au (measured and indicated resource) 7,753,000 tons, 0.025 opt Au (inferred resource) 2007: 50,600,000 tons, 0.0196 opt Au (inferred resource) 2008: 87,750,000 tons, 0.021 opt Au (inferred resource) 2011: 159,641,000 tons, 0.014 opt Au (measured and indicated resource) 114,567,000 tons, 0.017 opt Au (inferred resource)				
<b>Standard (Imlay district)</b>	2002: 17.2 million tons, 0.019 opt Au proven and probable reserves 2003: 404,100 oz Au proven and probable reserves 2004: 25,776,000 tons, 0.017 opt Au proven and probable reserves	1939-42, 1946-49: 45,743 oz Au, 127,451 oz Ag 2004-2010: included with Florida Canyon	Natchez Pass Limestone, Grass Valley Formation argillite		
<b>Tag-Wildcat (Farrel district)</b>	1989: <i>geologic resource</i> -1.5 million tons, 0.043 opt Au; reserves-416,000 tons, 0.076 opt Au 2003: see Wildcat		Tertiary volcanic rocks	Miocene	
<b>Trinity (Trinity district)</b>	1987: 1 million tons, 5.25 opt Ag Sulfide resource: ~4 million tons, 2.5 opt Ag	1987-89: ~5-6 million oz Ag	rhyolite porphyry, rhyolite tuff	26 Ma	
<b>Wildcat (Farrel district)</b>	2003: 38.108 million tons, 0.018 opt Au indicated resource; 28.355 million tons, 0.015 opt Au inferred resource		Tertiary volcanic	Miocene	

## MAJOR PRECIOUS-METAL DEPOSITS, PERSHING COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Willard (Willard district)</b>	2007: 17,295,000 tons, 0.016 opt Au (oxide, measured and indicated resource) 448,000 tons, 0.070 opt Au (sulfide, measured and indicated resource) 20,849,000 tons, 0.015 opt Au (inferred resource)	~90,000 oz Au (late 1980s to early 1990s)	Jurassic-Triassic Grass Valley Formation	6 Ma

### STOREY COUNTY

<b>Hartford Hill Complex (includes Billie the Kid Lucerne) (Silver City district)</b>	2010: 26,540,000 tons, 0.028 opt Au, 0.354 opt Ag (measured and indicated resource) 12,660,000 tons, 0.023 opt Au, 0.252 opt Ag (inferred resource)	2004: 2,836 oz Au, 12,695 oz Ag 2005: 5,715 oz Au, 26,488 oz Ag 2006: 5,000 oz Au, 20,000 oz Ag (estimated)		
---	--	--	--	--

<b>Comstock heap leach project (Comstock district)</b>	1992: 475,000 tons, 0.072 opt Au, 0.60 opt Ag 1996: 100,000 oz Au, 1.2 million oz Ag			
--	---	--	--	--

<b>Flowery (Golden Eagle) (Comstock district)</b>	1989: 1 million tons, 0.037 opt Au 1993: 362,000 tons, 0.064 opt Au, 0.97 opt Ag, <i>geologic resource</i> -88,128 oz Au and 1 million oz Ag	1988: 836 oz Au, 9,473 oz Ag 1990: 6,000 oz Au, 70,000 oz Ag 1992-97: 16,949 oz Au, 195,701 oz Ag	Alta Formation	12 Ma
---	---	---	----------------	-------

<b>Oliver Hills (Comstock district)</b>	1990: 3.37 million tons, 0.054 opt Au, 1.2 opt Ag 1993: 4 million tons, 0.05 opt Au, 0.5 opt Ag, <i>geologic resource</i> -225,000 oz Au and 2.25 million oz Ag	1991: 573 oz Au, 6,947 oz Ag		
---	---	------------------------------	--	--

### WASHOE COUNTY

<b>Mountain View Gold Project (Deephole district)</b>	1995: 19.5 million tons, 0.027 opt Au 1998: 10.7 million tons, 0.055 opt Au 2002: 23.219 million tons, 0.013 opt Au indicated resource; 4.466 million tons, 0.039 opt Au inferred resource		rhyolite	Miocene
---	--	--	----------	---------

<b>Olinghouse (Olinghouse district)</b>	1994: <i>geologic resource</i> -500,000 opt Au, 0.057 opt Au 1997: 512,800 oz Au proven and probable reserves, 0.042 opt Au	1998: 2,912 oz Au, 1,879 oz Ag 1999: 28,655 oz Au, 17,598 oz Ag	Miocene andesite	Miocene
---	--	--	------------------	---------

<b>Hog Ranch (Leadville district)</b>	1984: 2.5 million tons, 0.085 opt Au 1988: 5.5 million tons, 0.064 opt Au proven and probable reserves; 20.1 million tons, 0.029 opt Au <i>geologic resource</i> 2003: 1,598,350 tons, 0.033 opt Au indicated; 440,924 tons, 0.054 opt Au inferred	1986-87: 80,000 oz Au 1988-95: 118,045 oz Au, 25,400 oz Ag	rhyolite, explosion breccia sinter	15-16 Ma
---	---	--	--	----------

<b>Wind Mountain (San Emidio)</b>	1988: 15 million tons, 0.021 opt Au, 0.42 opt Ag 2007: 33,657,553 tons, 0.012 opt Au (measured and indicated resource) 9,758,547 tons, 0.009 opt Au (inferred resource)	1989: 30,900 oz Au, 335,000 oz Ag 1991: 91,000 oz Au, 405,000 oz Ag 1992: 54,690 oz Au, 297,403 oz Ag 1993: 19,570 oz Au, 92,630 oz Ag	Tertiary sedimentary rocks	late Tertiary or Quaternary
---------------------------------------	---	---	-------------------------------	--------------------------------

## MAJOR PRECIOUS-METAL DEPOSITS, WHITE PINE COUNTY

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>WHITE PINE COUNTY</b>				
<b>Alligator Ridge (Bald Mountain district)</b>	1983: 5 million tons, 0.09 opt Au 1989: 1 million tons, 0.064 opt Au 1992: 11.5 million tons, 0.046 opt Au; <i>geologic resource</i> -661,888 oz Au, includes Casino/Winrock	1981-90: 632,057 oz Au, 84,188 oz Ag 1991-92: 27,450 oz Au 1993: included with Bald Mountain 1994: 40,000 oz Au 1995: idle 1996: included with Bald Mountain	Pilot Shale	Mesozoic or early Tertiary
<b>Bald Mountain (Bald Mountain district)</b>	1989: 6.7 million tons, 0.069 opt Au 1999: 32.6 million tons, 0.041 opt Au, proven and probable reserves; 31.7 million tons, 0.044 opt Au, mineralized material 2000: 509,000 oz Au proven and probable; 2.03 million oz Au measured and indicated resource 2002: 508,000 oz Au proven and probable reserves; 2.03 million oz Au measured mineral resource 2003: 10,143,000 tons, 0.033 opt Au proven reserves; 8,549,000 tons, 0.040 opt Au probable reserves; 10,371,000 tons, 0.027 opt Au measured resource; 10,836,000 tons, 0.043 opt Au indicated resource; 19,224,000 tons, 0.029 opt Au inferred resource  2004: 21,530,000 tons, 0.044 opt Au proven and probable reserves; 53,586,000 tons, 0.027 opt Au measured and indicated resource; 10,808,000 tons, 0.018 opt Au inferred resource 2005 (includes Alligator Ridge): 105,050,700 tons, 0.032 opt Au (proven and probable reserves) 35,000,000 tons, 0.023 opt Au (measured and indicated resource) 14,868,000 tons, 0.026 opt Au (inferred resource) 2006 (includes Alligator Ridge): 109,922,000 tons, 0.031 opt Au (proven and probable reserves) 23,289,000 tons, 0.035 opt Au (measured and indicated resource) 17,290,000 tons, 0.023 opt Au (inferred resource) 2007 (includes Alligator Ridge): 128,093,000 tons, 0.024 opt Au (proven and probable reserves) 36,493,000 tons, 0.024 opt Au (measured and indicated resource) 24,648,000 tons, 0.017 opt Au (inferred resource) 2008 (includes Alligator Ridge): 157,675,000 tons, 0.018 opt Au (proven and probable reserves) 90,374,000 tons, 0.019 opt Au (measured and indicated resource) 71,004,000 tons, 0.021 opt Au (inferred resource) 2009 (includes Alligator Ridge): 227,346,000 tons, 0.020 opt Au (proven and probable reserves) 99,338,000 tons, 0.012 opt Au (measured and indicated resource) 40,184,000 tons, 0.012 opt Au (inferred resource) 2010 (includes Alligator Ridge): 246,711,000 tons, 0.019 opt Au (proven and probable reserves) 151,944,000 tons, 0.011 opt Au (measured and indicated resource) 60,636,000 tons, 0.011 opt Au (inferred resource)	1986: 50,000 oz Au 1988-89: 103,731 oz Au 1990-93: 287,110 oz Au, 76,745 oz Ag 1994: 80,000 oz Au 1995-96: 221,908 oz Au, 62,460 oz Ag 1997-98: 243,500 oz Au, 63,416 oz Ag 1999: 105,475 oz Au, 18,058 oz Ag 2000: 134,469 oz Au, 14,400 oz Ag 2001: 108,392 oz Au, 18,321 oz Ag 2002: 172,328 oz Au, 21,547 oz Ag  2003: 90,602 oz Au, 26,810 oz Ag 2004: 46,685 oz Au, 27,635 oz Ag 2005: 77,767 oz Au, 32,652 oz Ag 2006: 277,615 oz Au, 32,121 oz Ag 2007: 125,998 oz Au, 21,702 oz Ag 2008: 103,610 oz Au, 15,352 oz Ag 2009: 75,037 oz Au, 12,389 oz Ag 2010: 60,333 oz Au, 15,000 oz Ag	quartz porphyry, Cambrian shale and limestone	Jurassic?

## MAJOR PRECIOUS-METAL DEPOSITS, WHITE PINE COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Bellview (White Pine district)</b>	1988: 277,000 tons, 0.04 opt Au, <i>geologic resource</i> -1 million tons, 0.036 opt Au			
<b>Casino/Winrock (Bald Mountain district)</b>	1989: <b>Casino</b> -804,000 tons, 0.054 opt Au; <b>Winrock</b> 1.3 million tons, 0.037 opt Au 1990: <b>Winrock</b> -993,000 tons, 39,000 oz Au 1992: <i>see</i> Alligator Ridge	1990-92: 46,800 oz Au	late Paleozoic sedimentary rocks	Eocene
<b>Easy Junior (Nighthawk Ridge) (White Pine district)</b>	1989: 5.68 million tons, 0.031 opt Au 1991: 137,000 oz Au	1990: 11,500 oz Au, 900 oz Ag 1997: 510 oz Au, 76 oz Ag	Devonian and Mississippian rocks	Eocene
<b>Golden Butte (Cherry Creek district)</b>	1989: 4.23 million tons, 0.031 opt Au	1989-91: 43,519 oz Au, 16,911 oz Ag	Chainman Shale	Cretaceous or Eocene
<b>Griffon Gold property (White Pine district)</b>	1993: <i>geologic resource</i> -60,000 oz Au 1994: <i>geologic resource</i> -50,454 oz Au, 0.039 opt Au 1995: proven and probable reserves- 2,737,000 tons, 0.025 opt Au 1997: 100,000 oz Au	1998: 37,921 oz Au, 269 oz Ag 1999: 24,740 oz Au	upper Joana Limestone	
<b>Horseshoe (Bald Mountain district)</b>	1991: 1.5 million tons, 0.039 opt Au		Pilot Shale and intrusive quartz porphyry	36-38 Ma
<b>Illipah (Illipah district)</b>	1987: 57,000 oz Au	1987: ~25,000 oz Au/year 1988: 25,324 oz Au, mining ended 1989: 3,874 oz Au, heap-leached	Paleozoic sedimentary rocks	Eocene?
<b>Limousine Butte (Butte Valley district)</b>	1987: 57,000 oz Au 2009 (0.012 opt Au cut-off grade): 10,600,000 tons, 0.023 opt Au (measured and indicated resources) 2,500,000 tons, 0.020 opt Au (inferred resource)	1987: ~25,000 oz Au/year 1988: 25,324 oz Au, mining ended 1989: 3,874 oz Au, heap-leached	Paleozoic sedimentary rocks	Eocene?
<b>Little Bald Mtn. (Bald Mountain district)</b>	1986: 1 million tons, 0.10 opt Au 1989: 200,000 tons, 0.13 opt Au; <i>geologic resource</i> -260,000 tons, 0.127 opt Au 1993: 140,000 tons, 0.13 opt Au, <i>geologic resource</i> -21,800 oz Au	1985-88: 21,700 oz Au 1989: 5,500 oz Au, 1,500 oz Ag	Antelope Valley Formation	35-38 Ma
<b>Mt. Hamilton (White Pine district)</b>	1988: 7.7 million tons, 0.05 opt Au, 0.5 opt Ag 1994: reserve-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 2009: 12,617,000 tons, 0.031 opt Au, 0.144 opt Ag (measured and indicated resource) 1,491,000 tons, 0.012 opt Au, 0.122 opt Ag (inferred resource)	1995-97: 99,500 oz Au, 207,500 oz Ag	Dunderberg Shale	Cretaceous
<b>Pan (White Pine district)</b>	1989: 241,000 oz Au 1998: 10.86 million tons, 0.022 opt Au Drill-indicated and inferred 2003: 17,890,000 tons, 0.019 opt Au indicated resource; 7,986,000 tons, 0.016 opt Au (inferred resource) 2009 (0.006 opt au cut-off grade): 34,650,000 tons, 0.018 opt Au (measured and indicated resource) 1,600,000 tons, 0.017 opt Au (inferred resource) 2010 (0.004 opt au cut-off grade): 42,750,352 tons, 0.016 opt Au (measured and indicated resource) 1,600,000 tons, 0.017 opt Au (inferred resource)		Mississippian rocks	

## MAJOR PRECIOUS-METAL DEPOSITS, WHITE PINE COUNTY (continued)

Deposit name	Reserves/resources	Production	Host rock	Mineralization age
<b>Robinson (Robinson district)</b>	1989: 46.0 million tons, 0.019 opt Au; <i>geologic resource</i> -1 million oz Au 1991: <i>geologic resource</i> -200 million tons 0.012 opt Au 1999: 194 million tons, 0.59% Cu, 0.007opt Au, proven and probable reserves 2003: 146.3 million tons, 0.687% Cu, 0.008 opt Au, proven and probable reserves 2005: 160,400,000 tons, 0.69% Cu, ) 0.073 opt Au (proven and probable reserves) 610,979,000 tons, 0.55% Cu, 0.0064 opt Au (measured resource, 0.2% Cu cut-off) 171,858,000 tons, 0.44% Cu, 0.0041 opt Au (indicated resource, 0.2% Cu cut-off) 98,166,000 tons, 0.32% Cu, 0.0015 opt Au (inferred resource, 0.2% Cu cut-off) 2006: 122,401,000 tons, 0.69% Cu, 0.0076 opt Au (proven and probable reserves) 2007: 103,788,000 tons, 0.68% Cu, 0.0067 opt Au (proven and probable reserves) 2008: 121,693,000 tons, 0.54% Cu, 0.0067 opt Au (proven and probable reserves) 2009: 103,059,000 tons, 0.53% Cu, 0.0062 opt Au (proven and probable reserves) 2010: 121,250,000 tons, 0.50%Cu, 0.0053 opt Au (proven and probable reserves) 716,490,000 tons, 0.33% Cu, 0.0044 opt Au (measured and indicated resource) 154,320,000 tons, 0.29% Cu, 0.0041 opt Au (inferred resource)	1986: 48,000 oz Au, 96,000 oz Ag 1987-88: 88,957 oz Au 1989-90: 153,828 oz Au, 121,340 oz Ag 1991: 21,674 oz Au 1992: 35,581 oz Au, 55,000 oz Ag 1993: 13,432 oz Au 1996-98: 196,000 oz Au, 783,500 oz Ag, 370 million lbs Cu 1999: 26,250 oz Au, 153,104 oz Ag, 62 million lbs Cu 2004: 12,228 oz Au, 27 million lbs Cu 2005: 80,941 oz Au, 191,479 oz Ag, 126 million lbs Cu 2006: 75,074 oz Au, 156,839 oz Ag, 121,319,197 lbs Cu, 260,000 lbs Mo 2007: 108,118 oz Au, 179,238 oz Ag, 131,986,134 lbs Cu, 62,033 lbs Mo 2008: 137,628 oz Au, 183,903 oz Ag, 159,684,092 lbs Cu, 78,855 lbs Mo 2009: 99,000 oz Au, 200,819 oz Ag, 122,000,000 lbs Cu, 88,711 lbs Mo 2010: 72,998 oz Au, 245,746 oz Ag, 108,967,015 lbs Cu, 226,688 lbs Mo	Rib Hill Sandstone, Cretaceous Riepe Spring Limestone, intrusions	
<b>Taylor (Taylor district)</b>	1980: 10 million tons, 3 opt Ag 1988: 5.92 million tons, 2.7 opt Ag (resource) 2007: 6,433,000 tons, 2.31 opt Ag (measured and indicated resource) 757,000 tons, 2.54 opt Ag (inferred resource)	1980: 1,200 tons/day	Guilmette and Joana Limestones, rhyolite dikes	Eocene or Oligocene
<b>White Pine (White Pine district)</b>	1989: 63,000 oz Au, 0.04 opt Au	1989: 20,654 oz Au	Pilot Shale	Oligocene?
<b>Yankee (Bald Mountain district)</b>	1992: 683,000 oz Au 1993: <i>see</i> Bald Mountain	1990: ~15,000 oz Au 1992: 10,800 oz Au	Pilot Shale	36-38 Ma?

## Newmont Gold and Silver Production in the Carlin Trend

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

<u>Year</u>	<u>Gold (oz)</u>	<u>Silver (oz)</u>
1988	895,500	NA
1989	1,467,800	117,400
1990	1,676,000	NA
1991	1,575,700	NA
1992	1,588,000	98,000
1993	1,666,400	175,000
1994	1,554,000	158,000
1995	1,634,500	188,000
1996	1,700,000	322,000
1997	1,819,000	118,000
1998	1,575,391	150,400
1999	1,536,401	255,011
2000	1,865,648	108,111
2001	1,547,247	292,241
2002	1,378,782	277,753
2003	1,122,208	206,767
2004	1,287,674	363,052
2005	1,397,583	227,158
2006	1,310,258	169,212
2007	1,322,001	268,875
2008	1,320,019	149,254
2009	1,172,790	225,431
2010	934,282	69,430

NA= not available

# Other Metallic Deposits

by John L. Muntean

This is a compilation, in progress, of metallic deposits other than gold and silver. Initially, active projects with recently released reserves, resources, and production will be included. The information in this compilation was obtained from the Nevada Division of Minerals and from published reports, articles in mining newsletters, and company websites, annual reports, and press releases. Locations of active mines are shown on page 2, and contact information is listed in the Directory of Mining and Milling Operations.

Deposit name	Metals	Reserves/resources	Production
<b>ELKO COUNTY</b>			
<b>Carlin Vanadium (Carlin district)</b>	V	2010: 28,000,000 tons, 0.515% V <sub>2</sub> O <sub>5</sub> (inferred resource)	
<b>Contact (Contact district)</b>	Cu	2009: 33,578,000 tons, 0.293% Cu (proven and probable reserve) 89,551,000 tons, 0.268% Cu (measured and indicated resource) 50,520,000 tons, 0.302% Cu (inferred resource)	
<b>Indian Springs (Delano district)</b>	W	2007: 10.8 million tons, 0.171% WO <sub>3</sub> (indicated resource); 8.2 million tons, 0.167% WO <sub>3</sub> (inferred resource)	
<b>EUREKA COUNTY</b>			
<b>Gibellini (Gibellini district)</b>	V	2011: 19,970,000 tons 0.30% V <sub>2</sub> O <sub>5</sub> (proven and probable reserves, Gibellini Hill, part of the measured and indicated resource); 23,050,000 tons, 0.29% V <sub>2</sub> O <sub>5</sub> (measured and indicated resource, Gibellini Hill); 14,230,000 tons, 0.17% V <sub>2</sub> O <sub>5</sub> (inferred resource, reduced material)	
<b>Mount Hope (Mount Hope district)</b>	Mo	2007: 965,926,000 tons 0.068% Mo (proven and probable reserves); 109,641,000 tons, 0.030% Mo (measured and indicated resource); 191,308,000 tons, 0.063% Mo (inferred resource)	
<b>HUMBOLDT COUNTY</b>			
<b>Ashdown (Vicksburg district)</b>	Mo		2006: 10,500 lbs Mo 2007: 247,466 lbs Mo 2008: 202,597 lbs Mo 2009: 214,714 lbs Mo 2010: 189,035 lbs Mo
<b>Cordero (Opalite district)</b>	Ga	2007: 10 million tons, 47.7 ppm Ga (measured and indicated resource); 6.6 million tons, 43.7 ppm Ga (inferred resource)	
<b>Kings Valley (Disaster district)</b>	U	2006: 2,978,000 tons, 0.081% U <sub>3</sub> O <sub>8</sub> (inferred resource)	

## OTHER METALLIC DEPOSITS (cont.)

---

### LANDER COUNTY

---

<b>Apex (Reese River district)</b>	U	2006: 1,119,928 tons, 0.07% U <sub>3</sub> O <sub>8</sub> (inferred resource)	
<hr/>			
<b>Phoenix (Battle Mountain district)</b>	Cu	2007: 279,600,000 tons, 0.13% Cu (proven and probable reserves); 91,300,000 tons, 0.16% Cu (measured and indicated resource); 23,900,000 tons, 0.16% Cu (inferred resource) 2008: 302,000,000 tons, 0.15% Cu (proven and probable reserves); 91,700,000 tons, 0.20% Cu (measured and indicated resource); 95,953,000 tons, 0.23% Cu (inferred resource) 2009: 287,500,000 tons, 0.16% Cu (proven and probable reserves); 199,687,000 tons, 0.18% Cu (measured and indicated resource); 91,815,000 tons, 0.23% Cu (inferred resource) 2010 (non-leach): 332,600,000 tons, 0.15% Cu (probable reserve, 61% recovery) 150,900,000 tons, 0.13% Cu (indicated resource); 56,600,000 tons, 0.12% Cu (inferred resource) 2010 (leach): 132,900,000 tons, 0.23% Cu (probable reserve, 53% recovery) 25,900,000 tons, 0.19% Cu (indicated resource); 45,900,000 tons, 0.22% Cu (inferred resource)	2006: 6,235,096 lbs Cu 2007: 10,808,206 lbs Cu 2008: 15,853,706 lbs Cu 2009: 23,733,389 lbs Cu 2010: 19,008,818 lbs Cu

---

### LYON COUNTY

---

<b>Ann Mason (Yerington district)</b>	Cu	2010 (0.2% Cu cut-off grade): 1,409,960,000 tons, 0.336% Cu, (inferred resource) 2010 (0.4% Cu cut-off grade): 315,220,000 tons, 0.485% Cu, (inferred resource)	
<hr/>			
<b>MacArthur (Yerington district)</b>	Cu	2008: 57,365,000 tons, 0.239% Cu, (measured and indicated resource, oxide and chalcocite material) 75,832,000 tons, 0.283% Cu, (inferred resource, oxide and chalcocite material) 2010: 143,721,000 tons, 0.192% Cu (measured and indicated resource, oxide and chalcocite material, 0.12% Cu cut-off grade)) 215,043,000 tons, 0.197% Cu (inferred resource, oxide and chalcocite material, 0.12% Cu cut-off grade)) 74,090,000 tons, 0.256% Cu (inferred resource, primary sulfide material, 0.15% Cu cut-off grade))	
<hr/>			
<b>Pumpkin Hollow (Yerington district)</b>	Cu, Fe,	2007: 342,735,000 tons, 0.579% Cu, 0.0019 opt Au, 0.0700 opt Ag, 15.67% Fe (measured and indicated resource) 438,164,000 tons, 0.446% Cu, 0.0015 opt Au, 0.0700 opt Ag, 10.23% Fe (inferred resource)	
	Cu	2009 (0.2% Cu cut-off grade): 488,228,000 tons, 0.58% Cu, 0.002 opt Au, 0.069 opt Ag	

## OTHER METALLIC DEPOSITS - LYON COUNTY (cont.)

<b>Pumpkin Hollow (cont.)</b>		(measured and indicated resource) 440,826,000 tons, 0.42% Cu, 0.001 opt Au, 0.048 opt Ag (inferred resource)
	Fe	2009 (10% Fe cut-off grade) 306,420,000 tons, 30.04% Fe (measured and indicated resource) 440,138,000 tons, 20.67% Fe (inferred resource)
	Cu	2010: 531,042,000 tons, 0.55% Cu, 0.003 opt Au, 0.079 opt Ag (total measured and indicated resource, 0.2% Cu cut-off grade) 495,129,000 tons, 0.37% Cu, 0.001 opt Au, 0.044 opt Ag (total inferred resource, 0.2% Cu cut-off grade) 33,544,000 tons, 1.74% Cu, 0.010 opt Au, 0.244 opt Ag (measured and indicated resource, eastern underground deposits, 1% Cu cut-off grade) 249,155,000 tons, 0.6% copper, 0.002 opt gold, 0.067 opt Ag (measured and indicated resource, western open pitable deposits, 0.3% Cu cut-off grade)
	Fe	2010: 340,898,000 tons, 32.59% Fe (measured and indicated resource, western open pitable deposits, 20% Fe cut-off grade) 29,769,000 tons, 25.6% Fe (inferred resource, western open pitable deposits, 20% Fe cut-off grade)

---

### MINERAL COUNTY

<b>New York Canyon (Santa Fe District)</b>	Cu	2010: 26,250,000 tons, 0.43% Cu (indicated resource, 0.2% Cu cut-off grade) 2,900,000 tons, 0.31% Cu (inferred resource, 0.2% Cu cut-off grade)
--	----	--

---

### NYE COUNTY

<b>Liberty (formerly known as Hall-Tonopah) (San Antone district)</b>	Mo	2007 (April 2008): 432,951,000 tons 0.071% Mo, 0.07% Cu (proven and probable reserves); 109,336,000 tons, 0.052% Mo, 0.11% Cu (measured and indicated resource); 127,200,000 tons, 0.051% Mo, 0.08% Cu (inferred resource)
---	----	---

---

### PERSHING COUNTY

<b>Springer (Mill City district)</b>	W	1983: 3.59 million tons, 0.446% WO <sub>3</sub> (historical General Electric resource) 2009 (Sutton beds): 274,000 tons, 0.619% WO <sub>3</sub> (indicated resource) 1,097,000 tons, 0.562% WO <sub>3</sub> (inferred resource)
--	---	--

---

### WHITE PINE COUNTY

<b>Robinson (Robinson district)</b>	Cu, Mo	2006: 122,401,000 tons, 0.69% Cu (proven and probable reserves) 2007: 103,788,000 tons, 0.68% Cu (proven and probable reserves) 2008: 121,693,000 tons, 0.54% Cu (proven and probable reserves) 2009: 103,059,000 tons, 0.53% Cu (proven and probable reserves) 2010: 121,250,000 tons, 0.50% Cu (proven and probable reserves) 716,490,000 tons, 0.33% Cu (measured and indicated resource) 154,320,000 tons, 0.29% Cu (inferred resource)	2006: 121,319,197 lbs Cu, 260,000 lbs Mo 2007: 131,986,134 lbs Cu, 62,033 lbs Mo 2008: 159,684,092 lbs Cu, 78,855 lbs Mo 2009: 122,000,000 lbs Cu, 88,711 lbs Mo 2010: 108,967,015 lbs Cu, 226,688 lbs Mo (See Major Precious Metal Deposits also.)
---	--------	--	--

# Industrial Minerals

by David A. Davis

The total value of industrial minerals produced in Nevada in 2010 was estimated at \$418 million, which was 61% higher than in 2009. In decreasing order of estimated value, Nevada industrial minerals with production values of more than \$10 million in 2010 were construction aggregate, diatomite, barite, lime and limestone, lithium, gypsum, and silica. Industrial mineral commodities with production values of less than \$10 million were dolomite, clay, magnesia, cement, perlite, iron ore, salt, opal, dimension stone, and turquoise. Zeolite was processed in Nevada but mined in California, and as such was not included in the estimate of total industrial mineral value reported above. Data used for these estimates, and data reported for individual commodities below, were obtained from the Nevada Division of Minerals, the Nevada Department of Taxation, the U.S. Bureau of Land Management, the U.S. Geological Survey or directly from companies that produced the commodities. Data are given in short tons unless otherwise noted. U.S. Geological Survey data cited are from commodity reports on the agency's website at <http://minerals.usgs.gov/minerals/pubs/commodity>.

## Aggregate (Sand and Gravel, Crushed Stone)

According to the U.S. Geological Survey, the United States production of construction sand and gravel decreased 3% in 2010 to an estimated 838 million tons valued at \$5.9 billion, and crushed stone decreased 2% to an estimated 1.27 billion tons valued at \$11 billion.

Except for several years of flat production, production of construction sand and gravel had increased 86% between 1991 and 2006. 2010 was the fourth straight year of decreased production, which has decreased 43% from the high of 1.46 billion tons in 2006. Production of crushed stone had increased 17% between 2002 and 2006, but 2010 marked the fourth straight year of decreased production, down now 35% from the high of 1.95 billion tons in 2006. Apparent consumption of construction sand and gravel has declined 3% to an estimated 838 million tons, and apparent consumption of

crushed stone has declined 2% to an estimated 1.3 billion tons. Both have declined 3% from the 2006 highs of 1.46 billion tons of construction sand and gravel and 1.97 billion tons of crushed stone. The small difference between production and consumption was made up by imports mostly from Canada, Mexico, and the Bahamas. The average price of construction sand and gravel remained steady at \$6.99 per ton in 2010. It had increased 60% over the previous 10 years, and until 2010, it had been rising each year since at least 1970. The average price of crushed stone increased 3% to \$8.99 per ton in 2010. It has increased 85% since 1999 after a decrease in the late 1990s.

According to the U.S. Geological Survey, in 2010, Nevada produced an estimated 19,100,000 tons of construction sand and gravel valued at \$110,000,000 and an estimated 7,680,000 tons of crushed stone valued at \$80,800,000. The production and value of construction sand and gravel (using revised 2009 figures of 23,500,000 tons valued at \$138,000,000) decreased 3% and increased 7% respectively, and the production and value of crushed stone (using revised 2009 figures of 8,140,000 tons valued at \$81,300,000) decreased 6% and 1% respectively. Production from sand and gravel deposits accounted for about 71% of aggregate production statewide, with crushed stone and lightweight aggregate making up the balance. The total production value of almost \$191 million makes construction aggregate the third most valuable commodity produced in the state in 2010—well below the value of Nevada's gold production and about 44% of the value of second-ranked copper production, but nearly 1.3 times that of fourth-ranked silver (see production table in Overview section).

According to the *Bureau of Land Management – Nevada Briefing Book*, dated March 9, 2011, which was prepared for to the Nevada Legislature Senate Committee on Natural Resources, in 2010, the BLM sold 2,200,000 tons of sand and gravel valued at \$2,000,000 through its Minerals Material Program. This is a decrease of 55% from 4,900,000 tons and a decrease of 47% from \$3,800,000 in 2009. Most of the production

came from four community pits within the Las Vegas Valley.

An estimated 19.8 million tons of construction aggregate are estimated to have been produced in the Las Vegas area in 2010, which was a decrease of 3% from 2009. Sand and gravel operations accounted for about 75% of the aggregate used in the Las Vegas metropolitan area in 2009. As in past years, the Lone Mountain area in northwest Las Vegas remained the most important source of sand and gravel. The Lone Mountain area produced more than 10 million tons in 2005 and 2006, but annual production is estimated to have been below that from 2007 onward. Significant production also came from sand and gravel pits and stone quarries south and northeast of Las Vegas and in Ivanpah Valley south-southwest of Las Vegas. Sand and gravel from portable crushers at construction sites were also important producers of base aggregate in Las Vegas.

Companies in the Las Vegas area that produced more than one million tons of aggregate in 2010 were Aggregate Industries and Las Vegas Paving Corp. Companies with production between 500,000 and one million tons per year were Impact Sand and Gravel and Nevada Ready Mix Corp. Both had produced over a million tons in 2008 but dropped below that in 2009. American Sand and Gravel produced more than 500,000 tons in 2008 but dropped below that in 2009, and only one of their three pits produced more than 100,000 tons in 2010. Wells Cargo produced more than 500,000 tons in 2009 but dropped below that in 2010. CEMEX, which produced over 500,000 tons in 2008, produced nothing in 2009 and 2010.

Las Vegas Paving, a major producer of asphalt concrete, mostly produced sand and gravel from its Blue Diamond and Lone Mountain pits. The company also produced crushed stone from the Apex landfill about 10 miles northeast of Las Vegas. Nevada Ready Mix, a subsidiary of the Mitsubishi Corporation, mined most of its aggregate from a complex of pits in alluvium in the Lone Mountain area, with minor production coming from quarries in adjacent bedrock. Frehner Inc., a subsidiary of Aggregate Industries, mined and crushed limestone from its Sloan property a few miles south of Las Vegas. American Sand and Gravel

mostly produced aggregate from community pits. The Southern Nevada Lightweight operation near Jean produced aggregate for lightweight concrete block and sand for use in stucco. According to the U.S. Bureau of Land Management (BLM) database LR2000, community pits and other aggregate mining facilities administered by the BLM and operated by a number of companies, including some of those already mentioned, contributed an estimated 1.5 million tons to the total production of the Las Vegas and adjacent southern Nevada area in 2010, a drop of 58% from 2009.

The Cind-R-Lite Block Company shipped lightweight aggregate to the Las Vegas market from their cinder operation in a Quaternary basaltic cinder cone near Amargosa Valley in Nye County. Most of the material shipped was minus 3/8-inch aggregate for the manufacture of cinder blocks and pavers. Cind-R-Lite has two manufacturing sites in the Las Vegas Valley and one in the Amargosa Valley.

In 2006, Service Rock Products Corporation of California submitted an application to the BLM to build and operate an aggregate pit called the Sloan Aggregate Mine in N/2, section 32, T23S, R61E. In 2007, CEMEX submitted an application to build and operate an aggregate pit called the Mohave Minerals Project in S/2, section 29, T23S, R61E. The mining from two pits, expected to eventually grow into one large 2,500-foot deep pit covering about 640 acres, is proposed to produce 100 million tons of mostly limestone and dolomite over a 20- to 30-year period. The sale request for the material exceeds the volume limitations for noncompetitive sales and would have to be done on a competitive basis either through oral bid or auction. The sites would be auctioned as two separate parcels, and there is no guarantee that Service Rock and CEMEX would be the winning bidders. The proposed project also includes batch, processing, and asphalt plants; office buildings; scale houses; parking lots; a control laboratory; and other maintenance and support facilities. The public scoping meetings ended in January 2008, and the mining plan of operation was filed with the BLM in February 2009. The asphalt plant was removed from the proposed action, and the timeline of the process delayed. A draft Environmental Impact Statement was completed in the summer of 2011 with a public comment period scheduled for August through December 2011. A final Environmental Impact Statement is now

anticipated for January 2013 and a Record of Decision the following month ([http://www.blm.gov/nv/st/en/fo/lvfo/blm\\_informat ion/nepa/sloan\\_hills\\_competitive.html](http://www.blm.gov/nv/st/en/fo/lvfo/blm_informat ion/nepa/sloan_hills_competitive.html)).

Residents in several housing developments within five miles of the proposed pits are opposing the projects, which prompted Senator Harry Reid to propose legislation in May 2010 to have the project site withdrawn for mining purposes. The proposed withdrawal of this site for mining purposes is estimated to potentially cost the Federal Government up to \$11 million mainly in the loss of revenue from the stopping of mineral sales (<http://www.gpo.gov/fdsys/pkg/CRPT-111srpt318/pdf/CRPT-111srpt318.pdf>).

The Nevada Department of Transportation (NDOT) and Federal Highway Administration (FHWA) proposed to establish a 134-acre material source site four miles north of the Interstate 15/U.S. Route 93 intersection on the east side of 93 at milepost CL 56.3 east of Las Vegas. The site is in sec. 33, T17N, R63E. Over the next three years, a number of highway-resurfacing projects are scheduled for Interstate 15, and the site will provide material for base, borrow, aggregate, riprap, and plant mix bituminous surface material. The site is on public land, and NDOT, in cooperation with the FHWA and BLM, will complete an Environmental Assessment in 2011.

On April 1, 2010, Ready Mix, Inc. changed their name to RMX Holdings, Inc. and sold most of their assets to Skanon Investments, Inc. of Scottsdale, Arizona for \$9.75 million. Ready Mix is based in Phoenix, Arizona, with operations both there and in Las Vegas (<http://www.rmxholdings.com/RMXClosingRel.pdf>). Ready Mix, Inc. had two aggregate production facilities near Las Vegas—the Lee Canyon Sand and Gravel Pit and the Moapa Pit. In 2010, the Moapa pit produced some concrete sand and coarse aggregate, but was slated to be permanently closed in early 2011.

In 2010, Pipes Paving produced a small amount of aggregate and then went out of business. They had been in business since 1985 and had an aggregate operation at Lone Mountain since 1990. In 2010, Southern Nevada Paving, Inc. was listed as merged out and dissolved on the Nevada Secretary of State Business Search database. The company had been in business since 1962 and produced from the Lone Mountain Stocks pit since about 1980. It became a subsidiary of Aggregate Industries,

Inc. in 2003. Hollywood Gravel Co., which as late as 2009 produced almost 200,000 tons of sand and gravel from the Lone Mountain area produced about 10,000 tons in 2010 and then was listed as in default on the Nevada Secretary of State Business Search website. They have been in business since 1990.

An estimated 4.8 million tons of construction aggregate are estimated to have been produced in the Reno-Sparks-Carson City area in 2010, a decrease of about 4% from 2009. Production from Granite Construction, which was over one million tons of aggregate in 2007 and fell below that in 2008, fell below 500,000 tons in 2010. Granite Construction operates several pits in the area, but the bulk of the company's production was crushed andesite and crushed granitic rock from its Lockwood pit. A small amount was mined but a much larger amount was shipped from stockpiles at Granite Construction's Hidden Canyon Pit, which pushed the company's overall sales above 500,000 tons in 2010. In 2010 the company reopened their Hidden Canyon Quarry, which had been temporarily shut down in 2008. The pit was slated for temporary shutdown again in early 2011.

Of the two pits operated by Martin Marietta Materials, Inc., the Mustang Pit was temporarily shut down, and the Spanish Springs Quarry production was below 500,000 tons in 2010. Combined production from these two pits was over 1 million tons in 2006, fell below that in 2007, but remained above 500,000 tons through 2009. The Spanish Springs (Rocky Ridge) Quarry north of Sparks produces crushed granitic rock and some decomposed granite. The company is expecting to continue operations at the 389-acre Spanish Springs Quarry for another 20 to 30 years. Current plans are to gradually relocate quarrying activities from the present BLM Mineral Materials Sale area to their Broken Hill Extension on private property southwest of their existing operations. The processing and ancillary facilities would remain at their present site. To facilitate these plans, Martin Marietta proposed to renew their existing competitive Mineral Materials Sale contract and acquire a right-of-way to construct and operate an aggregate conveyor belt and associated road across public land between the Broken Hill Extension and the processing facilities. The BLM will complete a final Environmental Assessment and issue a Record of Decision in 2011 ([http://www.blm.gov/nv/st/en/fo/carson\\_city\\_field](http://www.blm.gov/nv/st/en/fo/carson_city_field)

[/blm\\_information/nepa/spanish\\_springs\\_quarry.html](#)).

Combined production from A and K Earthmovers' two pits, which was more than one million tons in 2007 and fell below 500,000 tons in 2008, remained below that level in 2010.

Rilite, Inc., which had an annual production between 500,000 and 1,000,000 tons in 2007 has remained below 500,000 tons since 2008.

CEMEX, which had an annual production between 500,000 and 1,000,000 tons in 2007, fell below 500,000 tons in 2008 and 2009, but rose above it in 2010. CEMEX owns the former All-Lite Aggregate crushed rhyolite pit and also operates the sand and gravel operation at the Paiute pit, which is leased from the Pyramid Lake Paiute Tribe.

Crushed rock accounted for about 60% of the aggregate used in 2009 in the Reno-Sparks-Carson City area. Lightweight aggregate, an important component of crushed rock production in the area, was produced by CEMEX, Rilite, and Basalite.

Cinderlite Trucking, Inc. produced a small amount of decorative rock and sand and cinder for deicing from their Black and Red Cinder pits northeast of Carson City.

In 2010, production from the Bella Vista Pit of A and K Earthmovers near Reno in Washoe County increased from 2009, but then the pit was temporarily shut down in December. Sierra Nevada Construction, Inc. reopened their Mustang Pit after being shut down in April 2009, produced aggregate, and then temporarily shut down the pit again in December 2010 with plans to reopen again in early 2011. Gopher Construction, Inc. temporarily shut down their Trico and Mull Pits in Storey and Lyon Counties, respectively, in 2009. The Trico pit was reopened in 2010.

Western Nevada Materials proposed their Tracy Pond Project, which is to expand their existing aggregate operations on private land by obtaining acceptance and approval for a competitive material sale contract on public land in sections 22 and 27, T20N, R22E, about 15 miles east of Reno. The project area would cover 424 acres of public land, of which 300 to 320 acres would be disturbed over a 30-year period for the production of up to 83 million tons of aggregate. In February 2010, the BLM issued an Environmental Assessment, Finding of No

Significant Impact, and Record of Decision approving the project.

At least 2.1 million tons of aggregate were produced outside of the major metropolitan areas in Nevada in 2010, which was a decrease of 12% from 2009. Together, operators in Nye County produced almost 580,000 tons in 2010, mostly in the Pahrump area, and Storey County produced about 545,000 tons. Lyon County produced over 370,000 tons, and Pershing County produced over 330,000 tons. Elko County produced almost 270,000 tons, and Churchill County produced almost 200,000 tons. Douglas County produced about 170,000 tons, but Esmeralda, Eureka, Lander, Lincoln, Mineral, and White Pine Counties each produced less than 100,000 tons of aggregate in 2010.

In 2010, A and K Earthmovers produced from their Hazen Pit in Churchill County and then temporarily shut the pit down in October. The company shipped some aggregate from stockpiles in the Desert Mountain Pit in Churchill County, which has been shut down since 2007. They were reclaiming the Russell Pass Pit about 8 miles south of Fallon in Churchill County as stockpiles were being removed.

The Pardo Quarry of Harney Rock and Paving Co. in Elko County produced and shipped a small amount of sand, gravel, and aggregate prior to October 2010, when it was temporarily shut down. In 2010, A. Borasky Excavating produced a small amount from their pit near Pahrump in Nye County and then permanently shut the pit down in October.

The Nevada Department of Transportation (NDOT) and Federal Highway Administration (FHWA) proposed to expand from 40 to 80 acres an existing material source site three miles southwest of Gabbs on the south side of State Route 361 at milepost NY 5.76. The site is in sec. 8, T11N, R36E. The site will provide material for base, borrow, aggregate, riprap, and plant mix bituminous surface material for the construction and maintenance of State Routes 361 and 844 and other State maintained roads in the area for the next 20 years. The BLM will complete an Environmental Assessment in 2011.

David Gibson proposed to expand the Gibson Road gravel pit from the authorized 5 acres to 15 acres. The pit is located in northwest quarter, sec. 19, T10N, R62E in White Pine County. The present pit has produced 14,000 cubic yards since 2006. The expansion will

provide for the mining or another 200,000 cubic yards – 150,000 cubic yards for ON Line Transmission Project and 50,000 cubic yards for local use. The BLM was preparing a Preliminary Environmental Assessment for release in 2011.

On November 19, 2010, the BLM completed a Final Environmental Impact State for the Crescent Dunes Solar Energy Project of Tonopah Solar Energy, LLC. The project will be located about 13.5 miles northwest of Tonopah in Nye County. The project will require aggregate from a proposed 40-acre borrow pit.

In 2010, approval was given to Nevada Geothermal Power Co. to produce sand and gravel from a new pit in 2011 at their Blue Mountain Geothermal Project Area. The pit will be referred to as the New Blue Pit located in sec. 14., T36N, R34E.

In 2010, the BLM sent out a notice seeking public input on an environmental analysis for the Pershing County Road Department's Mineral Materials Free-Use Permit Renewals, Community Pit Designations, and Expansion Project. The mineral materials are common variety and include but are not limited to sand, gravel, stone, clay, and decomposed granite. The proposed action is to evaluate the renewal, expansion, and creation of 37 mineral material sites on BLM land in Pershing County. The proposal includes renewing 29 Free-Use Permits (FUP) to the Pershing County Road Department; expanding 13 of these sites by a total of 410 acres; designating 10 of these sites as community pits; changing one FUP into a 26-acre community pit; creating five new FUPs covering a total of 40 acres; expanding an existing community pit by 10 acres; and creating a new 40-acre community pit. The BLM serial numbers of the sites are NVN-062506 and NVN-087644 through NVN-087687 inclusive ([http://www.blm.gov/nv/st/en/fo/wfo/blm\\_information/nepa0/minerals/hcrd\\_fups\\_compits.html](http://www.blm.gov/nv/st/en/fo/wfo/blm_information/nepa0/minerals/hcrd_fups_compits.html)).

## **Barite**

According to the U.S. Geological Survey, the United States production of barite increased 75% to an estimated 739,000 tons of barite valued at about \$36 million in 2010, which is the highest level since 1997. Most of this production comes from Nevada and the remainder comes from a mine in Georgia. Consumption increased 30% to 3 million tons. Imported barite, mostly from China and some from India, increased 47% to about 2.3 million

tons. It was mostly imported into the Gulf Coast for use in oil and gas drilling offshore in the Gulf of Mexico and onshore drilling in Louisiana, Oklahoma, and Texas. The average price of barite in 2010 remained high and increased 4% to \$49.00 per ton from the mine according to the U.S. Geological Survey. The price has increased every year since 2001, and has increased 116% since then. Higher prices in 2010 were due in part to adverse weather and flooding in the barite producing regions of China and India.

According to Schlumberger, the average weekly U.S. oil and gas drill rig count increased by 24% to 1,460 in 2010, and the Canadian rig count increased 58% to 316. The U.S. rig count continued a general increase started in late May 2009 and increased 39% from 1,196 during the first week of 2010 to 1,662 during the first week in November followed by a dip and ending the year at 1,643. The Canadian rig count jumped from 268 to 484 from New Years to the beginning of February and then slid to 99 at the beginning of May. The count then rose unevenly to 440 in early December and ended the year at 386.

According to data from the Nevada Division of Minerals, Nevada's barite production comes from four operations, three of which were actively mining in 2010. Production increased 38% to 657,167 tons from 476,451 tons shipped in 2009. Although this is considerably more than the recent low production of 377,000 tons in 2002 and the highest since 663,000 tons were produced in 1983, it is still far below the 2.48-million-ton high in 1981. The difference in reported production is that the U.S. Geological Survey reports run-of-mine, flotation, or other beneficiated material that is sold or used by the producer, while the Nevada Division of Minerals reports what is shipped, which can include some material from stockpiles. About 95% of the barite sold domestically is used as a weighting agent in oil and gas well drilling fluids. According to the U.S. Geological Survey, shipments of ground barite from Nevada mostly went to Colorado, New Mexico, North Dakota, Utah, and Wyoming gas drilling customers.

M-I SWACO was the largest Nevada barite producer in 2010. Their production increased 42% to 314,177 tons from 220,650 tons shipped in 2009 of crude and ground barite from the Greystone Mine and Battle Mountain plant, both in Lander County. This was the

highest production since 317,857 tons were shipped in 2004. A small amount of barite is also taken from old stockpiles in the nearby Mountain Springs Mine for blending at the plant. The barite of the Greystone Mine is in black chert and minor argillite and shale of the Middle to Late Devonian Slaven Chert. M-I SWACO was jointly owned by Smith International, Inc., and Schlumberger, Ltd. In August 2010, Schlumberger acquired and merged with Smith International

([http://www.slb.com/news/press\\_releases/2010/2010\\_0827\\_smith\\_merger\\_closes.aspx](http://www.slb.com/news/press_releases/2010/2010_0827_smith_merger_closes.aspx)).

Baroid Drilling Fluids, a subsidiary of Halliburton Co., was the second largest producer in Nevada. Their production increased 1% to 173,700 tons from 171,331 tons shipped in 2009. The company mined barite from the Rossi Mine in Elko County and processed it at the Dunphy Mill in Eureka County. Heemskirk Canada, Ltd., a Canadian industrial minerals concern, acquired crude barite from the Rossi Mine and shipped it from Dunphy to their Lethbridge, Alberta, processing plant. The barite was then supplied to the western Canadian drilling mud market. The barite occurs in chert of the Ordovician Vinini Formation.

Baroid proposed an amendment to their Plan of Operation referred to as the Rossi Mine Expansion Project. This would include continued mining at the Sage Hen and Queen Lode Mines, construction of a waste rock disposal facility in the Queen Lode area, expansion of the waste rock disposal facility in the Sage Hen area, and continuation of surface exploration. Sage Hen is part of the main Rossi Mine area, and the Queen Lode is near the south end of the main Rossi Mine area. An Environmental Assessment was prepared, and on October 21, 2010, the BLM issued a Record of Decision and a Finding of No Significant Impact.

Baker Hughes Oilfield Operations, Inc., formerly Baker Hughes Drilling Fluids, shipped 94,838 tons of barite from its Argenta operation near Battle Mountain in Lander County, an increase of 12% from 84,470 tons shipped in 2009. The barite deposits are in black chert and minor argillite and shale of the Middle to Late Devonian Slaven Chert in the upper plate of the Roberts Mountain thrust.

In 2009, Baker Hughes proposed to expand their operations from a current disturbance area of 433 acres to 592 acres within the boundaries of their Plan of Operation.

At the time, the open pits covered 83.6 acres. The BLM issued an Environmental Assessment for the project on August 30, 2010. Expansion was carried out on the Yuba Dump and F Pit North in 2010 and continued into 2011.

In May 2009, National Oilwell Varco acquired Spirit Minerals, LP and its assets, which includes the Big Ledge Mine and the adjacent Dry Creek Jig Plant. The mine was temporarily shut down December 15, 2009, but 74,452 tons of barite concentrate were shipped in 2010. The barite occurs in argillite and chert of the Ordovician Valmy Formation.

In 2009, Baker Hughes signed an agreement with Bravo Venture Group, Inc., whereby Baker Hughes can acquire 100% of any barite ore at Bravo's Shoshone Pediment gold Project. Bravo is a spin-off of Bravada Gold Corp. of Vancouver, BC. Baker Hughes will make annual payments of \$25,000 and to Bravo and cover the claim maintenance fees and can exercise the option by paying Bravo \$150,000 any time during the six-year option period. Also, Bravo would receive a split of any samples Baker Hughes drilled (<http://www.bravadagold.com/en/projects/shoshone-pediment-property/index.php>). In 2010, Baker Hughes continued to evaluate the property. The barite on the property is located in Sec. 24, T31N, R46E, and generally occurs interbedded with siltstone and black chert in the Devonian Slaven. It was earlier claimed in 1953, later owned by Milchem, Inc., and explored and developed in the past through drilling, trenching, and a small open pit (NBMG Bulletin 98).

## Cement

According to the U.S. Geological Survey, United States cement production declined 2% to an estimated 69.2 million tons with a sales value of \$6.5 billion in 2010, the fifth straight year of decline. For the ten years up to 2005, production increased over 25%, but has declined 37% since then to the lowest level since 1982. Apparent consumption declined 3% to an estimated 77 million tons in 2010 with the difference between production and consumption being made up by imports mainly from China, Canada, South Korea, and Thailand. Apparent consumption increased 14% between 2002 and 2005, but has declined 46% since then. The average mill price decreased 7% to \$83.46 per ton in 2010. The price ranged between \$68.04 and \$72.12 per ton between 1998 and 2004 but

then increased 23% to \$94.35 by 2007. It has dropped almost 12% since then. The drop in consumption is largely due to the severe decline in the housing market, which started in 2006, spread into the commercial and government sectors in 2008, and continued into 2010. Production picked up modestly after the first quarter of 2010, but still ended the year with a drop. From 2008 through 2010, six plants have closed, nine have been indefinitely idled, and a number have shut down at least some of their kilns. Only one new plant was scheduled to go on line in 2010.

In 2010, plant-level reporting of carbon dioxide emissions became mandatory to the Environmental Protection Agency (EPA). The overall industry strategy was to reduce emissions per ton of cement product rather than by plant and was in part being addressed by the installation of more energy efficient kilns, the partial use of noncarbonated sources of calcium oxide, and the partial substitution of supplementary cementitious materials such as pozzolan. In 2009, the acceptable emissions level was lowered for mercury and some other pollutants from cement plants, and after some revisions, were finalized by the EPA in 2010. Some plants may not be able to comply with the new limits, and the new mercury standards will make it difficult for plants to continue to burn fly ash for the production of clinker.

The only cement producer in Nevada is the Nevada Cement Co. (a subsidiary of Eagle Materials, Inc. of Dallas, Texas), which has a plant in Fernley, Lyon County. Production is confidential, but the plant was built in 1964 with a rated annual clinker capacity of 505,000 tons, and produces Type I/II, low alkali, moderate sulfate-resistant cement. The cement is manufactured from limestone mined from two areas, and from other raw materials that come from northern Nevada and elsewhere. Most of the limestone comes from Tertiary lacustrine limestone deposits mined a few miles south of Fernley. Small amounts of marble are also mined from Triassic or Jurassic limestone and marble deposits in the Trinity Range about 40 miles east of the plant.

Nevada Cement serves markets in northern Nevada and California, where they have a rail terminal in Sacramento. Both markets were particularly hard hit by the housing slowdown. Though production from the Fernley facility is confidential, it likely follows the overall

trend of the parent company. Eagle Materials reported their overall cement sales volume was up 2%, while their overall cement sales revenue was down 4% in 2010. Their average price declined 8% to \$80.92 per ton in 2010 (<http://www.eaglematerials.com>).

Eagle Materials had received permits from the state for its planned expansion of the Fernley facility, but the downturn in the economy has caused the company to decide to not move forward with those plans (<http://biz.yahoo.com/e/110303/exp8k.html>).

According to LR2000, in 2010, Nevada Cement staked 68 new lode claims in the Virginia Range immediately south of their main limestone pit. Nevada Cement also recently won a three-year contract to supply Barrick Gold of North America with cement for backfill and shotcrete for all their underground operations in northern Nevada ([http://elkodaily.com/mining%20/article\\_6e89812-2-d4fd-11e0-83a7-001cc4c002e0.html](http://elkodaily.com/mining%20/article_6e89812-2-d4fd-11e0-83a7-001cc4c002e0.html)).

Infrastructure Materials Corporation of Reno, Nevada, staked a large number of claims in 2009, and owns 12 projects for cement grade limestone in Nevada. These projects were summarized from the BLM database LR2000, and the company website <http://www.infrastructurematerials.com>, in last year's edition of this report. Railroad Industries, Inc. prepared for Infrastructure Materials a report titled Nevada Cement Study Update, February 28, 2010. Because of transportation costs and competitiveness issues of cement and aggregate materials, the report states the typical cement facility serves a market that a truck can reach within a 200-mile radius. The report uses the conservative forecast that full recovery to the peak demand for cement, which was reached in 2006, will take until between 2022 and 2025, and that it takes 8 to 10 years to develop cement facilities. Therefore, the facilities would be coming on line as the demand for cement was recovering to pre-recession levels. The report looked at the potential markets for two projects: Blue Nose in Lincoln County and Morgan Hill in Elko County.

The Morgan Hill Project consists of 212 claims located mostly in T37N, R58E about 20 miles west of Wells, Nevada. The facility would be located adjacent to the Union Pacific/BNSF Railway mainline at Death, Nevada, and could easily serve markets in southern Idaho; the Salt Lake City and Provo areas of Utah; and Reno and northern Nevada. The railroad also provides direct access to markets in the Sacramento Valley and southern Wyoming.

The Morgan Hill Claim Group covers large amounts of micritic limestone containing beds with unit thicknesses ranging up to 500 feet within the Devonian Devils Gate and Nevada Formations. The area also contains sandstone for a silica supply required for cement. The local topography is conducive to open pit mining with potentially little to no initial strip ratio. The beds, however, do contain varying amounts of magnesia. Magnesia content in excess of 5% is undesirable as it can affect the volume soundness of cement.

The Blue Nose Claim Group consists of 297 claims located in T8S, R68-69E along the south edge of the Clover Mountains about 25 miles southeast of Caliente, Nevada. The facility would be located adjacent to the Union Pacific Railroad at Lyman's Crossing, Nevada, and could easily serve the markets in the Las Vegas, Nevada, northwestern Arizona and southeastern California areas. I-15 and connecting rail lines also provide access to markets farther afield in southern Utah; Phoenix and other areas of northern Arizona; and Los Angeles, Bakersfield, and Riverside as well as being exported from ports in California.

The Blue Nose Claim Group covers limestone of the Mississippian Monte Cristo Formation. The property was surface mapped, sampled, and drilled. About 60% of the samples reportedly contained "cement grade material," and limestone from 27 of 29 drill holes reportedly assayed between 88% and 100% calcium carbonate. Areas of elevated magnesia were also reported but do not appear to affect the overall value of the cement grade zone.

## **Clay**

According to data from the Nevada Division of Minerals, Nevada clay production was an estimated 22,000 tons in 2010, a decrease of 12% from 25,000 tons in 2009. This production does not include halloysite clay mined in Washoe County for Nevada Cement.

In 2010, IMV Nevada, owned by Mud Camp Mining Company, LLC produced about 20,000 tons of sepiolite, saponite, and bentonite from deposits in the Ash Meadows-Amargosa Flat area of Nye County. This is the same as was produced in 2009. The clay occurs in shallow, flat-lying deposits in Pliocene lacustrine rocks. It is processed at a plant in Amargosa Valley, and clay products are exported worldwide. The sepiolite and saponite deposits

have unusual geology, they are considered to have originated in a Pliocene playa with an area of at least 22 square miles. The sepiolite, which yields most of the profits for the operation, occurs in an almost continuous bed with an average thickness of about 7 feet. IMV Nevada is the only commercial producer of sepiolite and saponite in North America.

Two companies campaign mine and ship relatively minor amounts of Nevada clay from several sites for use in high-value specialty products. At its White Caps Mill near Beatty in Nye County, Vanderbilt Minerals Co. processes small amounts of clay stockpiled from several deposits in Nevada, Arizona, and California. In 2010, the company did not actively mine but did ship smectite from the New Discovery Mine just south of Beatty, the Blanco Mine about 40 miles west-southwest of Tonopah in the Coaldale Mining District in Esmeralda County, and the Buff and Satin Mines about 10 miles northeast of Lovelock in the Willard Mining District in Pershing County.

The American Colloid Co. mined and shipped white bentonite from its Nassau property in Coal Canyon in the Willard Mining District for use in specialty clay products. The clay is in altered rhyolite tuff-breccia of probable Miocene-Pliocene age. American Colloid also mines several thousand tons of hectorite every few years from their Disaster Peak Mine in the Disaster Mining District about 30 miles west of McDermitt in Humboldt County. The hectorite is in moat deposits of the McDermitt Caldera. The Disaster Peak Mine did not produce in 2010.

The Art Wilson Company mined halloysite on an as-needed basis for the Nevada Cement Co., which owns the pit in the Terraced Hills about 8 miles northwest of Pyramid Lake. Because of its high alumina content, it is used in the production of Portland cement at the Nevada Cement Co. plant at Fernley.

Altenberg Media International, Inc., through Window Peak Trace Minerals, sold some montmorillonite interbedded with silt high in humus and lignite from a quarry on the Robin Nos. 1 and 2 claims in the Panaca mining district about 0.5 miles north of Panaca. The montmorillonite reportedly contains chelated trace minerals and is sold to producers of food supplements and agricultural soil supplements (<http://www.chelatedtraceminerals.com>). The deposit is in lake sediments of the Tertiary Panaca Formation (NBMG Bulletin 73).

## Diatomite

The United States is the largest producer of diatomite worldwide. According to the U.S. Geological Survey, the domestic production decreased 4% to an estimated 606,000 tons of diatomite in 2010 valued at \$138 million, which is also down 31% from the production peak of 881,000 tons in 2006. Apparent consumption increased 6% to 507 million tons, but exports, which accounted for 16% of production, increased 2% to 99 million tons. Production was from seven companies with twelve mining areas and nine processing facilities in California, Nevada, Oregon, and Washington with California and Nevada accounting for most of it. The average price at the plant decreased 2% to about \$227 per ton in 2010. For the last 19 years, the average price has ranged between \$200 and \$245 per ton and averaged about \$224 per ton. About two-thirds of the diatomite produced in Nevada is used in filtration and the remainder is largely used in absorbents, fillers, and cement. Emerging small-scale uses include pharmaceutical processing and nontoxic insecticides.

EP Minerals, LLC, a subsidiary of EaglePicher Corp., and the second largest diatomite producer in the world, produces most of Nevada's diatomite. EP Minerals' Colado operation in Pershing County is the company's most productive Nevada operation. It consists of a plant at Lovelock that mostly makes filtration products from diatomite mined about 15 miles to the northwest in the Velvet Mining District. The diatomite occurs in thick beds interbedded with fresh-water tuffaceous sedimentary rocks of probable Miocene age. The company also produces diatomite used in fillers and absorbents at its Clark plant and mine in the Clark Mining District Storey County about 20 miles east of Reno and diatomite used in insulation from a pit near Hazen in Lyon County. The diatomite at Clark occurs with diatomaceous shale and thin beds of volcanic tuff within the Miocene-Pliocene Kate Peak Formation and consists of about 90% of the diatom *Melosira granulata*.

The Celite Corp. operates a plant in Fernley that produces diatomite fillers and mined their Nightingale deposit north of Fireball Ridge in Churchill County in 2009. Their Hazen Pit, which had been mined since 1950 and still has reserves, was placed on standby and not mined in 2010. Celite is a subsidiary of World Minerals

Inc., the world's largest diatomite producer and a subsidiary of Imerys, a large French industrial minerals company.

The Moltan Company ships absorbent products, cat litter, and soil conditioner under several labels from a mine and plant complex in Churchill County about 20 miles northeast of Fernley in the Desert Mining District. Diatomite deposits in western Churchill County are interbedded with Pliocene lacustrine tuffaceous shale, sandstone, limestone, and siliceous tuff.

The Grefco Minerals, Inc. diatomite operation near the Esmeralda/Mineral County line is small relative to other Nevada diatomite companies but has been producing diatomite for many years for fillers. The deposit is in Miocene-Pliocene lacustrine sedimentary rocks consisting of diatomite, argillaceous and calcareous diatomite, clay, sand, and volcanic ash, and the main diatoms are *Melosira granulata*, *Stephanodiscus asraea*, and *Eunotia robusta*. Since 2004, production has been from stockpiled ore.

Global Silica, LLC, of Las Vegas, Nevada, owns claims in the Monte Cristo Range in northern Esmeralda County where plans to mine diatomite in section 26 and process and sell it as amorphous silica. The BLM is working on an environmental assessment, and production is tentatively scheduled for 2011. According to USGS Miscellaneous Field Studies Map MF-2260, the diatomite is abundant in the Miocene "sedimentary rocks of McLeans", which largely consists of siltstone, shale, and fine grained clayey sandstone. In 2010, Global Silica met with Esmeralda County and BLM officials to discuss options over additional maintenance to the county road that would be used when mining operations started.

## Dimension Stone and Landscape Rock

Mt. Moriah Stone Quarries, LLC, quarried flaggy quartzite of several colors from the Cambrian Prospect Mountain Quartzite at a quarry about 15 miles north of Baker in White Pine County. This material, which naturally splits into large slabs, is used for flagstone, ashlar (uncut facing stone), and other types of uncut building stone. The operation was temporarily shut down on November 30, 2010, with plans to reopen in April 2011.

Las Vegas Rock produced cut decorative slabs, flagstone, ashlar, boulders, and crushed landscape rock from its Rainbow

Quarries near Goodsprings, about 32 miles southwest of Las Vegas at the base of Mount Potosi. The operation consists of a main quarry and a number of satellite quarries located according to the color of the stone. The stone is mined from the Jurassic Aztec Sandstone, and technical data including hardness, strength, and composition are available on Las Vegas Rock's website <http://www.vegasrock.com>.

In 2010, D and H Mining leased their pits located about 5 miles north of Beatty to Kalamazoo Materials, Inc. of Tucson, Arizona. Kalamazoo Materials referred to these pits as the Beatty Quarry and mined crushed stone for landscaping. These pits are in Pliocene tuff, which in the past, D and H Mining mined and sold the rock under the name of "Spicerite" (strong, bright white, hydrothermally altered tuff used to make brick and blocks). Kalamazoo also mined crushed stone for landscaping from the Nipton Pit about 18 miles west-northwest of Searchlight in the Crescent District. This pit is largely in Precambrian gneiss and schist.

In 2010, Vista Landscape Center of Henderson, Nevada, sold decorative stone as wells as flagstone, boulders, and sand and gravel from area pits. Chase Crushing mined decorative stone from the Searchlight Pit just north of Searchlight for Vista Landscape. Vista Landscape also sold material from the Jericho Pit southeast of Henderson and the Mill Lode and Crescent Park Pits west of Searchlight.

## Fluorspar

The U.S. Geological Survey reports only U.S. production of fluorspar equivalent (equivalent to 92% fluorspar) derived as a by-product in the form of fluorosilicic acid from phosphate rock processed for phosphoric acid. The United States production of fluorspar increased 5% to an estimated 132,000 tons of fluorspar equivalent in 2010. Fluorspar was also recovered as a by-product from industrial waste, in Illinois from stockpiles produced as a by-product from limestone quarrying, but the production figures were not reported. Apparent consumption increased 10% to 573,000 tons in 2010 after decreasing 23% between 2007 and 2009. Imports, mostly from Mexico and China and some from South Africa and Mongolia made up the difference. The average price, which is reported for metallurgical grade, decreased 7% to \$92 per ton from the mine according to the

U.S. Geological Survey. Despite this overall average annual decrease, according to *Industrial Minerals*, prices for metallurgical grade fluorspar remained flat through April and then increased between 10% and 60%, depending upon the type of import, by the end of the year.

China is by far the largest producer of fluorspar – almost 56% of world production in 2010. Over time they have been increasing their capacity for the production of hydrofluoric acid and diverting fluorspar from export to internal consumption. China is now restricting exports of fluorite as well as other raw materials through quotas and/or taxes. This and the increase in demand outside of China starting in 2010 have led to an increase in exploration and development of new deposits and the reopening of mines closed during the drop in demand of the previous two years. Also, because of the concern about a potential shortage, the European Union placed fluorspar on their list of 14 critical raw materials.

According to NBMG Bulletin 93, *Fluorspar in Nevada*, Nevada produced an estimated 556,000 tons between 1928 and 1976, 91% of which came from four mines. According to the U. S. Geological Survey commodity reports, production from mines in Nevada continued through 1991 and then from stockpiles for several years afterwards. Authored by Keith Papke in 1979, Bulletin 93 summarized the geology, any known resources, and any estimated production for 62 fluorspar deposits and occurrences in Nevada.

In 2010, little if any exploration for fluorspar occurred in Nevada, although the concern of potential shortages might spur some renewed interest. Nevada Fluorspar, Inc. of Burtonsville, Maryland, had 40 lode claims around the Bisoni deposit in Eureka County and 40 lode claims around the Bruno prospect in Pershing County. Bulletin 93 reported that drilling at Bisoni outlined several large low-grade deposits of probably "many millions of tons" but with an average grade of slightly more than 10% CaF<sub>2</sub>.

The Blue Nose Claim Group of Infrastructure Materials Corporation discussed in the section on Cement also includes the Carp Mine. According NBMG Bulletin 93, the Carp Mine consisted of 6 small pits, and 44,900 tons grading 69% fluorspar was mined between 1958-1959 and 1968-1971. The fluorspar deposits contained minor amounts of

montmorillonite and are hosted in dolomite, dolomitic limestone, and calcitic dolomite locally containing barite.

A number of sites containing fluor spar are staked for precious metals exploration. In 2008, Min-Quest staked the Iowa Canyon area of Lander County for gold exploration and kept the claims current in 2010. According to their website, the project area includes the Blazer and Ell-See fluor spar deposits. The Blazer contains 300,000 tons of 30% fluor spar largely in the Ordovician Valmy Formation (<http://www.minquestinc.com/Properties.aspx>).

In 2010, Silverthorn Exploration, Inc. of Arden Hills, Minnesota, dropped their lode claims around the West Slope deposit in Mineral County. The area was subsequently claimed by Almaden America, Inc. of Reno, Nevada. Almaden America is a subsidiary of Almaden Minerals, Ltd., of Vancouver, British Columbia. The West Slope deposit, also known as the Black Cap prospect, is hosted in Tertiary rhyolitic tuff.

### **Gemstones**

Precious opal is produced from several mines in the Virgin Valley area of northern Humboldt County. Virgin Valley is a well-known source of gemstones in North America. The best known mines there are the Royal Peacock, Rainbow Ridge, and Bonanza Mines. In 2010, these mines combined produced about 100 pounds from pay-to-dig operations. The opal occurs in lacustrine sedimentary rock, volcanic ash and tuff, and bentonite of the Miocene Virgin Valley Beds of Merriam.

In 2010, a small amount of turquoise was shipped from Royston claims in the Royston District of Nye County, but the Blue Ridge Mine in the Bullion District of Lander County did not produce. Both operations are family owned. In the Royston District, turquoise mainly occurs in metachert, quartzite, and greenstone of the Permian(?) Pablo Formation. In the Bullion District, turquoise mainly occurs in siliceous shale, chert, and quartzite of the Ordovician Valmy Formation and in the Devonian Slaven Chert.

### **Gypsum**

According to the U.S. Geological Survey, the United States crude gypsum

production decreased 4% to an estimated 9.9 million tons valued at \$58.5 million in 2010. Apparent consumption decreased 8% to 21.4 million tons, the fourth consecutive annual decrease and a decrease of over 53% since peaking at 45.9 million tons in 2006, largely due to the collapse of the housing-construction market. The difference between production and consumption was mostly made up with imports mainly from Canada and some from Mexico and Spain, which decreased 22% to 3.6 million tons in 2010. In 2010, the price of crude gypsum decreased 24% to \$5.90 per ton from the mine. For the previous 15 years, the price has ranged between \$6.08 and \$8.01 per ton and averaged \$7.59 per ton. Sales of synthetic gypsum, produced largely through scrubbed emissions from coal-fired power plants, decreased 3% to 8.3 million tons in 2010. It had increased 36% between 2001 and 2006 to 10.2 million tons but has decreased 19% since then. The construction of new large wallboard plants and the continued expansion of existing facilities that began in 2005 using synthetic gypsum will eventually result in less use of mined gypsum.

Interestingly, while only 4% of production, exports of gypsum actually rose 131% to 379,000 tons in 2010. Exports fell to 158,000 tons in 2006 and have increased every year since then and are up 152% since then. The increase is likely due in part to the increase in use of wallboard and completion of new gypsum product plants in Asia.

In 2009, Nevada moved up from fifth to first and remained there in 2010 in the list of ten states which produce 83% of the country's total. According to data from the Nevada Division of Minerals, Nevada's gypsum production decreased 12% to an estimated 1.056 million tons, which is the seventh consecutive annual decline.

PABCO Gypsum in Clark County northeast of Las Vegas was the largest Nevada producer in 2010. Production fell 5% to about 682,000 tons in 2010 from about 715,700 tons of crude gypsum in 2009. This is the fifth annual decline and a drop of 60% since 2005, when production last peaked at 1.688 million tons. PABCO Gypsum processes the gypsum into wallboard at a plant adjacent to their mining operation. Processing yields about 70% by weight gypsum from the ore, which is in a nearly flat-lying late Miocene gypsite blanket atop a 5-

square-mile mesa. Drilling indicates the gypsum is at least 120 feet thick in the area of current mining.

USG, the nation's largest wallboard producer, was the second largest Nevada producer in 2010. Production decreased 19% to 162,636 tons in 2010 from 201,900 tons in 2009. This is the fourth annual decline and a drop of 56% since 2006, when production last peaked at 369,500 tons. The company mined gypsum in western Pershing County and processed it into wallboard and plaster at a plant at Empire in Washoe County. The gypsum is of Triassic or Jurassic age and forms several masses in a 2-square-mile area. The largest mass, the Selenite orebody, contains 85 to 95% gypsum. In December 2010, USG announced that because of the collapse in construction, the Empire operations would be shut down and placed on "indefinite idling" on January 30, 2011. The operation could be restarted if the economy improved and construction picked up (<http://www.rgj.com/article/20101202/NEWS/101202047>).

Material from two smaller operations is used in cement and agricultural applications. The Art Wilson Company of Carson City produced about 148,000 tons of gypsum and anhydrite from the Adams Mine in Lyon County, a 22% increase from about 121,600 tons in 2009. The Adams deposit is a folded body associated with limestone in Triassic metavolcanic rocks. The Pioneer Gypsum Mining Company produced about 62,992 tons of gypsum from the Pioneer Mine about 10 miles east of Las Vegas, a 60% decrease from 158,605 tons produced in 2009. The Pioneer Mine exploits the same late Miocene gypsite deposit as the PABCO operation about 5 mi to the north.

Georgia-Pacific Gypsum, LLC, operates a plant at Apex using synthetic gypsum and crude gypsum imported from St. George, Utah, for the production of drywall and related products. Nevada Cogeneration Associates No. 1 has an 85 MW combined cycle natural gas power plant adjacent to the gypsum plant. The power plant produces electricity for sale on the power grid and provides thermal energy and chilled water to the gypsum plant for wallboard production. Georgia-Pacific Gypsum, LLC, also own the Weiser Ridge quarry about 10 miles west of Overton. They have not actively mined

the quarry since 1995 but are planning to resume mining to provide crude gypsum for their Apex plant. The quarry is in gypsum interbedded with limestone of the Permian Toroweap and Kaibab Formations.

The Meadow Valley Gypsum Project, also referred to as the Thrasher Gypsum Mine, is stalled because of a lack of access. The project is in Lincoln County about 25 miles north of Moapa, and an Environmental Assessment, a Finding of No Significant Impact, and a Record of Decision were issued in 2006 and 2007. The project calls for an open pit and associated facilities, dump, and stockpiles on 12 acres with production lasting about five years. In 2010, the BLM was in the process of issuing a new right-of-way for a county road.

### **Iron Ore**

In 2010, the Saga Exploration Company shipped iron ore from stockpiles at the old Nevada Barth Mine in Eureka County. The iron ore consists mostly of hematite and some magnetite, and is used in the manufacture of cement. The American Smelting and Refining Company leased the property from the Central Pacific Railroad Company and mined 544,295 tons of iron ore between 1903 and 1918 for use as flux in their lead smelter in Salt Lake City. Lessees continued to work the property off and on afterwards with some mining in the 1960s and 1970s. Saga Exploration has shipped iron ore from stockpiles since 1993.

### **Lime, Limestone, and Dolomite**

According to the U.S. Geological Survey, the United States production of quicklime and hydrate increased 14% to 19.8 million tons valued at \$1.8 billion in 2010. Apparent consumption increased 12% also to 19.8 million tons in 2010. In 2010, the average price at the plant increased 3% to \$95.26 per ton for quicklime and also increased 3% to \$117.94 per ton for hydrate. Nevada's production is confidential, but it was one of seven states producing more than 1 million tons in 2010. Three of those states produced more than 2 million tons. Nevada had been on the list of states producing more than 1 million tons between 2002 and 2008 but not in 2009. Nevada has two large lime producers and several small specialty dolomite and limestone producers.

Nevada's larger lime producer, the Pilot Peak high-calcium lime operation of Graymont Western US, Inc. (formerly Continental Lime, Inc.) is in Proctor Mining District in the Toano Range about 10 miles northwest of Wendover in Elko County. The plant has three kilns with a combined capacity of more than 700,000 tons of quicklime per year and a hydrated lime plant capable of producing 350 tons per day. Pilot Peak mainly markets lime to gold-mining operations for use in cyanide-solution pH control. Although lime production is confidential, gold production in Nevada increased 6% in 2010, and gross proceeds for Pilot Peak reported to the Nevada Department of Taxation increased 16%. Production is mainly from the Middle to Late Devonian Devils Gate Limestone, which generally consists of interbedded limestone and dolomite.

Nevada's other lime producer, Lhoist North America (formerly Chemical Lime Co.) produces lime at Apex in the Apex Mining District about 20 miles northeast of Las Vegas. The operation makes high-calcium quicklime used in metallurgical processing, paper manufacturing, and environmental markets. The company also produces dolomitic lime and hydrated high calcium lime at Apex, mainly for construction uses. The company's Henderson plant processes Type S hydrated dolomitic lime for building and home construction. In addition to lime, Chemical Lime also shipped crushed limestone. Because of the decline in demand from the drop in the housing market, in 2009, Chemical Lime idled their plant in Grantsville, Utah, which remained idled through 2010. However, the production capacity at their Apex and Henderson operations would be adequate to cover that closing. Although production is confidential, despite the Grantsville closure and increase in prices, the gross proceeds reported to the Nevada Department of Taxation increased 21%. Production is from the Middle to Late Devonian Sultan Limestone. The composition of the Sultan Limestone is generally as follows: the Ironside Dolomite Member (lower member) is mostly dolomite; the Valentine Limestone Member (middle member) ranges from more than half limestone to mostly dolomite; and the Crystal Pass Limestone Member (upper member) is nearly pure limestone.

Of Nevada's specialty dolomite and limestone producers, the Nutritional Additives

Corp. produces agricultural and nutritional dolomite products along the northwest edge of the Sonoma Range about five miles south of Winnemucca. Production is from the Late Triassic Dun Glen Formation, which consists mainly of massive black dolomite with minor limestone and shale in its lower section. Min-Ad, Inc. a subsidiary of Inter-Rock Minerals Inc. of Toronto, Canada, also produced dolomite from the Dun Glen Formation about three miles south of the Nutritional Additives Corp. operation. Their dolomite is mostly sold into the midwestern U.S. and as far as New York State and Alberta, Canada, for use in beef and dairy feed. Along with gypsum and anhydrite, the Art Wilson Company of Carson City also produced some pure calcitic limestone from the Adams Mine. The limestone is used for soil pH control and reportedly contains no detectable magnesium.

## **Lithium**

According to the U.S. Geological Survey, the estimated United States consumption of lithium decreased 23% to 1,100 tons in 2010. Estimated consumption averaged 3,100 tons in the late 1990s to 2000, decreased rapidly to 1,200 tons in 2002, and increased rapidly to 2,750 tons in 2005 and 2006. It has declined every year since then, and is now down 60% since 2006. Nevada is the only state with domestic production of lithium raw materials, and since this production is from one company, actual production and consumption figures are kept confidential to protect company proprietary data. The Nevada Department of Taxation reported the gross proceeds from lithium increased 94% to \$14,526,203 in 2010.

Subsurface brines have become the dominant raw material for lithium carbonate production worldwide because of low production costs as compared with the mining and processing costs for hard-rock ores. Lithium was produced as a by-product from brine in California since 1938; however, the Nevada operation, initiated at Silver Peak in Esmeralda County in 1966 by Cyprus Mines, was the first to extract lithium as the sole commercial product from brine. This operation was the world's dominant lithium producer until the late 1980s, when a Chilean lithium brine operation started up. South American sources, two brine operations in Chile and one in Argentina, where a second one is under development, now

dominate the world market. U.S. lithium imports more than doubled between 2001 and 2005, steadily declined 47% between 2006 and 2009, and then increased 6% in 2010. U.S. lithium exports varied between 1,590 and 1,900 tons and averaged 1,710 tons between 2001 and 2008. Exports decreased 37% to 1,010 tons in 2009, and then increased 74% to an estimated 1,760 tons in 2010. Most of the increase was due to lithium-based rechargeable battery sales, which now account for 23% of the global lithium market, and according to *Industrial Minerals* (January 2010), is forecast to account for 36% in 2013.

The U.S. price for lithium carbonate was about \$2.00 per pound until the late 1990s, when large shipments of lithium carbonate began to be sold from the South American operations at about half list price. Prices then rose again due to increased demand for lithium for battery production. A decline in demand starting in 2009 and an oversupply in the market have resulted in a price drop. The price for lithium carbonate delivered in the U.S. was \$2.30-2.40 per pound throughout 2010, a drop of about 19% from \$2.80-3.00 per pound throughout 2008 and 2009 (*Industrial Minerals*).

Chemetall Foote Co., a subsidiary of Chemetall GmbH and its parent company, Rockwood Holdings, Inc., owns and operates the Silver Peak lithium facility. The company produces lithium carbonate, lithium hydroxide monohydrate, and lithium hydroxide anhydrite. The lithium chemicals are produced by solar evaporation preconcentration and subsequent refining techniques from brine that is pumped from beneath the Clayton Valley playa. The brine varies between 100 and 300 ppm lithium. Production figures are confidential; the most recent public information, from 1998 Securities and Exchange Commission data, showed production of about 12 million pounds of lithium carbonate and 5 million pounds of lithium hydroxide. *Industrial Minerals* (July 2008) reported the remaining economic reserves to be about 44,000 tons. Through its subsidiary Sociedad Chilena de Lithio, Chemetall GmbH also runs a lithium operation in Antofagasta, Salar de Atacama, Chile.

In 2009, the U.S. Department of Energy (DOE) awarded to Chemetall Foote \$28.4 million in American Recovery and Reinvestment Act funds to expand and upgrade production of

lithium materials for advanced transportation batteries. Part of those funds went to the expansion of lithium carbonate production at Silver Peak, which began in July 2010. The expansion will include a well drilling project to double production, and the installation of a geothermal power plant to make the operation self-sufficient for electrical power (<http://www.chemetalllithium.com>). In September 2010, the DOE issued a final Environmental Assessment for the expansion at Silver Peak and at Chemetall's facility at Kings Mountain, North Carolina.

On January 5, 2010, American Lithium Minerals, Inc. of Henderson, Nevada, entered into an agreement to acquire a 100% interest in the lithium assets of Gold Summit Corporation USA of Reno, Nevada. Gold Summit's lithium assets included their Paymaster property, which covers about 12 square miles about 10 miles northeast of the Chemetall Foote Co. operation at Silver Peak. A 1,200-foot exploration hole drilled in 2009 to locate intrabasinal aquifers and to sample any brines found gave disappointing results, and Gold Summit then decided to concentrate on their gold and silver resources. The agreement was for \$50,000 and 500,000 shares of stock with some caveats, the terms of which were carried out during 2010 (<http://www.sec.gov/Archives/edgar/data/135637/1/000127351111000010/0001273511-11-000010.txt>).

American Lithium also owns the Borate Hills Project, which covers over 3,400 acres between 15 and 20 miles west-northwest of Silver Peak. In 2010, American Borate staked an additional 149 lode and 12 placer claims as part of this project. On June 10, 2010, Japan Oil, Gas and Metals Corp. (JOGMEC) entered into a memorandum of agreement (MOA) with American Lithium to purchase up to a 40% participating interest in the Borate Hills Project for \$4,000,000 in cash or kind. JOGMEC had 90 days to complete a due diligence review and geologic review before the MOA took effect and can terminate the MOA any time after it has invested at least \$600,000 ([http://www.sec.gov/Archives/edgar/data/135637/1/000110465910033860/a10-12050\\_18k.htm](http://www.sec.gov/Archives/edgar/data/135637/1/000110465910033860/a10-12050_18k.htm)).

The Borate Hills project consists of three separate claim blocks: North Borate Hills and South Borate Hills in the northern Silver Peak Range in T1S, R37E and Fish Lake Deep on the east edge of Fish Lake Valley in T1S, R36E. In the 1980s, U.S. Borax drilled 57 holes up to

2,000 feet deep totaling 50,000 feet in the North Borate Hills and South Borate Hills areas. U.S. Borax identified a large deposit up to 1,300 feet thick ranking it as the second largest boron deposit in the country. Surface mineralization extends for at least 1.5 miles, and recent surface sampling at South Borate Hills assayed over 1% boron and up to 2,750 ppm lithium. The boron and lithium mineralization is contained in a strata-bound formation consisting of a claystone unit and a unit of volcanic tuff lacking clay (<http://www.amerilithium.com>); [http://www.evwind.es/noticias.php?id\\_not=6240](http://www.evwind.es/noticias.php?id_not=6240))

The Borate Hills Project is currently American Lithium's main focus, but other Nevada lithium properties owned by the company are Sarcobatus Deep in T8S, R44E and Teels Marsh Deep in T4N, R33E. The Sarcobatus Deep Project covers 2,100 acres centered over a gravity low in the Sarcobatus basin and contains anomalous lithium values of 280 to 340 ppm in playa samples. The Teels Marsh Deep Project covers 4,800 acres and contains anomalous lithium values of up to 550 ppm from playa samples and 850 ppm in the springs. The Fish Lake Deep Project noted earlier covers 3,640 acres over a basinal gravity low and contains anomalous lithium values of up to 1,020 ppm in playa samples and 350 ppm in surface brines. These three project areas and the Paradox Project in Utah were acquired from Nevada Mining Co., Inc. early in 2010 (<http://bantolo.net/search/lithium+exploration+nevada>; <http://www.amerilithium.com>).

In 2010, AmeriLithium Corp. of Henderson, Nevada, completed a gravity survey and a controlled source magnetotellurics/magnetotellurics geophysical survey of their Paymaster Canyon Project. Areas of low resistivity were measured during the geophysical survey, which indicates potential brine, and the resulting report recommended conducting seismic surveys in those areas. The Paymaster Canyon Project consists of 5,880 acres in Paymaster Canyon just northeast of Clayton Valley. AmeriLithium recently had a gravity survey conducted there. AmeriLithium Corp. also owns the Clayton Deep and Full Monty Projects. The Clayton Deep Project consists of 5,280 acres covering the entire Southwest Gravity Low less than 10 miles southwest of Silver Peak. The Full Monty Project consists of 5,760 acres about 25 miles north of Clayton Valley just west of Li3's MW Placer

Claims in Big Smoky Valley (<http://www.amerilithium.com>).

In 2010, Blue Lithium Energy, a subsidiary of Black Hawk Exploration of Fox Island, Washington, formed in 2009, drilled a well on their Clayton Valley property and intersected lithium-bearing brines between 60 and 530 feet. This helped to encourage Black Hawk Exploration to expand Blue Lithium Energy's acquisition budget. The property contains the BMP claim group, which consists of 56 placer claims covering 1,120 acres in Clayton Valley just north of Chemetall Foote's Silver Peak operation (<http://black-hawk-exploration.com>).

In 2010, First Liberty Power, Inc. of Las Vegas Nevada, entered into an agreement to acquire the Lida Valley LVW placer claims group. The group covers 12,800 acres, mostly in T5-6S, R43E in Esmeralda County and includes 76 160-acre association placer claims and 8 80-acre association placer claims. The group mainly covers the playa in Lida Valley. Hasbrouck Geophysics, Inc. of Prescott, Arizona, conducted a gravity survey of the property in June 2010, with a controlled source audio magnetotellurics/magnetotellurics geophysical survey planned for February 2011 (<http://www.firstlibertypower.com/properties/nevada>).

In 2010, International Lithium Corp., a wholly-owned subsidiary of TNR Gold Corp. of Vancouver, Canada, began a gravity survey of their Sarcobatus Flats lithium brine property. The property consists of 105 placer claims covering 2,660 acres located about 66 miles south of Tonopah mostly in southwestern T8S, R44E. A preliminary sampling program of surface sediments contained assays ranging between 210 and 340 ppm lithium. Also in 2010, TNR Gold Corp. began procedures to spin-off International Lithium Corp. as an independent company (<http://www.tnrgoldcorp.com>).

In early 2010, Li3 Energy, Inc. of Lima, Peru, executed a definitive purchase agreement to acquire the assets of Next Lithium. Li3 Energy will acquire options on a 100% interest in a 170,000-acre lithium brine property in Big Smoky Valley. In 2009, Next Lithium's assets included options to acquire 100% interests in the BSV Placer, CSV Placer, LM Placer, and MW Placer Claims, which together comprise about 75,000 acres of lithium brine properties at the south end of Big Smoky Valley between Coaldale and Tonopah. In the 1970s and 1980s, the U.S. Geological Survey drilled test holes in

Big Smoky Valley, and two holes in this area brines with lithium values up to 365 ppm. Prior to this, Li3 had concentrated on acquiring lithium properties in Peru, Chile, and Argentina (<http://www.li3energy.com>; <http://finance.yahoo.com/news/Li3-Energy-Executes-Final-iw-2031837529.html?x=0&v=1>).

In 2009, Lithium Corp. of Reno, Nevada, staked a large number of placer claims mostly over playas in three areas of interest. In 2010, Lithium dropped 29 placer claims from their Cortez property in the Alkali Flat of Grass Valley in Lander County. The Cortez property covers about 4,960 acres mostly within T25N, R47-48E and was sampled in 2009 and 2010. A drilling program was being considered for 2011.

Lithium staked 10 placer claims to add to their Fish Lake Valley property which covers about 6,400 acres mostly within T1-2S, R38E about 22 miles northwest of the Silver Peak Operation. In mid-2010, Lithium initiated a high resolution gravity survey, and late in 2010, Lithium concluded a drilling and assaying program. They drilled 18 holes up to 155 feet deep with results promising enough to initiate plans for a deeper drilling project in 2011.

Lithium dropped 36 placer claims from their Salt Wells property mostly within the Salt Wells Basin. The Salt Wells property covers about 12,320 acres mostly in T17N, R30-31E. It was sampled in 2009 with anomalous lithium values reported including one of 750 ppm lithium. A drilling program was being considered for later in 2011 (<http://www.lithiumcorporation.com>).

In 2010, Rodinia Lithium of Toronto, Canada, staked an extra 451 placer claims adjacent to the southern block of claims of their Clayton Valley Lithium Project. The project consists of 1,012 claims (including the DB Placer and SP Placer Claim blocks) covering 72,340 acres in Clayton Valley immediately surrounding most of Chemetall Foote's Silver Peak operation. In 2010, Rodinia Lithium completed a gravity survey over their entire land holdings and drilled six reverse circulation holes, which included down-hole porosity and density logging and sediment and brine sampling. One hole intersected a 30-meter section (169 to 200 meters depth) averaging 370 mg/L of lithium, which company geologists believe may be part of the same aquifer from which the adjacent Silver Peak operation produces. A third exploration project is in the permitting process and will include up to 72 reverse circulation drill holes targeting extensions of the Silver Peak

Aquifer. Rodinia reports that Clayton Valley contains at least 5 aquifers with lithium grades between 180 and 420 ppm lithium (<http://www.rodinialithium.com>).

TNR Gold Corp. also owns the Mud Lake Project and Fish Lake Project. The Mud Lake Project covers 7,200 acres in Ralston Valley about 10 miles southeast of Tonopah. TNR Gold Corp. completed a detailed gravity survey of the Mud Lake Project area with processing of the data underway in 2010. The Fish Lake Project contains 48 placer claims covering 3,200 acres in Fish Lake Valley about 47 miles southwest of Tonopah. The U.S. Geological Survey sampled Fish Lake Valley in 1976 and found lithium brines on the surface. One sample was on the project site and contained 200 ppm lithium (<http://www.tnrgoldcorp.com>).

Early in 2010, through their wholly-owned subsidiary Ultra Lithium (USA), Inc., Ultra Lithium, Inc. of Vancouver, British Columbia entered into a mineral property acquisition agreement to acquire a 100% interest in the South Big Smokey Valley property in Esmeralda County about 16 miles north of the Silver Peak operation. The property consists of 364 placer claims covering 7,280 acres. The claims were staked in 2009 and are mostly in T1-2N, R38-38.5E (<http://www.hotstockmarket.com/t/77126/ultra-lithium-tsxv>).

In 2010, Western Lithium Corp. of Vancouver, Canada, changed its name to Western Lithium USA Corp. and continued with exploration, testing, and evaluation of the lithium resources in their Kings River Valley Project, Nevada. Their Plan of Operation, which had been filed in 2008, was also finally approved. Western Lithium also staked 18 mill-site and 33 lode claims in 2010. If all goes according to plan, Western Lithium proposes to have the deposits in production in 2014.

According to the company website and the NI 43-101 reports, Western Lithium has leased over 27,000 acres through almost 1,400 lode claims, mainly in the Disaster Mining District in northern Humboldt County, from Western Energy Development Corporation for lithium exploration. The claims are within the McDermitt Caldera, and cover several areas containing inferred uranium resources and broader zones of uranium, molybdenum, and lithium mineralization. The lithium largely occurs in high-lithium clays with significant amounts of clay formed from the hydrothermal alteration of

the volcanoclastic sedimentary rocks making up the moat deposits in the western part of the caldera. These lithium-bearing moat deposits extend north through the western Montana Mountains and Disaster Peak into Oregon. Significant lithium mineralization has been defined in five areas referred to as: PCD, South Lens, South Central Lens, North Central Lens, and North Lens by Chevron (who drilled the area in 1985) and Stages I through V respectively by Western Lithium. In each area, the high lithium clay occurs in thick, apparently continuous accumulations with the zones of mineralization varying between about 3 and 300 feet thick. Drilling on the Stage I (PCD) deposit in 2008 showed it contained indicated resources of 53 million tons grading 0.27% lithium (736,000 tons lithium carbonate equivalent) and inferred resources of 47 million tons grading 0.27% lithium (668,000 tons lithium carbonate equivalent), both with a 0.2% cut-off grade.

In 2010, Western Lithium completed a drilling project on the Stage II (South Lens) deposit and had an NI 43-101 report prepared. The project involved drilling 38 core holes on an uneven grid spaced at a minimum of 200 m apart to confirm the mineralization indicated from the old Chevron holes. The results showed it contained indicated resources of 105 million tons grading 0.27% lithium (1,505,000 tons lithium carbonate equivalent) and inferred resources of 52 million tons grading 0.26% lithium (717,000 tons lithium carbonate equivalent), both with a 0.2% cut-off grade (<http://www.westernlithium.com>).

The mine plans call for annual production of about 30,500 tons from two open pits on the east and west deposit areas. The mine life is projected to be 18 years, and over that time, the pits will grow together. The clay is soft and easily broken up, and will be mined using a simple shovel and truck method. The raw material will enter the processing plant by conveyor belt, and 35 million tons are expected to be processed over the life of the mine. Laboratory testing presently has an 89% recovery rate. The status of the mineral rights is a sticking point that has yet to be resolved and involves whether high lithium clay is locatable or leasable (*Lithium's Clay Play; Industrial Minerals*, April 2010, p. 36-38).

## Magnesia

According to the U.S. Geological Survey data, the estimated U.S. production of

magnesium compounds increased 2% to 268,000 tons in 2010. Production decreased 30% between 1997 and 2006, increased 21% 2007, and decreased 30% between 2007 and 2009. About 54% of U.S. magnesia production came from seawater and natural brines in 2009, and the rest was produced from mining magnesite and minor brucite (Nevada) and olivine (North Carolina and Washington). Apparent consumption increased 31% to 575,000 tons in 2010 with most of the difference between consumption and production being made up by imports from China. Consumption has varied between 440,000 tons and 782,000 tons and averaged 669,000 tons for the 12 years prior to 2010.

The average price for calcined magnesite delivered in the U.S. rose slightly from between \$300 and \$320 in the latter half of 2009 to between \$358 and \$385 in the first half of 2010. The price rose to an average between \$385 and \$496 in June and then to between \$408 and \$529 in September for the rest of the year. Since most of the magnesia imported into the United States comes from China, the price increases are partly due to fluctuation in currency rates between the United States and China and a shortage of Chinese export licenses (*Industrial Minerals*).

Premier Chemicals, LLC, of Cleveland, Ohio, owns the Gabbs magnesia operation in Nye County, which is the only place in the country to mine magnesite. Magnesite and some brucite (<5%) have been mined at Gabbs since 1935, and in the 1940s were processed in Henderson, Nevada, to make magnesium metal. From the 1950s to the 1980s, mining and processing was by Basic Industries, a major producer of refractory magnesia. During the 1990s, the availability of cheap foreign refractory magnesia caused production at Gabbs to be switched to light-burned (caustic calcined) magnesia that is mainly marketed for wastewater treatment and agricultural uses.

Although production of magnesia at Gabbs is still substantially below its peak in 1981, magnesia shipments from the Gabbs operation increased steadily between 1996 and 2005. Production then see-sawed with decreases in 2006, 2008, and 2010 and increases in 2007 and 2009. Production is confidential, but the plant capacity is rated at about 150,000 tons per year. Also, Premier

Chemicals, LLC, reports their annual production is about 300,000 tons of oxide and slurry products from their mine at Gabbs and their seawater extraction plant at Port St. Joe, Florida. The Nevada Department of Taxation reported the 2010 gross proceeds at \$5,572,698, a decrease of 1% from 2009. The magnesite and brucite occur as complex replacement bodies in Triassic dolomite in an area of about 1,300 acres in the Paradise Range just east of the town of Gabbs. The resource was estimated to be about 64 million tons (*Magnesia Supplement, Industrial Minerals*, May 2010, p. 50-67) and is thought to be sufficient for more than 50 years of production at present mining rates.

During the summer of 2010, Molycor Gold Corp. of White Rock, Canada, conducted a geologic surface mapping and rock sampling program on their Tami-Mosi magnesium property, which consists of 119 claims covering about 2,700 acres in the western foothills of the Schell Creek Range between Tamberlain and Mosier Canyons about 6.5 miles southeast of Ely in White Pine County. 51 samples assayed between 7.7% and 12.9% magnesium. The dolomite is interpreted to cover 312.5 acres with an average thickness of 472 feet and with a strike length of over 2.6 miles. Molycor's 2009 NI 43-101 technical report notes an inferred resource of about 261.5 million tons of virtually pure dolomite grading 10% magnesium (more than 51 billion pounds of magnesium) plus some gold and manganese. The magnesium is in the Simonson Dolomite unit of the Devonian Guilmette Formation. In late 2010, Molycor began assembling a team to perform the scoping work for an NI 43-101 preliminary economic assessment study. The dolomite has a high enough quality for potential use in the production of magnesium based refractories, magnesium metal, cement, and agricultural products (<http://www.molycor.com>).

## Perlite

According to the U.S. Geological Survey, the estimated U.S. production of perlite increased 8% in 2010 to 413,000 tons valued at \$19.6 million. Production had decreased 44% from about 800,000 tons in 1999 to about 451,000 tons in 2007 before increasing 6% in 2008, and then decreasing 20% to 384,000 tons

in 2009. Until 2005 the U.S. was the world's largest producer of perlite, but since then, Greece has been the largest producer. Estimated apparent consumption increased 7% to 551,000 tons, and imports increased 5% to 176,000 tons in 2010. By 2009, imports had decreased 38% from record levels in 2006 before the small 2010 increase. About 53% of perlite production is used in building construction products, the manufacture of which is down because of the drop in construction. The estimated average price increased 6% to \$47 per ton in 2010. The price has increased every year since 1998 and has increased 63% since then.

Nevada has large perlite resources, and several deposits of perlite in central Pershing, northern Lincoln, and southern Clark Counties have been mined extensively. However, the state now produces only minor amounts of perlite. Current perlite production in Nevada is restricted to relatively small-scale mining of two deposits for niche markets, and the state produces less than 1% of the domestic total.

Wilkin Mining and Trucking Inc. mines perlite from the Tenacity Perlite Mine in the South Pahroc Range Mining District about 25 miles west of Caliente in Lincoln County. The company has been mining perlite in the area for more than 25 years. The company has a small popping plant in Caliente, and present sales are almost exclusively of expanded perlite that is used for horticultural purposes. Most years, the company ships between 1,500 and 2,000 tons. The deposit consists of a large, flat-lying, 20-foot thick perlite flow with obsidian pellets in Tertiary rhyolitic volcanic rocks, and in the 1950s was estimated to contain a reserve of over 15 million tons.

Noble Perlite produced expanded perlite from a plant in Fallon between 2004 and 2009. Noble purchased ore in New Mexico, which was brought in by truck and train, but the plant was not in production in 2010. Most of their processed perlite is microspheres used for fillers. Noble has eight placer claims about 20 miles south-southeast of Fallon on the south side of the White Throne Mountains in sections 16, 21, and 22, T16N, R29E, but these claims have not been mined by them. The perlite occurs as a gray vitrophyre with a few percent phenocrysts and an "onion-skin" texture. The unit is about 50 feet thick and capped by Tertiary basalt (NBMG Bulletin 83, p. 53).

EP Minerals produces a small amount of expanded perlite that is marketed as a filter aid from its Colado diatomite plant in Pershing County. Plant capacity is reportedly about 8,000 tons per year, but 2010 production is not available. The crude perlite comes from the Popcorn Mine about 15 miles south of Fallon in Churchill County, which is usually mined a week or two per year.

## Potassium

The Rulco Potassium Sulfate Project was temporarily shut down throughout 2009, but claims were kept current through 2010. In 2009 and 2010, the BLM resurveyed some of the subdivisional lines of the public lands involving the project for "potassium use" and to meet "certain administrative needs" of Rulco and the BLM (<http://edocket.access.gpo.gov/2009/E9-19062.htm>; [http://www.nv.blm.gov/LandRecords/view.php?loc=data/status\\_plats/mtp/north/nv210010n0382e00002.pdf](http://www.nv.blm.gov/LandRecords/view.php?loc=data/status_plats/mtp/north/nv210010n0382e00002.pdf)). Between 2001 and 2008 small amounts of potassium alum (kalinite) were shipped from the deposit in Esmeralda County about 10 miles north of Silver Peak by Rulco, LLC. The kalinite, which occurs with sulfur as veins and stringers in rhyolitic rock, was being marketed for horticultural use, particularly through Earth's Resources, LLC, of Ignacio, Colorado.

The Kings Valley Project of Western Lithium Corp. of Vancouver, Canada, is summarized under the section on Lithium. During the lithium extraction process, potassium sulfate would be recovered as a by-product. The 2009 NI 43-101 report prepared for the Stage I (PCD) deposit drilling project summarized results that showed the deposit contained indicated resources of 52 million tons grading 3.31% potassium (1,754,000 contained potassium tons) and inferred resources of 47 million tons grading 3.26% potassium (1,485,000 contained potassium tons). The 2010 NI 43-101 report prepared for the Stage II (South Lens) deposit summarized results that showed the deposit contained indicated resources of 105 million tons grading 3.66% potassium (3,862,000 contained potassium tons) and inferred resources of 52 million tons grading 3.83% potassium (1,984,000 contained potassium tons). The mine plans call for annual production of about 127,000 tons with a

recovery rate of 77-80% (<http://www.westernlithium.com>; *Lithium's Clay Play*, *Industrial Minerals*, April 2010, p. 36-38).

## Pozzolan

Pozzolan is a silica- and generally alumina-rich material that, when combined with lime and water, reacts to make a form of cement. Named for Pozzuoli, Italy, source of a leucite tuff that was used in cement in Roman times, natural pozzolans include rhyolite tuff, diatomite, or opaline chert. Pozzolan can also be manufactured by heating certain clays and shale. Pozzolan tends to counteract adverse effects, such as alkali-silica reactions, of certain aggregates used in concrete (Glossary of Geology, American Geological Institute, 2005).

In April 2010, the BLM issued an environmental assessment and finding of no significant impact on the plan of operation for Nevada Cement Co. to operate their proposed Mustache Pozzolan Quarry, which is expected to disturb 49 acres of BLM land and 1.6 acres of private land about 3 miles southwest of Fernley in section 28, T20N, R24E. The quarry is proposed to operate for 25 years and produce up to 100,000 tons of material. The site is largely in Miocene to lower Pliocene Chloropagus Formation, which consists of mainly basaltic and andesitic lava flows and breccias interbedded with rhyolitic tuffs and minor sedimentary rocks. Shale would be mined at the rate of up to 20 dump truck loads at 20 to 30 tons each per day, six days per week, and hauled to the Nevada Cement Co. plant to be heated and turned into pozzolan. This locally produced pozzolan would lower costs by reducing the need to import the fly ash presently being used as pozzolan from coal-fired power plants.

## Rare Earths

According to the U. S. Geological Survey, no rare earth elements (REE) were mined in the United States in 2010, though previously mined concentrates were processed at Mountain Pass, California. Consumption figures were withheld for 2009 and 2010, though consumption reportedly increased significantly. Apparent consumption was 8,200 tons in 2007. China contains about half of the world reserves and accounted for 97% of world production of 130,000 tons in 2010 and 92% of U. S. imports between 2006 and 2009.

Largely because of its own increasing consumption, in 2010, China cuts its exports by 70% resulting in an overall 40% drop for 2010. This has resulted in price increases ranging from 23% to 1,265% on various rare earth elements especially in the second half of 2010. The world has little near term production capacity outside of China, with only the startup of an operation in Australia and the restart of Mountain Pass, California, in 2011 and 2012 respectively, to add to that capacity. This has led to an increase in exploration (*Industrial Minerals*). Nevada had some REE exploration in 2010.

Elissa Resource, Ltd. of Vancouver British Columbia was created as a subsidiary of Red Hill Energy, Inc. and on April 16, 2010 received a number of Red Hill's assets including the Thor Rare Earth Elements Property in Clark County, Nevada. The property consisted of 175 claims acquired by Red Hill in 2009. Red Hill conducted reconnaissance radiometric surface transverses and on March 2, 2010 had an NI 43-101 technical report completed. Elissa Resources staked additional claims, and the property now consists of 198 claims covering 3,660 acres mostly in T28S and T29S, R61E. A surface exploration program was conducted consisting of mapping, sampling, and geophysical and radiometric surveying, and an updated NI 43-101 technical report was completed on October 8, 2010. The project area is thought to contain some common features with the Mountain Pass REE deposit 16 miles to the west. The project area is in Precambrian rocks but, unlike Mountain Pass with rare earths in bastnaesite, the mineralization is monazite, apatite, and xenotime. Significant REE and some thorium mineralization have been identified at nine sites at three zones referred to as the Lopez Trend and Black Butte and NAD areas. Also, a zone referred to as the Santos Trend has become an area of interest (<http://www.elissaresources.com>).

In 2010, Rare Earth Minerals Corp. of Jacksonville, Oregon, dropped the remaining 12 of 42 lode claims they had staked in Humboldt County in 2005 and 2006. These last claims were mainly in section 1, T46N, R28E and section 36, T47N, R28E on the edge of the Vicksburg District. This area is underlain by lacustrine sedimentary rocks of the Tertiary Thousand Creek Beds of Merriam (NBMG Bulletin 59).

## Salt

According to data from the Nevada Division of Minerals, the Huck Salt Co. produced 25,893 tons of salt in 2010, an increase of 3% from 2009. Production has ranged between 9,053 tons and 30,502 tons and averaged 17,653 tons for the previous 12 years. The salt is mainly used for de-icing roads, and production levels are dependent on weather. The salt is mined from a playa on Fourmile Flat about 25 miles southeast of Fallon in Churchill County, where it has been harvested almost continuously since the 1860s, when it was hauled to the mills that processed Comstock silver and gold ore.

## Silica

According to the U.S. Geological Survey, which reports silica as "Industrial Sand and Gravel", the U.S. is by far the world's largest producer of silica sand. In 2010, the estimated domestic production increased 6% to 29.2 million tons valued at \$777 million. While better than the previous year, 2010 production was still the lowest since 1993 with 2009 not included. Estimated exports increased 21% to almost 2.9 million tons in 2010. Estimated apparent consumption increased 1% to 26.4 million tons. The average price in 2010 decreased 7% to \$26.46 per ton after rising steadily 75% between 1995 and 2009. About 31% of the total is used in manufacturing glass and 25% is used for hydraulic fracturing sand and well-packing and cement sand.

According to data from the Nevada Division of Minerals, Nevada's major silica producer, Simplot Silica Products at Overton, Clark County, shipped about 400,000 tons of silica sand in 2010, a decrease of 3% from 2009 and a decrease of 47% from an average of about 750,000 tons produced in 2004 and 2005. The sand is mined from a large open pit in the relatively friable Cretaceous Baseline Sandstone, washed in the pit, and transported via a 5-mile slurry pipeline to a plant where it is screened and bagged. The facility produces four grades of sand based on coarseness, AFS 55, 60, 70, and 100. AFS 70, which is used mainly in manufacturing glass and foundry castings, is the main product.

In 2010, James Hardie Building Products, Inc. mined high purity silica from the Lucky Boy Quarry in the Lucky Boy District

about 10 miles southwest of Hawthorne in Mineral County. They mined the Kramer Hill deposit about 1.5 miles south of Golconda in Humboldt County in 2008 but not in 2009 or 2010. The quartzite is used as feed for the company's fiber-cement siding manufacturing plant in the Tahoe-Reno Industrial Park east of Sparks, Nevada. The company leases the mines. The lease is set to expire in January 2014 but includes an option to buy. The Lucky Boy Quarry is in a 1300-foot by 350-foot body of milky quartz hosted in granodiorite. A sample reportedly assayed 99.6% silica. The deposit was mined by the Hawthorne Silica Co. in the 1970s (NBMG Mining District File document 29300015). The Kramer Hill Quarry is in the Cambrian Osgood Mountain Formation, which generally consists of white to light gray, thinly bedded to massive, medium grained quartzite.

In 2010, Global Silica, Inc. of Las Vegas, Nevada, staked 4 lode claims adjacent to 158 placer claims and 2 lode claims they staked in 2008 and 2009. These claims are located mostly in T4N, R37E in the Monte Cristo Range in Esmeralda County. In 2010, Nevada Silica Co. of Pahump, Nevada, staked two lode claims adjacent to 12 lode claims staked in 2007 and 2009. These claims are located in T3-4N, R37E, also in the Monte Cristo Range in Esmeralda County.

## **Zeolites**

Nevada contains large known resources of zeolite; however, zeolite production has been small, and no zeolite is currently mined in Nevada. In 2010, Zeox Mineral Materials Corp. operated the Ash Meadows plant, which ships 1,000 to 5,000 tons annually of clinoptilolite used in water filtration, odor control, and nuclear clean-up from their plant in Amargosa Valley in Nye County. The plant, which has a 40,000 ton annual capacity, also produces zeolite based cement for building materials and oil and gas projects. The clinoptilolite is mined from a small open pit just over the state line in Inyo County, California, in a large area of zeolite deposits that extends into Nevada.

According to their website, in 2009, Zeox pledged its U.S. assets as collateral for a \$369,595 loan from Imagin Minerals, Inc., and the two companies began merger negotiations. The merger plans eventually fell through, and Imagin seized Zeox's U.S. assets and sold them to their subsidiary, St. Cloud Mining Co., in 2010

to cover the loan and \$600,000 break-up fee. Zeox is taking legal action to get its assets back.

KMI Zeolite, Inc. owns a plant in Sandy Valley about 32 miles southwest of Las Vegas and a deposit reportedly containing about 60,000,000 tons of largely clinoptilolite in California about 85 miles northwest of the mill. The mill is capable of producing 55,000 tons per year.

In the past, the Moltan Company has mined small amounts of mordenite in the Trinity Range in Churchill County about 40 miles northeast of Fernley, but none was mined in 2010. The company uses mordenite to make absorbent products at its Fernley plant.

In 2008, Nevada Specialty Minerals, LLC was formed as a joint venture to explore and develop the Lovelock zeolite deposit 13 miles northwest of Lovelock in the Trinity Range in the Gold Butte District of Pershing County. The new LLC's managers are listed as Castle Park Minerals, LLC, of Holladay, Utah, Steelhead Specialty Minerals, LLC, of Spokane, Washington, and Trabits Group, LLC, of Wasilla, Alaska. The Nevada Specialty Minerals, LLC lease covers 1,280 acres. The Lovelock zeolite deposit contains varying amounts of ferrierite, mordenite, and clinoptilolite with an outcrop area about 4,000 feet long from north to south, averaging 2,000 feet wide, and up to 55 feet thick near the center. The host rock is a series of Miocene or Pliocene unnamed sedimentary rocks and tuffs.

Trabits Group, LLC holds licensed intellectual property involving zeolite-containing cement and drilling fluid technology that requires the use of ferrierite and has a 45% working interest in Nevada Specialty Minerals, LLC. In 2010, Trabits Group received a grant from the U.S. Department of Energy to compare ferrierite to other types of zeolite for strength and thermal stability in cement blends and acquired a 1,000-pound sample to be used on this project (<http://www4.eere.energy.gov/geothermal/projects/36>; George Trabits, e-mail, 2011).

# Geothermal Energy

by Lisa Shevenell and Richard Zehner

During 2010 the Nevada Division of Minerals issued 119 geothermal well permits (down 76 permits from 2009) that included the following: six project area permits, 28 industrial production well permits, seven industrial injection well permits, no commercial well permits, one domestic well permit, 56 gradient well permits, and 19 observation well permits. A total of 74 geothermal wells of all types (see Table of Nondomestic Geothermal Wells below for complete listing) were reported as drilled during 2010, whether permitted in 2010 or earlier.

Nevada geothermal electrical production in 2010 from federal and private lands combined was 2,634,714 megawatt-hour (MWh) gross and 2,060,030 MWh net (Nevada Division of Minerals). This was an increase in gross production of 453,254 MWh, compared to the 2009 production, and an increase in net production of 390,974 MWh from 2009. According to the Nevada Department of Taxation Net Proceeds of Minerals Bulletin (2011), the total 2010 gross proceeds from geothermal power generation in Nevada was \$145,265,422 (over \$35 million greater than in 2009, and over \$50 million greater than in 2008), with the largest gross proceeds generated by the Steamboat complex at over \$44.7 million. Net proceeds were \$26.1 million (Department of Taxation, 2011, pg. 8). These proceeds were not entirely from power generation but included Elko Heat Company's \$203,709 gross proceeds from commercial heating.

Currently installed equipment, or nameplate, capacity at 12 existing geothermal power production sites in Nevada is 437.9

megawatts (MW), a small 13.4 MW increase from 2009. Table 1 lists operators, plant locations, and energy production for individual Nevada geothermal power producers at the end of 2010 (however it includes Jersey Valley that was commissioned in early 2011). Figure 1 shows the location of these power plants, including Jersey Valley. Nevada is second only to California in total installed geothermal generating capacity.

In Nevada during 2010, there were 272 authorized federal leases covering approximately 481,121 acres based on a query of BLM's LR2000 on September 28, 2011. Figure 2 shows the location of active geothermal leases in Nevada, with 2010 obtained from the BLM provided shape files at [http://www.blm.gov/nv/st/en/prog/minerals/lease\\_ble\\_minerals/geothermal0/ggeothermal\\_leasing\\_prior\\_sales.html](http://www.blm.gov/nv/st/en/prog/minerals/lease_ble_minerals/geothermal0/ggeothermal_leasing_prior_sales.html)

with the remainder of the years created from data obtained by the now unavailable (due to lawsuits with BLM/ESRI) Geocommunicator.

On May 11, 2010, a lease sale was held that resulted in the sale of 75 of 114 parcels offered and yielded an approximate total lease sale income in Nevada of \$2.8 million (Table 2), down substantially from previous years (Table 3). Seventy-five percent of this income went to the State of Nevada (25% had gone to the counties of Nevada prior to the 2009 state budget crisis), and 25% went to the U.S. Department of Interior to help support BLM's geothermal program ([http://www.blm.gov/nv/st/en/prog/minerals/lease\\_ble\\_minerals/geothermal0/ggeothermal\\_leasing.html](http://www.blm.gov/nv/st/en/prog/minerals/lease_ble_minerals/geothermal0/ggeothermal_leasing.html); BLM 2010).

Table 1. Nevada geothermal power plants, 2010.

Plant name (year on line)	Nameplate Capacity (MW)	2010 Production (MWhr)		Location	Operator
		Gross	Net		
Beowawe (1985)	16.6	124,785	108,171	S13,T31N,R47E	TerraGen Power, LLC
Blue Mountain (2009)	49.5	346,691	267,453	S14,T34N, R34E	Nevada Geothermal Power
Bradys (1992)	26.1	122,100	75,695	S12,T22N,R26E	Ormat Nevada
Desert Peak (1985)	Decommissioned			S21,T22N,R27E	Ormat Nevada
Desert Peak II (2006) <sup>2</sup>	23	137,494	111,086		
Dixie Valley (1988) <sup>3</sup>	62	475,310	427,839	S7,T24N,R37E S33,T25N,R37E	TerraGen Power, LLC
Empire (1987)	4.8	32,255	21,662	S21,T29N,R23E	USG Nevada LLC
Jersey Valley (2011)	15	1,073	776	S28,T27N,R40E	Ormat Nevada
Salt Wells (2009)	18	149,863	112,673	S36,T17N,R30E	Enel North America
Soda Lake No. 1 (1987)	5.1	11,246	7,599	S33,T20N,R28E	Magma Energy Corp
Soda Lake No. 2 (1991)	21	82,017	60,898	S33,T20N,R28E	
Steamboat I (1986) <sup>1</sup>	Decommissioned			S29,T18N,R20E	Ormat Nevada
Steamboat I-A (1986)	2.4	11,376	10,444	S29,T18N,R20E	
Steamboat II (1992)	25.6	149,405	105,239		
Steamboat III (1992)	25.6	152,753	110,394		
Galena (2005)	30	196,903	165,471		
Galena 2 (2007)	13.5	90,449	78,744		
Galena 3 (2008)	30	226,223	179,623		
Steamboat Hills (1988, formerly Yankee Caithness)	20.1	98,448	78,276	S5,6,T17N,R20E	
Total MW at Steamboat				147.2	
Stillwater (1989) isolated from the grid; shut down mid-January				S1,T19N,R30E	Enel Stillwater
Stillwater 2 (2009)	47.2	217,640	133,137	S6,T19N,R31E	

Wabuska (1984)	2.4	8,683	48,580	S15,16,T15N,R25 E	Homestretch Geothermal
<b>Total:</b>	<b>437.9</b>	<b>2,634,714</b>	<b>2,103,760</b>		

<sup>1</sup> Ormat decommissioned the Steamboat I plant.

Footnotes to Table 1.

<sup>1</sup>Nameplate capacity is the manufacturer's rating of equipment output capacity as reported to the Nevada Division of Minerals by the plant operators (as of February, 2010) and does not necessarily reflect the capability of the currently developed resource. These nameplate capacities are estimates, and several different values can be found in the literature. Generator nameplate capacity actually refers to how big the actual generator is but not the turbines or the actual capacity of the power plant. There are no public documents breaking down nameplate capacity of the turbines or gross power so these numbers may not adequately reflect actual generation (Dan Fleischmann, personal communication, June 2010).

<sup>2</sup>Desert Peak II is a new binary power plant that was built to replace the original steam turbine power plant at Desert Peak, which was permanently shut down on May 1, 2006. The new power plant came online on August 1, 2006 with a generation capacity of 23 MW, more than twice that of the original power plant.

<sup>3</sup>Ormat decommissioned the Steamboat I plant.

Addresses and telephone numbers for companies listed in Table 1

TerraGen Operating Co., LLC  
9590 Prototype Ct., Suite 200  
Reno, NV 89521  
(775)829-3900

Enel North America/Stillwater  
1755 East Plumb Lane, Suite 155  
Reno, NV 89502  
(775)786-5681

Nevada Geothermal Power  
840-1140 West Pender St.  
Vancouver B.C.,Canada V6C-1Y  
(866)688-0808

Alterra Power Corp  
(Magma Energy Corp)  
600-888 Dunsmuir Street  
Concouver, BC V6C 3K4  
(604)669-4999

Ormat Technologies, Inc.  
6225 Neil Road  
Reno, Nevada 89511  
(775)356-9029

Homestretch Geothermal  
10 Julian Lane  
Yerington, NV 89447  
(775)463-4633

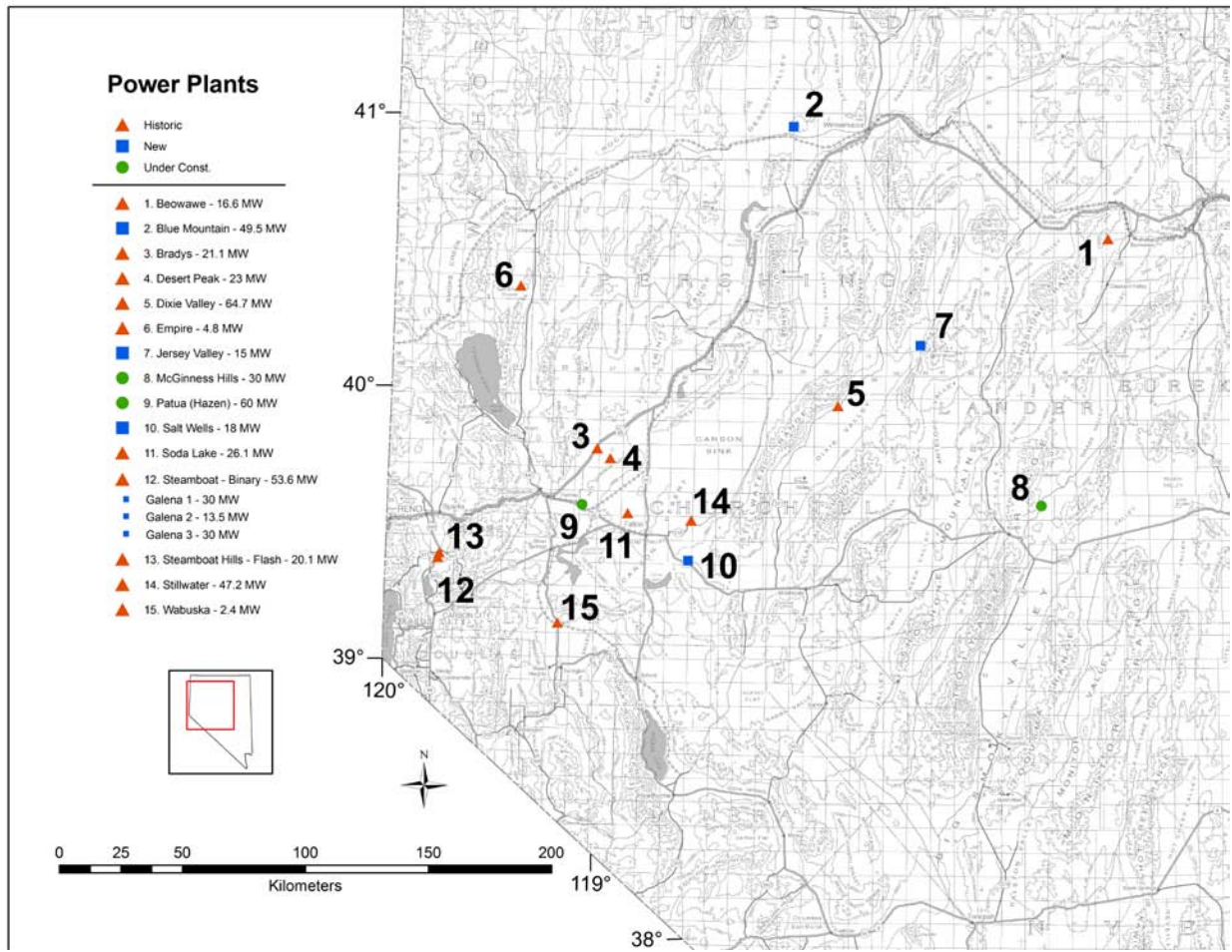


Figure 1. Locations of existing power plants noted in Table 1 (modified from Shevenell and Zehner, 2011; “new” indicates power plants constructed since 2005).

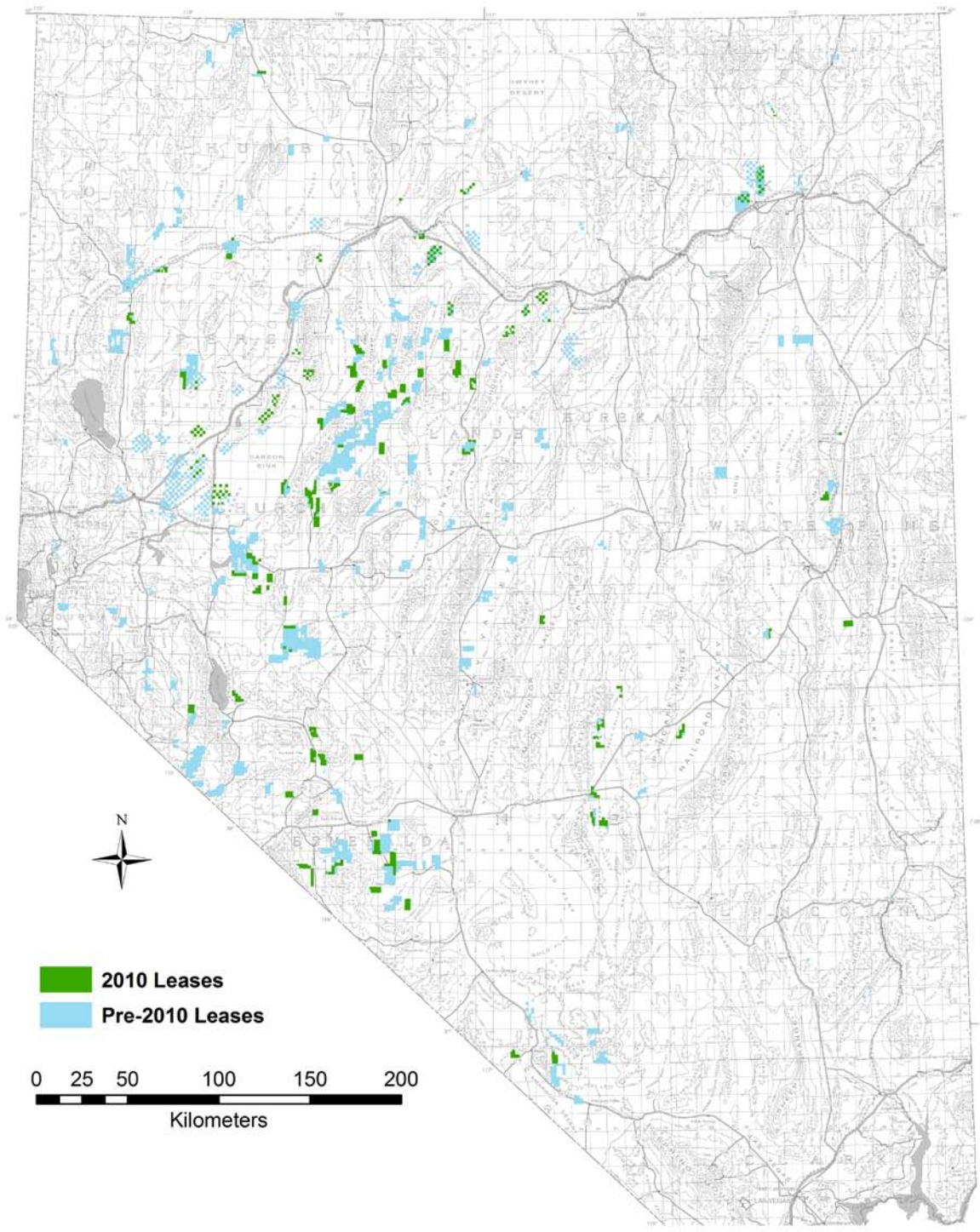


Figure 2. Locations of active leases in Nevada, highlighting the ones from 2010 in green.

Table 2. 2010 BLM competitive lease results.

PARCEL	LEASE	LOCATION	COMPANY	T R		Sec	Bid/Acre	ACRES	Total
				(N)	(E)				
1	88398	San Emidio Desert	VENTURE PROSPECTS LLC	30	23	1	\$5	4,208 (1,703 ha)	\$18,936
3	88399	Hot Springs Flat	VENTURE PROSPECTS LLC	24	27	12	\$2	5,101 (2,064 ha)	\$10,204
4	88400	Valley	MAGMA ENERGY (US) CORP	27	27	29	\$2	5,152 (2,085 ha)	\$10,304
7	88401	Upsal Hogback	MICHAEL A CASEY	20	29	4	\$5	2,652 (1,073 ha)	\$11,939
8	88402	Upsal Hogback	MICHAEL A CASEY	21	29	34	\$6	5,759 (2,330 ha)	\$31,675
9	88472	Sulphur	GEOTHERMAL TECHNICAL PARTNERS	34	29	10	\$3	2,560 (1,036 ha)	\$7,680
10	88403	Black Rock Desert	INC	35	29	13	\$4	640 (259 ha)	\$2,240
19	88404	Humboldt Lake	VENTURE PROSPECTS LLC	25	32	18	\$4	5,030 (2,036 ha)	\$20,120
20	88405	Howard Hot Spring	SIERRA GEOTHERMAL	45	31	32	\$3	1,880 (761 ha)	\$5,640
22	88406	Stillwater	VENTURE PROSPECTS LLC	21	33	7	\$55	3,870 (1,566 ha)	\$212,905
26	88407	Gabbs Valley	RAM POWER INC	13	33	15	\$2	2,622 (1,061 ha)	\$5,244
28	88408	Luning	VENTURE PROSPECTS LLC	7	35	20	\$3	4,922 (1,992 ha)	\$14,766
30	88409	Dixie Valley	MICHAEL A CASEY	19	34	2	\$4	4,721 (1,910 ha)	\$18,884
31	88410	Dixie Valley	MICHAEL A CASEY	20	34	35	\$2	4,719 (1,910 ha)	\$9,440
34	88411	Dixie Valley	MICHAEL A CASEY	20	34	3	\$2	3,057 (1,237 ha)	\$6,114
36	88412	Carson Sink	VENTURE PROSPECTS LLC	25	35	31	\$2	3,750 (1,518 ha)	\$7,502
39	88413	Columbus Marsh	VENTURE PROSPECTS LLC	3	35	28	\$2	2,560 (1,036 ha)	\$5,120
40	88414	Rhodes Marsh	VENTURE PROSPECTS LLC	6	35	35	\$20	5,041 (2,040 ha)	\$100,840
41	88415	Sodaville Springs	OSKI ENERGY LLC	6	35	7	\$3	5,116 (2,071 ha)	\$15,351
44	88416	Dixie Comstock Mine	VENTURE PROSPECTS LLC	23	36	6	\$4	1,263 (511 ha)	\$4,424
45	88417	Buena Vista Valley	VENTURE PROSPECTS LLC	25	36	1	\$4	2,557 (1,035 ha)	\$10,228
46	88418	New York Canyon	VENTURE PROSPECTS LLC	25	36	5	\$5	1,283 (519 ha)	\$5,774
47	88419	Buena Vista Valley	VENTURE PROSPECTS LLC	26	36	26	\$8	3,183 (1,288 ha)	\$25,464
48	88420	Buena Vista Valley	VENTURE PROSPECTS LLC	28	37	31	\$2	1,911 (773 ha)	\$3,822
49	88421	Buena Vista Valley	VENTURE PROSPECTS LLC	28	36	13	\$12	1,886 (763 ha)	\$22,632
50	88422	Buena Vista Valley	VENTURE PROSPECTS LLC	28	36	35	\$12	3,169 (1,282 ha)	\$38,028
51	88423	Buena Vista Valley	0718033 NEVADA LTD	29	36	24	\$2	4,776 (1,933 ha)	\$9,552
53	88424	Valley	RAM POWER INC	2	38	34	\$2	2,560 (1,036 ha)	\$5,120
54	88425	Alum Mine	RAM POWER INC	1	38	13	\$60	1,920 (777 ha)	\$115,200
55	88426	Alum Mine	RAM POWER INC	1	38	26	\$170	2,811 (1,138 ha)	\$477,870
56	88427	Alum Mine	SIERRA GEOTHERMAL	(S)	38	1	\$30	2,877 (1,164 ha)	\$86,340
57	88428	Tungsten Mountain	ORMAT NEVADA INC	21	38	26	\$2	320 (129 ha)	\$640
58	88429	Dixie Valley	VENTURE PROSPECTS LLC	23	38	3	\$2	5,111 (2,068 ha)	\$10,224
59	88430	Pleasant Valley	VENTURE PROSPECTS LLC	28	38	23	\$2	2,960 (1,198 ha)	\$5,920
60	88431	Valley	RAM POWER INC	2	39	7	\$2	632 (256 ha)	\$1,264
61	88432	Jersey Valley	ORMAT NEVADA INC	26	40	19	\$2	2,630 (1,064 ha)	\$5,260
63	88433	Golconda	EARTH POWER RESOURCES INC	37	39	4	\$2	638 (258 ha)	\$1,276
66	88434	Golconda	0718033 NEVADA LTD	35	40	2	\$2	2,438 (987 ha)	\$4,878

67	88435	Pumpnickel Valley	NEVADA GEOTHERMAL POWER CO	34	41	4	\$2	2,022 (818 ha)	\$4,046
68	88436	Pumpnickel Valley	NEVADA GEOTHERMAL POWER CO	34	41	30	\$2	2,491 (1,008 ha)	\$4,982
69	88437	Pumpnickel Valley	NEVADA GEOTHERMAL POWER CO	35	41	28	\$2	2,560 (1,036 ha)	\$5,120
75	88438	Reese River Project	SIERRA GEOTHERMAL	24	43	28	\$2	4,541 (1,838 ha)	\$9,082
77	88439	Battle Mountain	BARRICK CORTEZ INC	30	45	12	\$2	3,849 (1,558 ha)	\$7,700
79	88440	Dianas Punch Bowl	0718033 NEVADA LTD	14	47	27	\$2	3,440 (1,392 ha)	\$6,880
84	88441	Nanny Goat Springs	0718033 NEVADA LTD	4	50	30	\$2	2,080 (842 ha)	\$4,160
85	88470	Hot Creek Valley	HOV ENERGY	6	50	1	\$2	4,160 (1,684 ha)	\$8,322
86	88471	Hot Creek Valley	HOV ENERGY	7	50	2	\$2	3,191 (1,291 ha)	\$6,382
87	88442	Reveille Valley	HOV ENERGY	2	51	18	\$2	4,390 (1,776 ha)	\$8,780
88	88443	Hot Creek Valley Chimney Hot Springs	HOV ENERGY	10	51	25	\$2	2,200 (890 ha)	\$4,400
89	88444		HOV ENERGY	7	55	20	\$2	4,484 (1,815 ha)	\$8,968
90	88445	Deeth	STANDARD STEAM TRUST LLC	37	58	12	\$2	680 (275 ha)	\$1,360
91	88446	Deeth	STANDARD STEAM TRUST LLC	37	59	8	\$2	2,560 (1,036 ha)	\$5,122
92	88447	Deeth	STANDARD STEAM TRUST LLC	37	59	18	\$2	640 (259 ha)	\$1,280
93	88448	Deeth	STANDARD STEAM TRUST LLC	38	59	1	\$2	320 (130 ha)	\$642
94	88449	Deeth	STANDARD STEAM TRUST LLC	39	59	25	\$2	360 (146 ha)	\$720
95	88450	Deeth	STANDARD STEAM TRUST LLC	38	60	19	\$2	1,920 (777 ha)	\$3,842
96	88451	Deeth	STANDARD STEAM TRUST LLC	38	60	29	\$2	1,280 (518 ha)	\$2,562
97	88452	Deeth	STANDARD STEAM TRUST LLC	39	60	17	\$2	240 (97 ha)	\$480
98	88453	Deeth	STANDARD STEAM TRUST LLC	39	60	18	\$2	120 (49 ha)	\$240
99	88454	Deeth	STANDARD STEAM TRUST LLC	39	60	31	\$2	1,685 (682 ha)	\$3,370
101	88455	Steptoe Valley	0718033 NEVADA LTD	20	63	3	\$2	3,853 (1,559 ha)	\$7,706
102	88456	Southern Steptoe Valley	SOUTHERN NV WATER AUTHORITY	13	65	18	\$2	4,473 (1,810 ha)	\$8,946
103	88457	Steptoe Valley	0718033 NEVADA LTD	24	64	20	\$2	640 (259 ha)	\$1,280
115	88467	Desert Queen	ORMAT NEVADA INC	22	27	1	\$2	754 (305 ha)	\$1,510
116	88468	Desert Peak	MAGMA ENERGY (US) CORP	22	28	30	\$50	1,888 (764 ha)	\$94,400
117	88469	Desert Peak	MAGMA ENERGY (US) CORP	22	27	14	\$1,000	640 (259 ha)	\$640,000

Following the competitive leases in May 2010, 39 parcels were available for lease, of which 23 parcels for 71,851 acres were leases for a total revenue of \$125,715.

At the end of 2010, there were 65 projects in various stages of development in Nevada, which should result in the construction of between 2,132 and 2,408 MW of additional power generation capacity over the next 5 to 10 years (638-648 MW planned capacity addition; Jennejohn, 2011). Twenty grants funded

through the American Recovery and Reinvestment Act of 2009 (ARRA) are partially supporting Nevada projects.) Nameplate capacity by year appears in Figure 3, whereas production wells drilled by year appear in Figure 4.

Table 3. Geothermal competitive leasing activity in Nevada, 2007-2011.

Year	Parcels offered	Parcels sold	Acres	Total receipts	Average per acre
2007	43	43	122,849	\$11,669,821	\$95
2008	35	35	105,212	\$28,207,806	\$268
2009	108	82	323,223	\$8,909,445	\$28
2010	114	75	212,370	\$2,762,292	\$13
2011	51	17	42,627	\$456,353	\$11
Totals:	351	252	806,281	\$52,005,717	\$83

Source: [http://www.blm.gov/nv/st/en/prog/minerals/leasable\\_minerals/geothermal0/ggeothermal\\_leasing.html](http://www.blm.gov/nv/st/en/prog/minerals/leasable_minerals/geothermal0/ggeothermal_leasing.html)

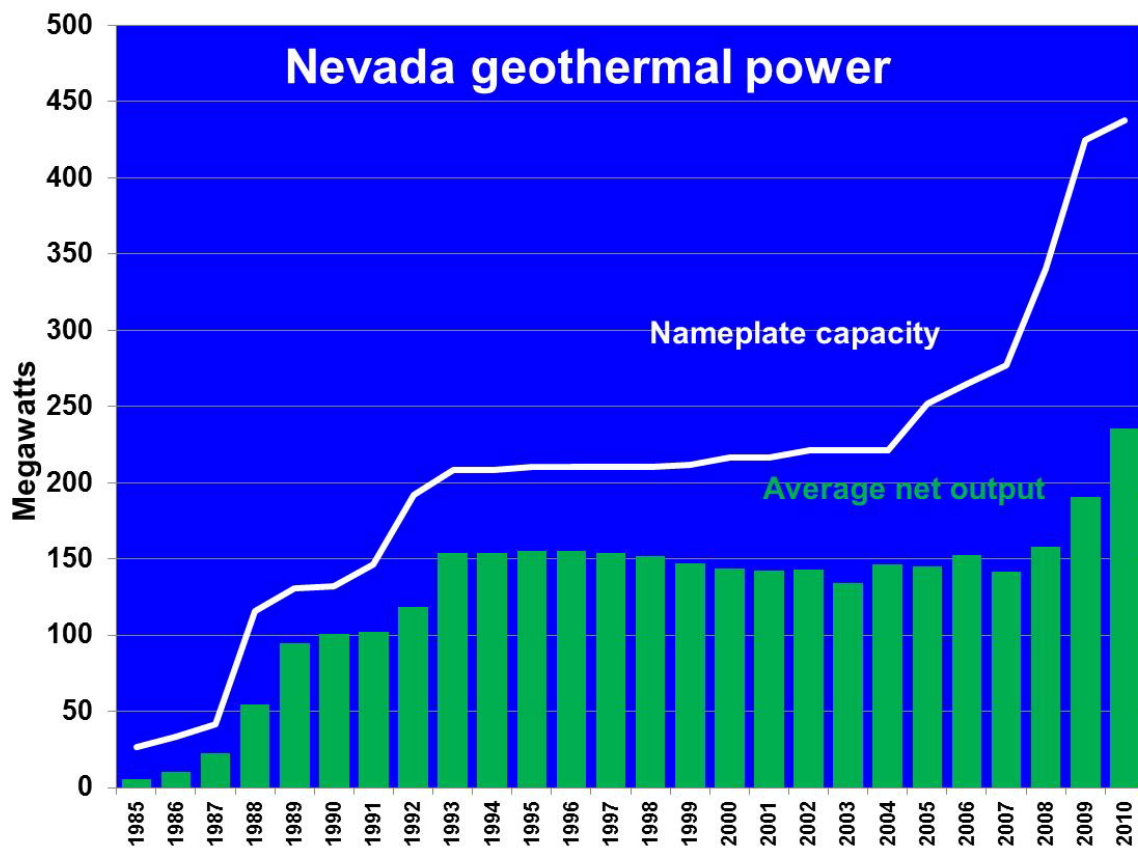


Figure 3. Graph of annual geothermal electric power based on nameplate capacity reported to the Division of Minerals by year from 1985-2010. Average net output is annual sales in megawatt-hours divided by the number of hours in a year (8760). No commercial geothermal power was produced in Nevada before 1985.

Table 4. Geothermal wells reported as drilled, redrilled or completed in 2010.

Area	Company Name	Well Type <sup>1</sup>	Well Number	Permit Number	Location	Permitted Depth (ft)	SPUD Date <sup>2</sup>	Application Date <sup>3</sup>
<b>Churchill County</b>								
Patua	Vulcan Power Company	O	36-15	1076	NE/4 SW/4 S 15, T20N, R26E	7,000	2/18/2010	1/21/2010
	Vulcan Power Company	O	45-27	1077	NE/4 SW/4 S 27, T20N, R26E	7,000	3/6/2010	1/21/2010
	Vulcan Power Company	O	45-9	928	NE/4 SW/4 S 9, T20N, R26E	7,000	1/31/2010	7/8/2009
	Patua Project LLC	O	44-21	892	SE/4 NW/4 S 21, T20N, R26E	?	5/22/2010	3/9/2009
	Patua Project LLC	P	36A-15	1143	NE/4 SW/4 S 15, T20N, R26E	10,000	6/24/2010	6/17/2010
Stillwater	Enel Stillwater, LLC	O	45-19	1129	NE/4 SW/4 S 19, T20N, R31E	± 1600	3/24/2010	3/11/2010
Desert Queen	Magma Energy	TG	26-17	1117	NW/4 SW/4 S 17, T22N, R28E	1,000	3/6/2010	3/1/2010
	Magma Energy	TG	17-9	1119	SW/4 SW/4 S 9, T22N, R28E	1,000	3/15/2010	3/1/2010
	Magma Energy	TG	31-17	1121	NE/4 NW/4 S 17, T22N, R28E	1,000	3/3/2010	3/1/2010
	Magma Energy	TG	36-33	1124	NE/4 SW/4 S 33, T23N, R28E	1,000	3/10/2010	3/1/2010
Soda Lake	Magma Energy	P	25A-33	1142	NW/4 SW/4 S 33, T20N, R28E	4,500	6/27/2010	6/3/2010
	Magma Energy	TG	44-34	1166	SE/4 NW/4 S 34, T20N, R28E	1,000	9/20/2010	8/31/2010
	Magma Energy	TG	75-34	1167	NE/4 SE/4 S 34, T20N, R28E	1,000	11/1/2010	8/31/2010
	Magma Energy	TG	44A-34	1176	SE/4 NW/4 S 34, T20N, R28E	1,000	10/22/2010	10/13/2010
	Magma Energy	TG	58-27	1180	SW/4 SE/4 S 27, T20N, R28E	1,000	10/27/2010	10/22/2010
	Magma Energy	TG	88-27	1181	SE/4 SE/4 S 27, T20N, R28E	1,000	11/3/2010	10/22/2010
	Magma Energy	TG	64-29	1183	SW/4 NE/4 S 29, T20N, R28E	1,000	11/9/2010	11/8/2010

Area	Company Name	Well Type <sup>1</sup>	Well Number	Permit Number	Location	Permitted Depth (ft)	SPUD Date <sup>2</sup>	Application Date <sup>3</sup>
Fallon	Gradient Resources	O	78-36	1146	SE/4 SE/4 S 36, T18N, R29E	7,000	7/23/2010	6/29/2010
	Gradient Resources	O	13-36	1170	SE/4 NE/4 S 36, T18N, R29E	7,000	10/22/2010	9/24/2010
Coyote Upsal Hogback	TGP Dixie Development	O	76-14	1162	NE/4 SE/4 S 14, T24N, R36E	10,000	9/16/2010	8/27/2010
	Magma Energy	TG	46-20	1163	NE/4 SW/4 S 20, T20N, R28E	1,000	10/18/2010	8/31/2010
<b>Elko County</b>								
Mary's River	Standard Steam, LLC	TG	6	1093	NW/4 NE/4 S 24, T39N, R59E	500	3/17/2010	1/28/2010
	Standard Steam, LLC	TG	10	1097	NW/4 NE/4 S 26, T39N, R59E	500	3/8/2010	1/28/2010
	Standard Steam, LLC	TG	13	1100	SW/4 SW/4 S 26, T39N, R59E	500	3/10/2010	1/28/2010
	Standard Steam, LLC	TG	16	1103	SW/4 NW/4 S 11, T38N, R59E	1,000	3/17/2010	1/28/2010
	Standard Steam, LLC	TG	17	1104	SE/4 SE/4 S 10, T38N, R59E	500	3/22/2010	1/28/2010
	Standard Steam, LLC	TG	22	1108	NE/4 SE/4 S 22, T38N, R59E	500	3/22/2010	1/28/2010
	Standard Steam, LLC	TG	27	1110	NW/4 SE/4 S 35, T38N, R59E	500	4/12/2010	1/28/2010
	Standard Steam, LLC	TG	23	1113	NW/4 SE/4 S 27, T38N, R59E	500	4/8/2010	1/28/2010
	Standard Steam, LLC	TG	24	1130	NE/4 SW/4 S 26, T38N, R59E	500	4/6/2010	1/28/2010
	Standard Steam, LLC	TG	19	1131	SE/4 SW/4 S 14, T38N, R59E	500	3/25/2010	1/28/2010
	Standard Steam, LLC	TG	25	1132	SE/4 NE/4 S 26, T38N, R59E	500	5/11/2010	1/28/2010
	Standard Steam, LLC	TG	4	1091	NW/4 SE/4 S 13, T39N, R59E	500	4/26/2010	2/5/2010
	Standard Steam, LLC	TG	20	1106	NW/4 SE/4 S 13, T38N, R59E	500	4/20/2010	2/5/2010
	Standard Steam, LLC	TG	21	1107	NW/4 SE/4 S 24, T38N, R59E	500	4/16/2010	2/5/2010

Area	Company Name	Well Type <sup>1</sup>	Well Number	Permit Number	Location	Permitted Depth (ft)	SPUD Date <sup>2</sup>	Application Date <sup>3</sup>
Tuscarora	HSS II	P	65A-8	1144	NW/4 SE/4 S 8, T41N, R52E	~5030	6/24/2010	6/22/2010
Hot Sulfur Springs	HSS II	P	66A-5	1151	NW/4 SE/4 S 5, T41N, R52E	5,000	7/26/2010	7/22/2010
	HSS II	P	65B(64)- 8	1174	SW/4 NE/4 S 8, T41N, R52E	4,850	10/24/2010	10/12/2010
<b>Esmeralda County</b>								
Silver Peak	Sierra Geothermal Power	O	38-11	1075	SW/4, SW/4, S11, T2S, R39E	7,000	1/19/2010	1/15/2010
	Sierra Geothermal Power	TG	41-11 TGH	1084	NE/4 NW/4 S 11, T2S, R39E	1,000	2/6/2010	1/15/2010
	Sierra Geothermal Power	TG	88-2 TGH	1085	SE/4 SE/4 S 2, T2S, R39E	1,000	2/4/2010	1/15/2010
Alum	Sierra Geothermal Power	O	26-19	1080	NW/4 SW/4 S 19, T1N, R38.5E	7,000	1/24/2010	1/7/2010
<b>Humboldt County</b>								
Blue Mountain	NGP Blue Mountain I LLC	I	41-27	1078	NE/4 NW/4 S 27, T36N, R34E	± 7000	3/1/2010	1/19/2010
	NGP Blue Mountain I LLC	P	91-15	844	NW/4 NE/4 S 15, T36N, R34E	± 9000	1/5/2010	9/25/2008
	NGP Blue Mountain I LLC	I	86(16- 23)-22	1158	NE/4 SE/4 S 22, T36N, R34E	~6000	11/8/2010	8/17/2010
<b>Lander County</b>								
McGinness	Ormat Nevada	P	58B-22	1047	SW/4 SE/4 S 22, T20N, R45E	± 6000	2/10/2010	10/1/2009
	Ormat Nevada	P	61-22	1073	NW/4 NE/4 S 22, T20N, R45E	3,050	5/7/2010	1/5/2010
	Ormat Nevada	P	66B-22	1114	NW/4 SE/4 S 22, T20N, R45E	~6000	6/6/2010	2/18/2010
	Ormat Nevada	P	28A-10	1145	SW/4 SW/4 S 10, T20N, R45E	~3600	6/28/2010	6/25/2010
	Ormat Nevada	P	67-15	1157	SW/4 SE/4 S 15, T20N, R45E	4,020	9/22/2010	8/11/2010

Area	Company Name	Well Type1	Well Number	Permit Number	Location	Permitted Depth (ft)	SPUD Date2	Application Date <sup>3</sup>
<b>Lyon County</b>								
Patua	Vulcan Power	P	21-19	824	NE/4 NW/4 S 19, T20N, R26E	10,000	4/5/2010	7/25/2008
	Vulcan Power	P	23-17	826	SW/4 NW/4 S 17, T20N, R26E	10,000	2/18/2010	7/25/2008
	Vulcan Power	P	37-17	827	SE/4 SW/4 S 17, T20N, R26E	10,000	Rocket Drill2/RD3 2/7/2009; ST1 2/12/2010	7/25/2008
	Patua Project LLC	P	77A-19	1137	NE/4 SE/4 S 19, T20N, R26E	10,000	7/27/2010	5/21/2010
	Patua Project LLC	O	27-29	1159	SW/4 SW/4 S 29, T20N, R26E	7,000	8/31/2010	8/23/2010
	Patua Project LLC	P	16-29	1173	NW/4 SW/4 S 29, T20N, R26E	10,000	10/16/2010	10/5/2010
<b>Mineral County</b>								
Dead Horse	Ormat Nevada	TG	87-11	996	SE/4 SE/4 S 11, T11N, R32E	1,000	4/28/2010	9/3/2009
	Ormat Nevada	TG	57-1	982	SW/4 SE/4 S 1, T11N, R33E	1,000	5/12/2010	9/3/2009
	Ormat Nevada	TG	24-6	986	SW/4 NW/4 S 6, T11N, R33E	1,000	5/16/2010	9/3/2009
	Ormat Nevada	TG	24-12	998	SW/4 NW/4 S 12, T11N, R32E	1,000	5/5/2010	9/3/2009
	Ormat Nevada	TG	62-12	1000	NW/4 NE/4 S 12, T11N, R32E	1,000	5/9/2010	9/3/2009
	Ormat Nevada	P	68-1	1161	SW/4 SE/4 S 1, T11N, R32E	3,500	10/3/2010	8/27/2010
	Ormat Nevada	P	85-11	1191	NE/4 SE/4 S 11, T11N, R32E	3,500	12/31/2010	12/20/2010
Gabbs Valley	Ormat Nevada	TG	26-18	1015	NW/4 SW/4 S 18, T12N, R34E	1,000	2/9/2010	9/9/2009
	Ormat Nevada	TG	72-24	1016	NE/4 NE/4 S 24, T12N, R33E	1,000	1/30/2010	9/9/2009
	Ormat Nevada	TG	43-24	1017	SE/4 NW/4 S 24, T12N, R33E	1,000	2/4/2010	9/9/2009
	Ormat Nevada	TG	75-29	1126	NE/4 SE/4 S 29, T13N, R34E	500	5/27/2010	3/5/2010



A comparison shows the steady increase in geothermal activity between federal fiscal years 2007 and 2009 (Table 5). Note that wells are not necessarily drilled in the same year in which they are permitted. Drilling permits are valid for two years from the date of approval. Additionally, Table 3

shows the changes in BLM permitting results over five years (one lease sale was conducted each year). The peak in revenue was in 2008, whereas the peak in acres and parcels sold was in 2009 (Shevenell and Zehner, 2011 and Table 3). Activity and revenues appear to have leveled off in 2010. .

**Table 5. Geothermal drilling activity, 2007-2010.**

Year	Number of permits	Number of wells drilled	Number of production wells drilled
2007	71	41	5
2008	130	53	16
2009	195	71	16
2010	119	74	19

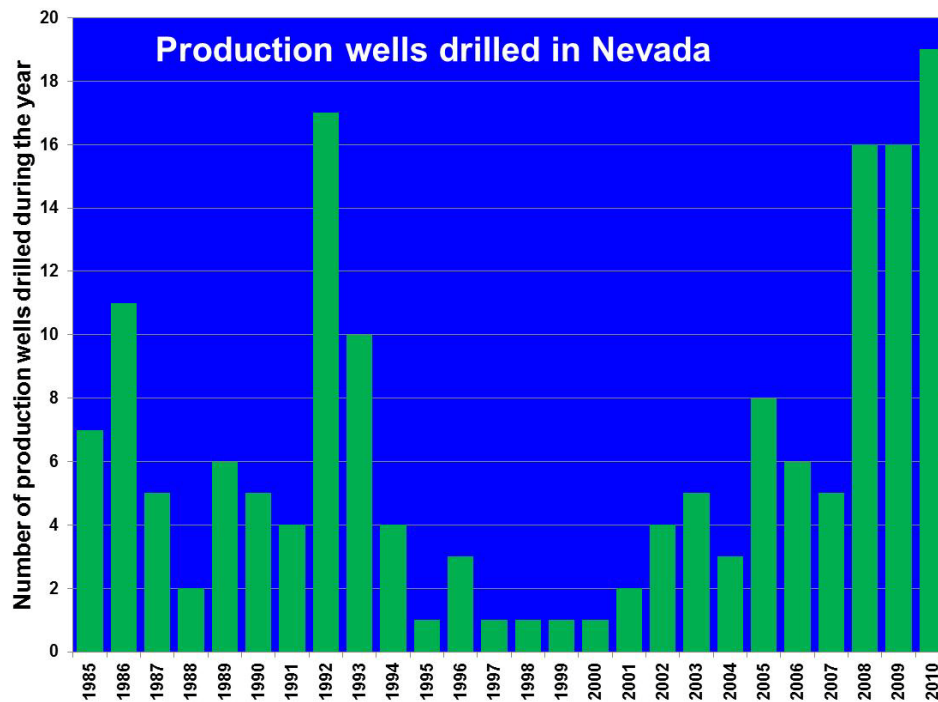


Figure 4. Industrial-class (power-generating) wells drilled in Nevada, 1985–2010 (excludes injection, observation and gradient wells).

## ALUM GEOTHERMAL AREA, ESMERALDA COUNTY

The 7,198-acre (2,913 hectare) Alum project was drilled in the 1970s and 1980s by Amex Exploration, Phillips Petroleum, and O'Brien Resources (46 thermal gradient holes). Geothermometer temperatures indicate a reservoir temperature of up to 225°C (437°F). The maximum bottom-hole temperature from prior drilling was 118°C (244.4°F) at 1,493 ft. (455 m). In November 2009, Sierra Geothermal Power (SGP) completed ground-based magnetotellurics and airborne Z-Axis

Tipper Electromagnetic surveys and the drilling of well 25-29, which reached 126°C (258.8°F) at 2,034 ft. (620 m). SGP was awarded a \$5 million DOE grant, which included funds to be used at Alum for day/night thermal infrared imagery, 3D resistivity, shallow temperature surveys, and drilling. Ram Power acquired Alum (part of their Clayton Valley project) and plans to add 32 MW of electrical generating capacity from a resource that may be able to support 64 MW (Jennejohn, 2011).

## BLUE MOUNTAIN GEOTHERMAL AREA, HUMBOLDT COUNTY

The **Nevada Geothermal Power, Inc. (NGP)** Blue Mountain project area covers approximately 17.2 square miles (44.5 km<sup>2</sup>) in Humboldt County above a blind geothermal system with no visible hydrothermal features at the surface. It was located during gold exploration drilling that encountered high temperature water (up to 88°C) in the early 1990s (Parr and Percival, 1991). NGP signed a fixed-price, date-certain engineering, procurement, and construction (EPC) contract with Ormat Nevada, a subsidiary of Ormat Technologies Inc., to construct the Blue Mountain Faulkner 1 binary cycle geothermal power plant by December 31, 2009. Maximum temperatures encountered at the site are 188°C (370.4°F) at approximately 2,000 ft (610 m) (Niggeman et al., 2009). Ormat completed construction of the plant approximately three months ahead of schedule. NGP brought the plant on line in September 2009 and held the official dedication ceremony on October 22, 2009. As well-field development drilling has moved forward, it appears that the Blue Mountain geothermal resource should be able to eventually support power production at the level of 49.5 MW gross, 39.5 net. As of November 2009, Blue Mountain was producing power at a sustainable rate of 27 MW net as plant output was limited by deep injection capacity. Three additional deep wells were planned to bring the plant up to a capacity of greater than 40 MW (net). Power production for the year ending June 30, 2011 averaged 45 MW gross and 35 MW net (according to NGP's September 27, 2011 news release). The company reported that Department of Treasury grant funds (\$57.9 million awarded) will be used to complete additional drilling and pipeline connection. Early production wells 14-14, 15-14 and 17-14 have production capacities between 7 and 7.5 MW (net)

each, similar to the three original wells drilled (23-14, 25-14, 26A-14 (March 9, 2010 company press release). The resource is an artesian reservoir at or below an elevation of about 1,100 ft (about 335 m), and geothermometers predict reservoir temperatures of 250°C (about 482°F) at depth. Waters produced are oversaturated with respect to silica, causing a potential for scaling, which will be mitigated by chemical inhibition (Casteel et al., 2009). NGP completed construction of a 20-mile-long 120 kV overhead transmission line that connects to the electric grid just north of Mill City with an approved capacity of 75 MW. The path of the transmission line traverses a checkerboard of land ownership that is approximately 50% private land and 50% public land administered by the Bureau of Land Management. NGP completed its production well drilling program for the first phase of the project. Due to the checkerboard nature of the property, NGP acquired the mineral rights to Blue Mountain from Gryphon Gold Corp in order to protect access to the geothermal resources. Additionally, NGP hired GeothermEx to conduct reservoir modeling and evaluate its power production potential over the long term. Early results showed that Faulkner 1 should be initially operated at 70% capacity to assure a sustainable operation. A preliminary conceptual model of the Blue Mountain area is presented in Casteel et al. (2009). The Blue Mountain area is located at T36N, R34E in south-central Humboldt County, Nevada, 25 miles west of Winnemucca (Blue Mountain Geothermal Project, Nevada Geothermal Power, Inc., website: <http://www.nevadageothermal.com/s/Home.asp>).

Blue Mountain 2 is currently under expansion with an anticipated additional resource size of 35 MW (Jennejohn, 2011).

## COYOTE CANYON, CHURCHILL COUNTY

Terra-Gen (TGP) plans to construct a 70 megawatt geothermal power plant. Power will be delivered to an existing transmission line via a short tie-in line from the new power plant. TGP reported to the Geothermal Energy Association (GEA) that the resource could support up to 100 MW (Jennejohn,

2011). The record of decision was issued by BLM on March 7, 2011 that there would be no significant impact by construction of the power plant ([http://www.blm.gov/nv/st/en/fo/carson\\_city\\_field/blm\\_information/nepa/tgp\\_coyote\\_canyon.html](http://www.blm.gov/nv/st/en/fo/carson_city_field/blm_information/nepa/tgp_coyote_canyon.html)).

## EDWARDS CREEK AREA, CHURCHILL COUNTY

The Edwards Creek project encompasses 4,160 acres (1683 hectares) along 6 mi (9.6 km) of the Clan Alpine Mountains range-front fault. Areas of hydrothermal alteration occur along the fault, and boiling water was encountered at shallow depths by 23 exploration holes drilled by previous operators. Cation and silica geothermometer temperatures from well waters suggest an approximately 175°C (~347°F) reservoir. The Great Basin Center for Geothermal Energy identified a shallow (2m) thermal anomaly that is coincident with the location of the hot wells. Standard Steam Trust (SST) has completed a detailed gravity survey that shows a southeast dip of ~60° to the range-front fault, which would place the reservoir at feasible depths beneath SST's leaseholds. SST planned to drill a slim hole in 2010 to ascertain temperature and flow within the

reservoir as part of a ~\$1 million exploration program.

Another project in southwest Edwards Creek encompasses 7,617 acres (3082.495 hectare) covering 8 miles (13 kilometers) of the Clan Alpine Mountains range-front fault. The 2008 gravity survey identified the location of the Clan Alpine fault as well as a sub-parallel fault that lies basinward of the range-front fault. This sub-parallel fault may be the more significant of the two faults, and is believed to be the fault associated with high-temperature ground water encountered by shallow exploration drilling at Edwards Creek in 2005 and 2006.

Jennejohn (2011) report that Ormat Technologies currently is developing the Edwards Creek area, although no resource size has been defined.

## EIGHT MILE FLAT (SALT WELLS), CHURCHILL COUNTY

In April 2009 **Enel North America, Inc.**, a subsidiary of **Enel S.p.A., Italy**, inaugurated its 18 MW gross-capacity binary geothermal power plant at Salt Wells and its new 47.3 MW gross-capacity Stillwater binary plant. The Nevada Division of Minerals issued a geothermal project area permit (#698PA) to Enel Salt Wells, LLC to drill up to eight production wells with estimated depths of 1,000 feet (304.8 meters), eight injection wells with estimated depths of 3,000 feet (914.4 meters), and 10 observation wells. The project area is located in Sections 23, 24, 25, 26, 35, and 36 of Township 17 North, Range 30 East. A transmission line to the site of the power plant near Salt Wells was completed (Great Basin Center for Geothermal Energy, Current Geothermal Exploration Activity: <http://www.unr.edu/geothermal/explactivity.htm> and Enel North America, Inc.: <http://www.enel.it/northAmerica/>). On September 25, 2009, it was announced that Enel had been awarded \$61,520,872 in ARRA "1603 Program" funds for its Salt Wells and Stillwater projects. According to the Economic Development Authority of Western Nevada (EDAWN), the Salt Wells (along with the new Stillwater) project will generate over \$4 million dollars and will create 25 permanent jobs for the next thirty years. Both plants are binary cycle plants that operate at temperatures between 130-150°C (266-302°F) (<http://www.usnews.com/science/articles/2009/04/16/two-nv-geothermal-plants-open-others-explored.html>). In an April, 2009 Enel press release,

they stated that the two plants "have a total gross installed capacity of 65 MW, which will generate over 400 million kWh of electricity a year, enough to meet the needs of some 40,000 US households and avoid the emission of over 331 thousand tons of CO<sub>2</sub>" ([http://www.enel.com/en-GB/media/press\\_releases/release.aspx?iddoc=1608017](http://www.enel.com/en-GB/media/press_releases/release.aspx?iddoc=1608017)).

Other projects in the Salt Wells area include projects by Vulcan and Ormat. Vulcan (now Gradient Resources) plans to construct up to six geothermal power plants and related facilities. The currently stated resource size is 60 MW (Jennejohn, 2011).

Ormat plans to develop one geothermal power plant in the area. Additionally, NV Energy plans to construct above-ground transmission lines, electrical substations, and switching facilities. Because the projects proposed by the three companies are occurring nearly simultaneously and with similar potential impacts, the BLM is conducting one EIS for the three projects simultaneously. The three projects are called the Salt Wells Energy Projects, and the area encompassed by the projects covers approximately 24,152 acres (9,774 hectares) near Salt Wells, including an area just southwest of Fallon to approximately 24 mi (39 km) southeast of Fallon. A notice of intent was published September 11, 2009. The final release date was July 22, 2011, with the ROD expected in the Fall of 2011, approximately 2 years following the notice of intent. [http://www.blm.gov/nv/st/en/fo/carson\\_city\\_field/blm\\_information/nepa/salt\\_wells\\_energy.html](http://www.blm.gov/nv/st/en/fo/carson_city_field/blm_information/nepa/salt_wells_energy.html).

## FLORIDA CANYON, PERSHING COUNTY

ElectraTherm (Reno, NV) is pursuing a co-production unit using their "Green Machine" (small plant for generating electricity from waste heat) at the Florida Canyon Mine. This project is in the advanced stage of development and is anticipated to produce 50 kW of electricity for the mine (Jennejohn,

2011). ElectraTherm received slightly less than \$1 million in federal assistance to develop this project, providing \$500,000 in cost share. As of publication of Jennejohn (2011), there had been no expenditures.

## HAZEN (PATUA), CHURCHILL COUNTY

Several exploration drill rigs were observed on ground controlled by Vulcan Power Company (now Gradient Resources) in 2009. Vulcan had drilled seven production wells and eight observation wells at Patua. On February 11, 2010, Vulcan announced plans to begin construction of a 60 MW power plant immediately, with plant completion expected in 2012. The project is located about 38 miles (about 61 kilometers) east of Reno and 10 miles (16.1 kilometers) east of Fernley. Vulcan has been conducting an extensive exploration program including well drilling and core drilling; geological, geochemical, and geophysical surveys; and well discharge testing. Thirteen hot springs occur in the

project area that range in temperature from 28 to 96°C (82 to 204°F). In 1962, Magma Power drilled three wells from 300 to 750 ft (91 to 230 m), recording a maximum temperature of 132°C (270°F). (<http://www.vulcanpower.com/Pages/Patua.html>). Gradient Resources indicates a possible resource size up to 120 MW (Jennejohn, 2011). "Currently, Gradient is focusing its development efforts on the southwestern portion of the Patua geothermal leases. Construction on the Patua Geothermal Power Plant site began during Q3 2011, with commercial operations slated for the end of 2012." (<http://www.gradient.com/portfolio/patua-nv/>)

## JERSEY VALLEY, PERSHING COUNTY

The Jersey Valley geothermal area is located at the base of the western flank of the Fish Creek Range in Pershing County (T27N, R40E), likely along a projection of a mountain-front fault shown by Stewart and Carlson (1976). Early temperature estimates using silica and Na-K-Ca geothermometers indicated reservoir temperatures of 142°C and 182°C, respectively (Mariner and others, 1974). Ormat Nevada Inc. began drilling in this area in 2007, encountering valley fill and metasediments of the Fish Creek Range. A 20-year

power purchase agreement (PPA) between Ormat Technologies Inc. and NV Energy was established. Construction of a 30 to 35 MW nameplate-capacity generation facility began in mid 2010. As of February 3, 2011, ORMAT's 15 MW Jersey Valley power plant had been built, was undergoing commissioning, and was operating at partial capacity with final completion planned in the second quarter of 2011. The Jersey Valley power plant was the only geothermal power plant built in Nevada in 2010.

## McGINNESS HILLS, LANDER COUNTY

Surface sinter is exposed in this former gold exploration property in Lander County. Drilling encountered hot water with high geothermometer temperatures. Subsequent work led to a November 2009 announcement of a 20-year power purchase

agreement (PPA) between Ormat Technologies, Inc. and NV Energy to furnish 51 MW (NV Energy, 2010) from the McGinness Hills geothermal project, which is currently under construction. Ormat plans an additional 30 MW of capacity (Jennejohn, 2011).

## MOANA, WASHOE COUNTY

The Peppermill Resort Casino is located within the Moana geothermal area and is the only hotel in the country that uses geothermal energy for heating. The resort drilled a recent 4,400 ft (1,340 m) deep well that produces 170°F (77°C) water at 1,200 gallons per minute. With this new well and a complete overhaul of the existing geothermal system, the resort invested \$9.7 million to offset their

use of natural gas for heating. The Peppermill is currently harnessing the geothermal energy, which now heats 100% of the resort's domestic water and is heating the entire 2.1-million-square-foot facility 24 hours per day. The conversion to geothermal heating is expected to save the resort millions of dollars by offsetting natural gas use.

## REESE RIVER, LANDER COUNTY

Exploration to date at the 6,145 acre (2487 hectare) Reese River project includes a total of 57 wells ranging in depth from 328 to 5000 feet (100 to 1524 meters) with recorded temperatures up to 150°C (302°F). Temperature data indicate a large thermal anomaly approximately 6.2 mi (10 km) long by approximately 1.9 mi (3 km) wide. Temperature gradients measured in this area reach a maximum of approximately 500°C/km. Geophysical surveys completed include seismic, gravity, magnetotelluric, and radiometric surveys. Geological and structural mapping has been completed, and geochemical

analyses were undertaken on soil, water, rock, and vegetation. In November 2009, Sierra Geothermal Power completed a program of 10 shallow exploration holes totaling 7,021 feet (2,140 meters), with the results suggesting that the size of the thermal anomaly is greater than previously thought. Ram Power acquired the property and report they are in advanced stage planned capacity addition phase for 24 MW, with a total of 40 MW anticipated for the site once built-out (Jennejohn, 2011).

As of late 2011, the project was no longer active and not listed on their web site.

## SAN EMIDIO AND GRANITE CREEK GEOTHERMAL AREAS, WASHOE COUNTY

**U.S. Geothermal, Inc.** announced the completion of a transaction with Michael Stewart and **Empire Geothermal Power** to acquire the Empire geothermal power plant and 28,358 acres (11,4766 hectares) of geothermal leases and ground water rights in May 2008. The total purchase price for the power plant and acreage was \$16.62 million. The transaction included assets from two locations, San Emidio and Granite Creek. San Emidio includes the Empire power plant and approximately 22,944 acres (9,285 hectares) of leases and ground-water rights and a mothballed dehydration facility located adjacent to the site. The Granite Creek assets are 5,414 acres (2,191 hectares) of BLM leases about 6 miles (9.7 kilometers) north of Gerlach, Nevada. U.S. Geothermal originally planned to develop a 35-megawatt power project for the San Emidio resource. Drilling that commenced on a new production well intended to expand the resource for development of the new power plant. This \$75- to \$85-million-plan calls for the construction of twin binary-cycle plants. It is anticipated that the current well field could provide approximately 75% of the geothermal fluid requirement for one of the binary

plants, and an expanded production and injection well field could be drilled to provide the balance of the needed geothermal fluid for the second plant to make, in total, a 27-megawatt development (U.S. Geothermal, Inc. <http://www.usgeothermal.com> and Nevada Geothermal Update, Nevada Division of Minerals, May 2008). This development will be conducted in two stages: repower and expansion. During the first stage, the existing 3.6 MW plant is being replaced with a new, more efficient 9- to 10-MW power plant that will utilize the existing, proven geothermal reservoir and be on-line in late 2011. The second stage requires drilling new production wells and the construction of an upgraded transmission line to allow for increased power production. This expansion is expected to produce an additional 26 MW and be on line by the third quarter of 2012 (<http://www.usgeothermal.com/NewsReleases/December-8-2009.pdf>). US Geothermal plans to add 16 MW of electrical generating capacity for the repower, with a possibility of 44 MW total capacity when built-out (Jennejohn, 2011).

## SILVER PEAK, ESMERALDA COUNTY

Silver Peak project (7,873 acres/3186 hectares; part of Ram Power's Clayton Valley project) was first explored in the 1980s when Phillips Petroleum Company drilled six temperature gradient wells in the area. Exploration resumed in 2005 with two more gradient holes drilled by the property vendor and ten shallow thermal gradient (TG) holes drilled by Sierra Geothermal Power (SGP) in November, 2009. Geothermal features visible on the property include geothermal vents, travertine-manganese-silica sinter deposits, fossilized algal mats, and complex faulting. Shallow wells with temperatures of up to 88°C (190°F) have geothermometry indicating reservoir temperatures up to 227°C (440.6°F) and temperature gradients

exceeded 500°C/km. SGP also completed detailed magnetotelluric (MT) and airborne Z-tipper Electromagnetic (ZTEM) surveys at Silver Peak. During 2010 SGP intended to complete transmission studies related to power purchase agreements, additional geophysics, 300-meter-deep temperature gradient drilling, and (1-2-kilometer-deep) core holes, slim holes, and 13-inch diameter production assessment wells. SGP was awarded a \$5 million DOE grant. Funds were to be used for drilling and exploration activities on the project, on a 50:50 cost-share basis. Ram Power acquired the property in 2010 and reported that they plan to build a plant with a 16 MW capacity with a 24 MW possible resource once built out (Jennejohn, 2011).

## **SODA LAKE, CHURCHILL COUNTY**

When Magma Energy (US) Corp. acquired the Soda Lake power plant from Constellation Energy in 2008, it was not operating at its full nameplate capacity, and they decided to restore the plant to full capacity, then increase power production by drilling more wells and stepping out beyond the existing, known field (Van Gundy et al., 2010). In 2009, Magma acquired additional leases adjacent to their Soda Lake property and completed two drill holes to depths of 4,468 feet (1362 meters) and 8,995 feet (2742 meters) to determine the distribution of permeability and heat in hope of doubling the plant's gross generating capacity from

11 to 23 MW. Maximum temperatures attained in these two wells were 202 and 207°C (395 and 405°F) (<http://www.magmaenergycorp.com>).

In early 2010, Magma received a \$5 million DOE grant to perform sophisticated 3D seismic surveys on the property. Production hole 45A-33, drilled in 2009, has been stimulated to produce 3 MW net of geothermal power. In 2010 Magma applied for permits to drill 7 temperature gradient wells and 3 production holes on the property. Magma reported that this upgrade and expansion project is expected to produce 23 MW (Jennejohn, 2011), with a potential of up to 41 MW.

## **STEAMBOAT HOT SPRINGS, WASHOE COUNTY**

The Galena No. 3 plant, Ormat's newest binary geothermal power plant at Steamboat Hot Springs, came online in 2008. Gross power production from the Steamboat Hot Springs area is approximately 100 MW. Sierra Pacific Power Co. (now NV Energy) and ORNI 14 LLC, a subsidiary of ORMAT Nevada, Inc., signed a 20-year 20 MW power purchase agreement (PPA) for the Galena No. 3 project. Ormat decommissioned the original 7.4 MW Steamboat I power plant, which was

originally brought on line in 1986. At present, there are no new power plants planned for the Steamboat geothermal area (Nevada Division of Minerals, 2009), and the total nameplate capacity of the Steamboat complex (including the Steamboat Hills flash plant) is 147.2 MW, although output was only 83 MW, and sales after parasitic loads were only 61 MW (NV Energy, 2011, p 46; summation of MWhr for Steamboat plants divided by annual number of hours of 8760 hours).

## **TUSCARORA, ELKO COUNTY**

The Bureau of Land Management (BLM) Elko District, signed a right of way (ROW) for an access road and transmission line proposed by Ormat for the Tuscarora geothermal plant. This decision follows completion of the EIS issued July 15, 2011 ([www.blm.gov/rv5c](http://www.blm.gov/rv5c)). The 18 MW power plant is to be located 10 miles (16 km) north of Tuscarora at the north end of Independence Valley

and will require a 24.5-mile (39-km), 120-kilovolt transmission line. Although the plant will be entirely on private land, the transmission line will affect 8.5 miles (13.7 km) of BLM managed land and 16 miles (25.7 km) of private land ([http://www.blm.gov/nv/st/en/fo/elko\\_field\\_office/blm\\_information/newsroom/2011/august/blm\\_signs\\_decision.html](http://www.blm.gov/nv/st/en/fo/elko_field_office/blm_information/newsroom/2011/august/blm_signs_decision.html)).

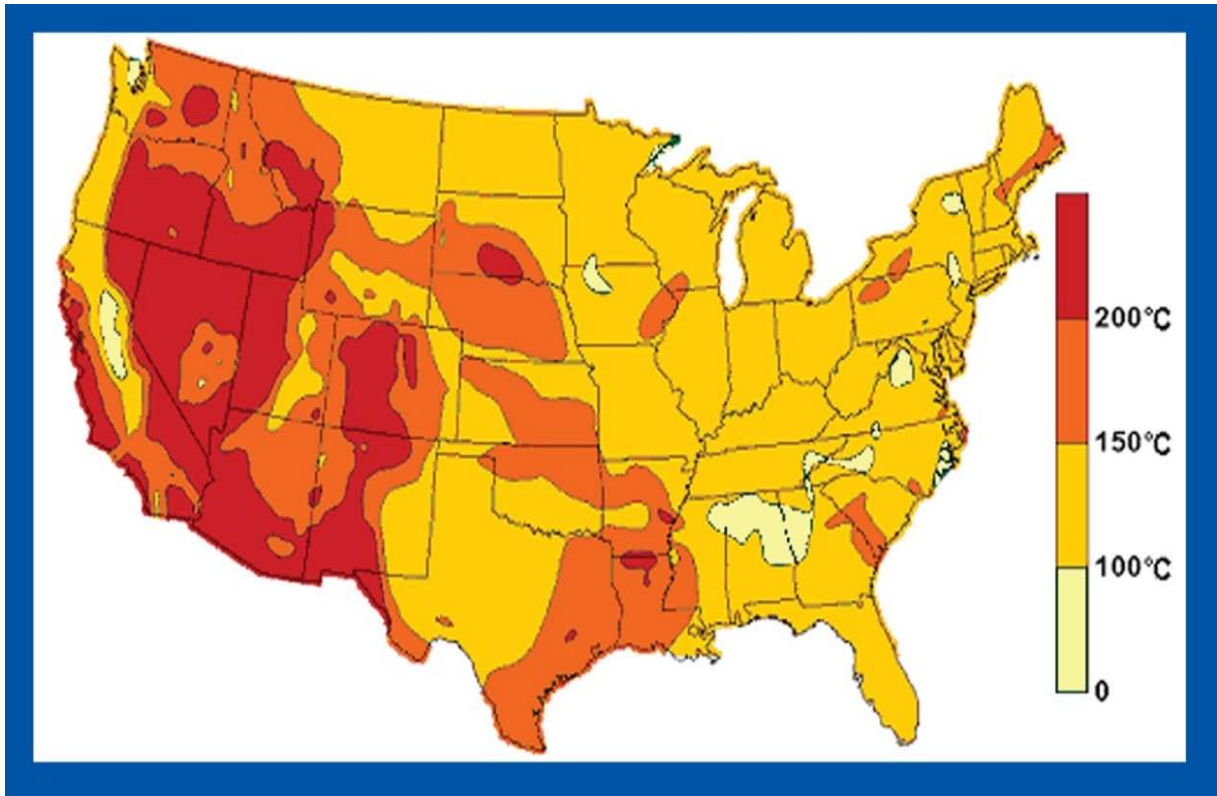


Figure 5. Geothermal resources map of the United States (2007) showing the estimated subterranean temperatures at a depth of 6 kilometers. To estimate the Earth's internal temperature at any depth below the capabilities of normal well drilling, multiple data sets are synthesized. The data used for this figure are: thermal conductivity, thickness of sedimentary rock, geothermal gradient, heat flow, and surface temperature (U.S. Department of Energy - Energy Efficiency and Renewable Energy Geothermal Technologies Program, original author SMU Geothermal Lab 2007, <http://smu.edu/geothermal/>).

## REFERENCES

- BLM, 2010,  
[http://www.blm.gov/nv/st/en/prog/minerals/leasable\\_minerals/geothermal0/ggeothermal\\_leasing/prior\\_sales.html](http://www.blm.gov/nv/st/en/prog/minerals/leasable_minerals/geothermal0/ggeothermal_leasing/prior_sales.html)
- Department of Taxation (Division of Assessment Standards), 2011. 2010-2011 Net Proceeds of Minerals Bulletin. 31 p.
- Casteel, J., Trazona, R., Melosh, G., Niggemann, K., and Fairbank, B., 2009, A Preliminary Conceptual Model for the Blue Mountain Geothermal System, Humboldt County, Nevada; Transactions Geothermal Resources Council, v. 33, p. 917-920.
- Jennejohn, D., 2011, Annual U.S. Geothermal Power Production and Development Report - April 2011; Geothermal Energy Association, 59 p.
- NV Energy, 2011, NV Energy Portfolio Standard Annual Report; Compliance Year 2010, April 1, 2011 (available on the Public Utilities Commission of Nevada website; Docket #11-04001), 328 p.  
<http://pucweb1.state.nv.us>
- NV Energy, 2010, NV Energy Portfolio Standard Annual Report; Compliance Year 2009, Table 18, April 1, 2010 (available on the Public Utilities Commission of Nevada website;  
<http://pucweb1.state.nv.us>), p. 72.
- Niggeman, K., Samuel, A., Morriss, A. V., and Hernández, R., 2009, Foamed Cementing Geothermal 13 3/8-in. Intermediate Casing: NGP #61-22; Transactions Geothermal Resources Council, v. 33, p. 217-222.
- Shevenell, L., and R. Zehner, 2011. Status of Nevada geothermal resource development – Spring 2011. Transactions Geothermal Resources Council, v. 35, p.
- Van Gundy, T., G. Oppliger, M. Ohren, D. Benoit, and M. Morrisson, 2010. Utilizing a Comprehensive 3D Model to Understand, Maintain, and Expand the Soda Lake Geothermal Resource, Nevada USA. Geothermal Resources Council *Transactions*, v.34, p. 1185-89.

### Geothermal Bibliography and Web Links to Other Geothermal Information

For further information on geothermal resources in Nevada check the following Websites or contact David Davis at (775) 682-8766 or via e-mail at [ddavis@unr.edu](mailto:ddavis@unr.edu):

Map of Geothermal Resources in Nevada (second edition), NBMG Map 141, available online in PDF-file format: <http://www.nbmq.unr.edu/dox/m1412.pdf> .

Nevada Bureau of Mines and Geology Geothermal Resources of Nevada Website at <http://www.nbmq.unr.edu/geothermal/gthome.htm>. This site contains geothermal exploration data, interactive maps, lease and information, and numerous geothermal digital data sets.

Nevada Commission on Mineral Resources, Nevada Division of Minerals at <http://minerals.state.nv.us/> . GEO-HEAT CENTER, at <http://geoheat.oit.edu/>, Oregon Institute of Technology, Klamath Falls, Oregon. This site focuses on direct use applications of geothermal energy.

DOE/INEEL Geothermal Resource Location Maps for 13 Western States in PDF, JPG, and e00 file formats at <http://geothermal.id.doe.gov/maps/index.shtml> .

The Nevada Geothermal Resources map in PDF file format is found at <http://geothermal.id.doe.gov/maps/nv.pdf> .

The Renewable Resource Data Center (RReDC) provides access to an extensive collection of renewable energy resource data, maps, and tools. Geothermal, biomass, solar, and wind resource data for locations throughout the United States on the RReDC site at <http://www.nrel.gov/rredc/>.

Southern Methodist University Geothermal Lab, specializing in geothermal gradient data and maps of the entire country, post information at <http://www.smu.edu/geothermal/>.

Summary of Supporting Data for USGS Regional Heat-flow Studies of the Great Basin, 1970-1990, by John H. Sass, Susan S. Priest, Arthur H. Lachenbruch, S. Peter Galanis, Jr., Thomas H. Moses, Jr., John P. Kennelly, Jr., Robert J. Munroe, Eugene P. Smith, Frederick V. Grubb, Robert H. Husk, Jr., and Charles W. Mase; USGS Open-File Report 2005-1207 online version 1.0 on the Web at <http://pubs.usgs.gov/of/2005/1207/>.

Geothermal Industry Temperature Profiles from the Great Basin, by John H. Sass, Susan S. Priest, Arnold J. Blanton, Penelope C. Sackett, Stephanie L. Welch, and Mark A. Walters; USGS Open-File Report 99-425 online version 1.0 on the Web at <http://pubs.usgs.gov/of/1999/of99-425/webmaps/home.html> .

The Bureau of Land Management Land and Mineral Records-LR2000 system Web address is <http://www.blm.gov/lr2000/>. provides reports on BLM land and mineral use authorizations for oil, gas, and geothermal leasing, rights-of-ways, coal and other mineral development, land and mineral title, mining claims, withdrawals, classifications, and more on federal lands or on federal mineral estate. The U.S. Department of Energy (DOE) Geothermal Technologies Program [http://www1.eere.energy.gov/geothermal/Scientific and Technical Information \(OSTI\)](http://www1.eere.energy.gov/geothermal/Scientific%20and%20Technical%20Information%20(OSTI)) have scanned approximately 3,300 agency and national lab technical reports. These files are in a PDF, full-text-searchable format and accessible online at <http://www.osti.gov/energycitations/> .

# Oil and Gas

by David A. Davis

## PRODUCTION

According to the Nevada Division of Minerals, Nevada's net oil production in 2010 was 427,222 barrels (0.021% of total U.S. production), which was down 6% from 2009 and the lowest since 2007. Production came from 66 actively producing wells in ten fields in Railroad Valley, Nye County, which accounted for 87% of the state's production, and five wells in one field in Pine Valley, Eureka County, which accounted for 13%. One other minor field was shut in throughout 2009 and four other minor fields are plugged and abandoned. Nevada ranked 26 out of the 31 oil-producing states in the country in 2010 (<http://www.eia.doe.gov>). According to the Division of Minerals, the average per barrel net wellhead price for Nevada crude oil was \$62.42, which was an increase of 37% from \$45.45 in 2009. The sales volume (or gross yield) increased 36% to \$26,665,355 in 2010 from \$19,570,860 in 2009.

The production of Nevada's 71 actively producing wells ranged between less than 2 and 118 barrels of oil per day and between 0 and 3,007 barrels of water per day. They averaged 16 barrels of oil per day and 247 barrels of water per day. Thirty-one wells were strippers, and 19 produced more than 20 barrels of oil per day. Thirty-three wells produced less than 50 barrels of water per day, and nine produced more than 500 barrels of water per day.

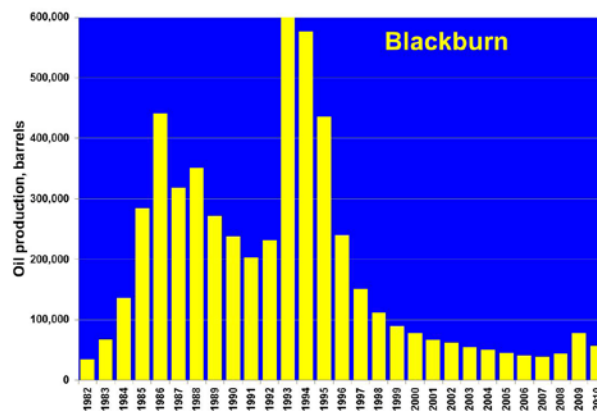
Ninety-six wells in 12 fields were listed as producers in 2009. Of these, 25 were shut in for the entire year. At year's end, eight wells had been shut in for less than six months, but none had been shut in for more than six but less than 12 months. Two wells had been shut in since 2009; two wells had been shut in since 2008; four wells had been shut in since between 2002 and 2006; and the rest had been shut in since between 1986 and 1998.

Grant Canyon No. 10, which went into production in May, was Nevada's highest ranking producer in 2010. It averaged 118 barrels of oil and 1506 barrels of water per day. Grant Canyon No. 9, which had been Nevada's highest ranking producer between 1996 and 2007 and in 2009, was Nevada's second highest volume producer in 2010. It averaged 102 barrels of oil and 793 barrels of water per day. Nevada's third highest volume producer was Munson Ranch 12-43, which had been Nevada's second highest volume producer in 2009. It averaged 82 barrels of oil and 1 barrel of water per day.

The Bacon Flat Field, which produces from the Devonian Guilmette Formation (carbonate) between about 4,960-5,350 feet, averaged 20

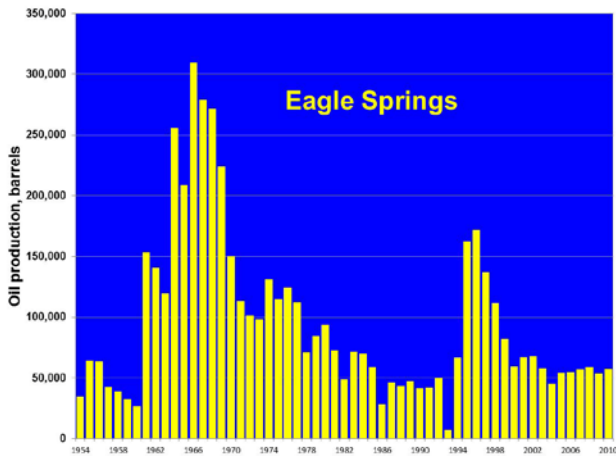
barrels of oil and 15 barrels of water per day in 2010 and accounted for about 2% of Nevada's total oil production. Oil and water production both decreased 4% and 84% respectively. Only one of its three producers was active. One well has been shut in since 1993 and the other since 1988.

The Blackburn Field, which produces from the Oligocene Indian Well Formation (tuff and tuffaceous sandstone), Mississippian Chainman Shale (sandstone), and Devonian Nevada Formation (carbonate) between about 6,700-6,750 feet, averaged 157 barrels of oil and 4,448 barrels of water per day in 2010 and accounted for about 13% of Nevada's total oil production. Oil production decreased 26% and water production decreased 2%. Of the five active producers, oil production increased in one and decreased in four. Daily per well oil production ranged between 5 and 71 barrels and averaged 34 barrels per day. Daily per well water production ranged between 49 and 2,150 barrels and averaged 963 barrels per day. Of the two inactive producers, one well that produced and then was shut in during 2009 remained shut in throughout 2010, and the other, except for a brief production period in November 2005, has been shut in since 1998.

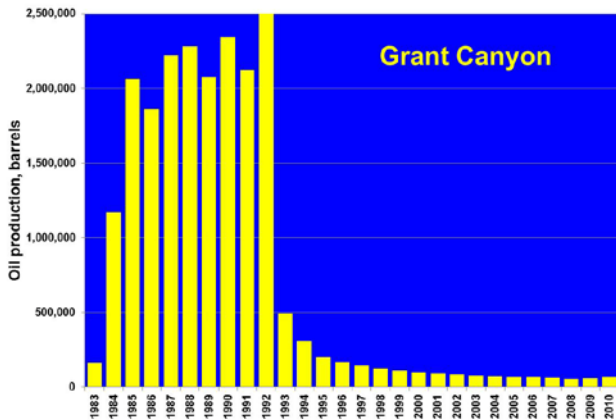


The Eagle Springs Field, which produces from Oligocene ignimbrites, the Eocene Sheep Pass Formation (lacustrine carbonates), and the Pennsylvanian Ely Limestone between about 5,780-7,360 feet, averaged 157 barrels of oil and 1,915 barrels of water per day in 2010 and accounted for 13% of Nevada's total oil production. Oil production increased 7% and water production remained flat. Daily per well oil production ranged between 5 and 21 barrels and averaged 11 barrels per day. Daily per well water production ranged between 17 and 316 barrels and averaged 138 barrels per day. Of

the 15 active producers, oil production increased in ten and decreased in five. Three producers were shut in for two months each. Of the six inactive producers, one has been shut in since 2008, one has been shut in since 2004, three have been shut in since 1997, and one since 1986.



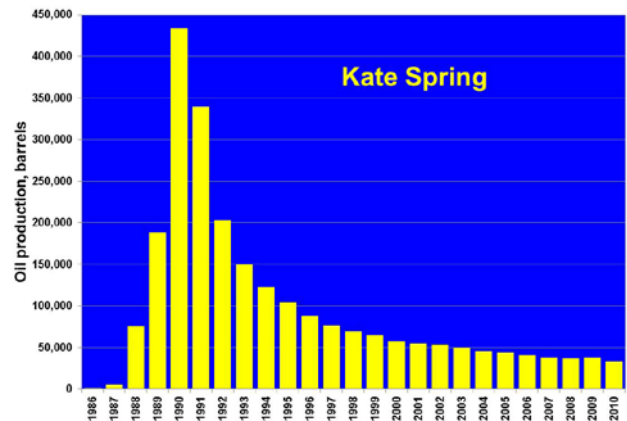
The Ghost Ranch Field, which produces from the Devonian Guilmette Formation between about 4,350-4,620 feet, averaged 59 barrels of oil and 1,450 barrels of water per day in 2010 and accounted for 5% of Nevada's total oil production. Oil production decreased 10% and water production increased 7%. Daily per well oil production ranged between 10 and 23 barrels and averaged 15 barrels per day. Daily per well water production ranged between 292 and 474 barrels and averaged 363 barrels. Oil production increased in one producer and decreased in three producers.



The Grant Canyon Field, which produces from the Devonian Guilmette Formation between about 2,160-4,300 feet, averaged about 189 barrels of oil and about 1,944 barrels of water per day in 2010 and accounted for about 16% of Nevada's total oil production. Oil and water production increased 15%, and 14% respectively. Daily per well oil production ranged between 39 and 118 barrels and averaged 63 barrels. Daily per well water production ranged between 30 and 1,506 barrels and averaged 644 barrels. Oil production decreased in the three

older producers, and a new producer came on line. One producer was shut in for two months. The one inactive producer has been shut in since 1992.

The Kate Spring Field, which produces from the Tertiary Horse Camp Formation (breccia) and the Devonian Guilmette Formation between about 4,450-4,820 feet, averaged 93 barrels of oil and 1,355 barrels of water per day in 2010 and accounted for 8% of Nevada's total oil production. Oil and water production decreased 12%, and 5% respectively. Oil production increased in one active producer and decreased in three. Of the two inactive producers, one has been shut in since 1997 and the other since 1993. A total of 4,009 thousand cubic feet of gas was produced from the Kate Spring Field in 2010, an increase of less than 2% from 2009. The gas is used to operate production and related equipment at the lease sites of Makoil, Inc., and Western General, Inc.

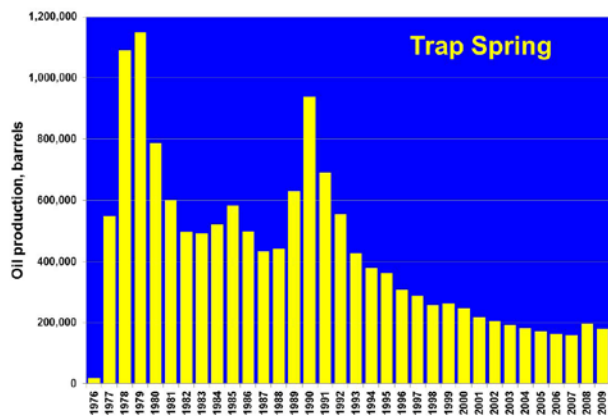


The Sand Dune Field's only producer, which produces from Permian and Pennsylvanian limestones between about 5,970-6,200 feet, averaged 10 barrels of oil and 103 barrels of water per day in 2010 and accounted for less than 1% of Nevada's total oil production. Oil production decreased 63% and water production increases 25% respectively.

The Sans Spring Field's only active producer, which produces from the Oligocene Garrett Ranch Group (volcaniclastic rocks and ignimbrites) between about 5,640-5,770 feet, averaged 38 barrels of oil and no barrels of water per day for 39 days of production in 2010 and accounted for 0.3% of Nevada's total oil production. Oil production increased 5%. Of the two inactive producers, one has been shut in since 1998 and the other has been temporarily abandoned since 1993.

The Trap Spring Field, which produces from the Oligocene Tuff of Pritchards Station between about 3,210-4,950 feet, averaged 480 barrels of oil and 6,273 barrels of water per day in 2010 and accounted for 41% of Nevada's total oil production. Oil and water production decreased 3%, and less

than 1% respectively. Daily per well oil production ranged between 2 and 82 barrels and averaged 17 barrels. Daily per well water production ranged between less than 1 and 3,007 barrels and averaged 223 barrels. Oil production increased in 14 active producers and decreased in 21. Three wells were shut in for one month each. One well shut in since 2006 produced for 2 months before being shut in again. Of the eight inactive producers, one has been shut in since 2008, one since 1999, one since 1998, two since 1996, one since 1992, one since 1991, and one since 1986.



Two minor fields produced 227 barrels of oil in 2009. The Currant Field's only production well produced from the Eocene Sheep Pass Formation between about 6,850-7,080 feet. Its oil production decreased 3% in 2010, and it produced no water. Oil production decreased 2% and water production remained the same from the Duckwater Creek Field's only producer, which produces from the Oligocene Garrett Ranch Group between about 5,680-5,830 feet.

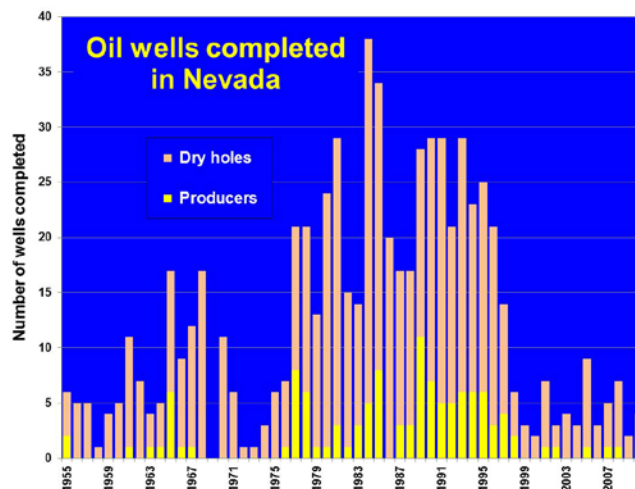
Five other minor fields recorded no production for 2010. The North Willow Creek Field, which produced from the Mississippian Chainman Shale between about 6,290-6,470 feet, was shut in throughout 2010. One producer was shut in March 2008 and the other has been shut in since 2002. The Three Bar Field's three production wells, which produced from the Miocene Humboldt Formation (sandstone and volcanic rock), the Oligocene Indian Well Formation, and the Cretaceous Newark Formation (sandstone and carbonate) between about 5,720-7,070 feet, were plugged and abandoned since 2000 and 2001. The Tomera Ranch Field's two production wells, which had produced from the Oligocene Indian Well Formation (chert and tuffaceous sandstone) between about 1,150-1,950 feet, were plugged and abandoned in 2007. Deadman Creek's only production well, which produced briefly from the Miocene Humboldt Formation between 8,165-8,850 feet, was plugged and abandoned in 1998. Toano Draw's only production well, which produced from the Miocene

Humboldt Formation, was plugged and abandoned in October 2008.

Most Nevada oil is used to make such products as No. 1 and No. 2 diesel fuel, kerosene, stove oil, and asphalt. Foreland Refining Corporation owns the two refineries in Nevada. Nevada crude oil was transported in batches by trucks to the 8,000-barrel-per-day capacity refinery near Currant in Railroad Valley in 2010. The refinery and asphalt storage facility at Tonopah has not been in operation since 2002 and will likely not be in operation again. In 2010, several tanks were being used for diesel and gasoline storage, and the towers were still standing, but the facility is slowly being dismantled.

## NEW PRODUCERS

One new producer came on-line in 2010. Grant Canyon Oil and Gas, LLC, reentered Grant Canyon No. 10 on 27 January 2010, completed it on 12 February 2010, and began production on 22 May 2010. The production zone is between 3,874 feet to 3,966 feet in the upper part of the Devonian Guilmette Formation. Grant Canyon No. 10 was originally permitted under NDOM permit no. 706 in 1993 by Apache Corporation. Apache drilled to 6,150 feet and then plugged and abandoned the well on 17 November 1993.



## EXPLORATION

Four wells were permitted for oil and gas in 2010, up from 3 permitted in 2009. Four wells were spudded in 2010, up from three spudded in 2009. Drilling was completed on three of these wells in 2010, two of which were plugged and abandoned and one was shut in. The fourth well was had not been drilled before end of the year. One well spudded in 2009 was completed and then plugged and abandoned in 2010. One well spudded in 2004 and then listed as being tested was finally completed in 2010 and later plugged and abandoned. A well plugged and

## Production from Nevada's oil fields (barrels of oil)

*Compiled from producers' reports filed with the Nevada Division of Minerals*

Field (year discovered)	1954-2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Eagle Springs (1954) (Railroad Valley)	4,938,159	67,908	57,946	45,176	54,362	54,708	56,992	58,683	53,851	57,394	5,445,179
Trap Springs (1976) (Railroad Valley)	12,837,607	206,424	193,191	181,937	170,896	163,299	159,821	196,089	181,320	175,352	14,465,936
Currant (1979) (Railroad Valley)	1,467	21	23	9	3	0	81	108	111	109	1,932
Bacon Flat (1981) (Railroad Valley)	946,819	12,647	11,763	10,612	7,556	8,112	8,301	7,968	7,764	7,427	1,028,969
Blackburn (1982) (Pine Valley)	4,928,699	62,412	54,623	51,372	45,369	41,491	39,477	43,600	77,730	57,260	5,402,033
Grant Canyon (1983) (Railroad Valley)	20,571,794	85,722	79,293	73,879	68,944	70,158	62,236	56,247	60,036	68,927	21,197,236
Kate Spring (1986) (Railroad Valley)	2,022,399	53,408	49,698	45,656	44,288	41,124	38,411	36,863	38,347	33,824	2,404,018
Tomera Ranch (1987) (Pine Valley)	22,466	11,901	1,981	124	0	0	0	0	0	0	36,472
North Willow Creek (1988) (Pine Valley)	44,614	573	349	377	2,064	2,552	1,256	56	0	0	51,841
Three Bar (1990) (Pine Valley)	23,837	0	0	0	0	0	0	0	0	0	23,837
Duckwater Creek (1990) (Railroad Valley)	16,498	869	436	200	185	122	150	120	120	118	18,818
Sans Spring (1993) (Railroad Valley)	244,392	5,532	4,775	4,169	3,324	3,265	2,971	2,407	1,419	1,494	273,748
Ghost Ranch (1996) (Railroad Valley)	339,527	31,814	26,129	36,423	37,874	30,255	26,070	23,615	24,011	21,630	597,348
Deadman Creek (1996) (Elko County)	367	0	0	0	0	0	0	0	0	0	367
Sand Dune (1998) (Railroad Valley)	53,672	14,211	13,123	13,124	11,878	10,618	10,562	10,467	9,883	3,687	151,225
Toano Draw (2007) (Elko County)							1,916	48	0	0	1,964
<b>Total</b>	<b>46,992,317</b>	<b>553,442</b>	<b>493,330</b>	<b>463,058</b>	<b>446,743</b>	<b>425,704</b>	<b>408,244</b>	<b>436,271</b>	<b>454,592</b>	<b>427,222</b>	<b>51,100,923</b>
Change from previous year		-3%	-11%	-6%	-4%	-5%	-4%	7%	4%	-6%	

abandoned in 1993 was entered and completed as a producer in 2010. The details are in the previous section. These wells totaled 31,985 feet, up 85% from 17,268 feet in 2009. One well drilled in 2005 was still waiting for a completion rig. Ten wells drilled between 1993 and 2008 continued to be listed as either idle, shut in, temporarily abandoned or testing, or drilled with no other information available.

One rig operated during the January/February, May/June, July/August, and November/December periods. Two rigs operated during the September/October period and none during the March/April period.

In 2010, 1,730 oil leases were in effect in Nevada, which was a decrease of 4% from 2009. These covered 3,314,497 acres, which was a decrease of 6%. This is about 7% of the public lands managed by the U.S. Bureau of Land Management (BLM) in Nevada and covers an area slightly smaller than the State of Connecticut.

On March 9, 2010, the Nevada State Office of the Bureau of Land Management (NSO-BLM) held an oil and gas lease sale on 171 parcels covering 305,716 acres in Eureka, Elko, Lincoln, and White Pine Counties. The bids totaled \$244,398.50 on 45 parcels covering 81,303 acres, which averaged \$3.00 per acre. The two highest bids were both \$10.00 per acre for parcels in T39N, R66E in Elko County. Energy West Corp. of Denver, CO, acquired Parcel 138, which covers 1,905 acres in portions of sections 6 and 18 and all of section 8, and North Star Expeditions, Inc., of Las Vegas, NV, acquired Parcel 139, which covers 1,920 acres in a portion of section 30 and all of sections 30 and 32. Eight parcels went for bids between \$4 and \$6 per acre and the remaining parcels for the \$2.00 per acre minimum (*IHS Drilling Wire, Four Corners Edition*, Section I, February 3, 2010; *IHS Drilling Wire, Wyoming Edition*, Section I, March 16, 2010).

On June 8, 2010, the NSO-BLM held an oil and gas lease sale on 101 parcels covering 193,275

## Production of water from Nevada's oil fields (barrels of water)

*Compiled from producers' reports filed with the Nevada Division of Minerals*

Field (year discovered)	1994-2003	2004	2005	2006	2007	2008	2009	2010	Total
Eagle Springs (1954)	3,834,676	357,021	428,375	501,462	804,428	842,435	699,950	699,147	8,167,494
Trap Spring (1976)	26,455,873	1,727,583	2,427,226	2,298,300	2,371,513	2,356,016	2,307,911	2,289,505	42,233,927
Currant (1979)	0	0	0	0	0	0	0	2	2
Bacon Flat (1981)	716,608	3,479	4,694	4,899	2,153	10,204	33,664	5,331	781,032
Blackburn (1982)	19,010,567	10,728,237	1,840,581	1,537,556	1,582,937	1,558,039	1,588,194	1,623,338	39,469,449
Grant Canyon (1983)	3,519,521	438,911	391,017	506,854	442,826	638,822	624,493	709,918	7,272,362
Kate Spring (1986)	4,996,455	417,030	424,809	416,752	437,983	416,983	520,099	494,605	8,124,716
Tomera Ranch (1987)	475,219	23,393	0	0	0	0	0	0	498,612
N. Willow Creek (1988)	2,762	97	268	83	0	0	0	0	3,210
Three Bar (1990)	5,958	0	0	0	0	0	0	0	5,958
Duckwater Creek (1990)	62,947	1,013	1,410	855	1,350	1,080	1,080	1,080	70,815
Sans Spring (1993)	2,898,474	317,230	238,854	261,500	244,756	217,288	0	0	4,178,102
Ghost Ranch (1996)	1,154,010	254,781	569,511	641,022	690,599	711,865	496,553	529,423	5,047,764
Deadman Creek (1996)	0	0	0	0	0	0	0	0	0
Sand Dune (1998)	208,874	30,807	31,935	27,043	31,044	32,684	29,998	37,399	429,784
Toano Draw (2007)					25,614	3,507	0	0	29,121
<b>Total</b>	<b>63,341,944</b>	<b>14,299,582</b>	<b>6,358,680</b>	<b>6,196,326</b>	<b>6,635,203</b>	<b>6,788,923</b>	<b>6,301,942</b>	<b>6,389,748</b>	<b>116,312,043</b>
Change from previous year		153%	-56%	-3%	7%	2%	-7%	1%	

acres in Elko, Eureka, Nye, and White Pine Counties. The bids were all for the \$2.00 per acre minimum and totaled \$68,586 on 23 parcels covering 34,288 acres. Only two companies acquired leases. J. Bar Cane, Inc., of Stanley, NM, acquired 16 parcels, and Albo, Inc., of Denver, CO, acquired seven parcels (*IHS Drilling Wire, Four Corners Edition*, Section I, April 18, 2010; *IHS Drilling Wire, Southeastern Edition*, Section I, June 10, 2010).

On September 14, 2010, the NSO-BLM held an oil and gas lease sale on 75 parcels covering 153,798 acres in Eureka, Lincoln, Nye, Pershing, and White Pine Counties. The bids totaled \$212,928.00 on 21 parcels covering 42,763 acres, which averaged \$4.98 per acre. The highest bid was \$18.50 per acre by Makoil, Inc., of Las Vegas, NV, for Parcel 39 consisting of 1,280 acres covering the S/2 of section 21, the S/2 of section 22, and all of section 25, T10N, R57E in Nye County. The second highest bid was \$14.00 per acre by Kirkwood Oil and Gas, LLC, of Casper, WY, for Parcel 40 consisting of 2,114 acres covering portions of sections 28, 29, 33, and 34, T10N, R57E, in Nye County. Eight parcels went for bids between \$4 and \$11 per acre and the remaining parcels for the \$2.00 per acre minimum (*IHS Drilling Wire, Four Corners Edition*, Section I, August 4, 2010; *IHS Drilling Wire, Newsletter Edition*, Section I, September 17, 2010).

The December 14, 2010, lease sale was cancelled.

True Oil Co. spudded their DY Federal 43-36 well (NDOM Permit 914) in Nye County on December 21, 2009, completed it to 6,521 feet on January 10, 2010, and then plugged and abandoned it. An oil show was reported in the form of black pinpoint oil dots and a rainbow of oil sheen on the shaker. The oil show was from between 3,565 and 3,589 feet in dolomite in a Devonian slide block.

Cabot Oil and Gas Corp. spudded their Lake Valley No. 10-29 well (NDOM Permit 915) in Lincoln County on September 6, 2010, completed it to 9,515 feet on October 10, 2010, and then plugged and abandoned it. Dead oil was reported in volcanic rock at about 5,960 feet. Between 7,330 and 7,665 feet a series of questionable shows were reported as generally consisting of faint yellow ring cuts in siltstone and limestone of the lower Chainman Shale.

According to the *IHS Drilling Wire*, Empire Petroleum Corp. of Tulsa, OK, drilled their Paradise Unit No. 2-12 well (NDOM Permit 916) in Gabbs Valley, northwestern Nye County, and then suspended operations after November 10, 2010. Their target was a Triassic section between 5,500 and 6,500 feet. However, because of lost circulation and very good oil shows, Empire attempted completion at 4,248 feet. Empire perforated the well along a zone of concentrated oil shows between

# Status of Nevada oil and gas production wells in 2010

This table gives the amount of oil and water produced and the number of production days in 2010. The sources of information include well records and statistics from the Nevada Division of Minerals. Status abbreviations with dates of the action where applicable: BBL-barrels; MCF-thousand cubic feet; N/A-not available; PA-plugged and abandoned; Prod-production; SI-shut-in; WD-water disposal

FIELD/OPERATOR/WELL	NEVADA PERMIT	DATE COMPLETED	STATUS	LOCATION	PRODUCTION OIL (BBL)	PRODUCTION WATER (BBL)	PRODUCTION GAS (MCF)	PRODUCTION DAYS
<b>EAGLE SPRINGS (Nye Co., 1954)</b>								
<b>Berry Petroleum Co.</b>								
Eagle Springs Federal No. 44-35	813	05/98	SI 2004	SE/4, NW/4, S35, T9N, R57E	0	0		0
Eagle Springs Federal No. 54-35	726	10/94	Prod	SW/4, NE/4, S35, T9N, R57E	5,478	37,742		342
Eagle Springs Unit No. 1-34	107	07/67	SI 1986	SE/4, NE/4, S34, T9N, R57E	0	0		0
Eagle Springs Unit No. 1-35	4	05/54	WD 1978	NE/4, NW/4, S35, T9N, R57E				
Eagle Springs Unit No. 1-36	76	02/65	SI 2008	SW/4, NE/4, S36, T9N, R57E	0	0		0
Eagle Springs Unit No. 2-36	80	07/65	Prod; SI 1996-2006	NW/4, SE/4, S36, T9N, R57E	5,689	105,766		358
Eagle Springs Unit No. 4-36	86	10/65	SI 1997	NW/4, SE/4, S36, T9N, R57E	0	0		0
Eagle Springs Unit No. 5-36	94	04/66	Prod	NW/4, NE/4, S36, T9N, R57E	6,397	63,190		361
Eagle Springs Unit No. 15-35	21	07/55	Prod; SI 1995-2002	NW/4, SW/4, S35, T9N, R57E	1,522	12,156		296
Eagle Springs Unit No. 35-35	17	03/55	Prod	NE/4, SW/4, S35, T9N, R57E	1,691	13,623		339
Eagle Springs Unit No. 43-36	83	08/65	Prod	NE/4, SE/4, S36, T9N, R57E	501	5,390		293
Eagle Springs Unit No. 62-35	46	01/60	Prod	NW/4, NE/4, S35, T9N, R57E	725	8,562		280
Eagle Springs Unit No. 73-35	69	10/63	Prod	SE/4, NE/4, S35, T9N, R57E	5,951	75,370		361
Eagle Springs Unit No. 74-35	71	04/64	Prod; SI 1998-2001	SE/4, NE/4, S35, T9N, R57E	2,942	54,149		359
Eagle Springs Unit No. 84-35	77	01/65	SI 1997	SE/4, NE/4, S35, T9N, R57E	0	0		0
Eagle Springs/Plains Petroleum No. 13-36	744	02/96	Prod	SW/4, NW/4, S36, T9N, R57E	4,063	47,384		361
Eagle Springs/Plains Petroleum No. 23-36	733	10/95	Prod	SW/4, NW/4, S36, T9N, R57E	7,433	77,833		361
Eagle Springs/Plains Petroleum No. 24-36	737	11/94	Prod	SW/4, NW/4, S36, T9N, R57E	1,021	5,936		346
Eagle Springs/Plains Petroleum No. 55-35	761	11/95	SI 1997	SW/4, NE/4, S35, T9N, R57E	0	0		0
Eagle Springs/Plains Petroleum No. 64-35	755	09/95	Prod	SW/4, NE/4, S35, T9N, R57E	3,880	23,308		294
Eagle Springs/Plains Petroleum No. 82-35	734	10/94	Prod	NE/4, NE/4, S35, T9N, R57E	6,169	113,913		361
Eagle Springs/Plains Petroleum No. 83-35	754	07/95	Prod	SE/4, NE/4, S35, T9N, R57E	3,934	54,832		360
<b>TRAP SPRING (Nye Co., 1976)</b>								
J. N. Oil and Gas Federal No. 1	449	09/85	PA 1999	NE/4, NW/4, S34, T9N, R56E				
<b>Frontier Exploration Co.</b>								
Munson Ranch No. 13-1	435	08/85	Prod	SE/4, NW/4, S13, T9N, R56E	3,076	1,995		364
Munson Ranch No. 13-45	547	08/89	Prod	NW/4, SW/4, S13, T9N, R56E	1,728	3,768		363
Munson Ranch No. 13-46	548	07/89	SI 1992	NE/4, SW/4, S13, T9N, R56E	0	0		0
Munson Ranch No. 14-33	513	07/89	Prod	NW/4, SE/4, S14, T9N, R56E	1,194	2,624		352
Munson Ranch No. 14-49	550	08/89	Prod	NE/4, SE/4, S14, T9N, R56E	1,173	756		353
Munson Ranch No. 14-49X	562	02/90	Prod	NE/4, SE/4, S14, T9N, R56E	351	0		36
Trap Spring No. 14-42	523	10/88	Prod	SE/4, NE/4, S14, T9N, R56E	1,757	5,275		365
<b>Makoi, Inc.</b>								
Britton No. 13-21	224	04/78	SI 1991	NE/4, NW/4, S13, T9N, R56E	0	0		0
East Inselberg No. 36-33	860	04/05	Prod; SI 2006-2011	NW/4, SE/4, S36, T10N, R56E	79	856		54
Munson Ranch No. 12-14	688	05/95	Prod	SW/4, SW/4, S12, T9N, R56E	440	547		44
Munson Ranch No. 12-23	596	11/90	SI 1998	NE/4, SW/4, S12, T9N, R56E	0	0		0
Munson Ranch No. 12-24	432	04/85	Prod	SE/4, SW/4, S12, T9N, R56E	3,889	11,864		365
Munson Ranch No. 12-32	559	12/89	Prod	SW/4, NE/4, S12, T9N, R56E	6,701	32,492		344
Munson Ranch No. 12-33	423	03/85	SI 1996	NW/4, SE/4, S12, T9N, R56E	0	0		0
Munson Ranch No. 12-34	406	10/84	Prod	SW/4, SE/4, S12, T9N, R56E	3,250	3,318		362
Munson Ranch No. 12-42	572	06/90	PA 2008	SE/4, NE/4, S12, T9N, R56E	0	0		0
Munson Ranch No. 12-43	880	03/08	Prod	NE/4, SE/4, S12, T9N, R56E	29,005	230		352
Munson Ranch No. 12-44X	445	07/85	PA 2008	SE/4, SE/4, S12, T9N, R56E	0	0		0
Munson Ranch No. 13-11	622	11/91	SI 2003	NW/4, NW/4, S13, T9N, R56E	0	0		0
Munson Ranch No. 13-11R	840	11/01	Prod	NW/4, NW/4, S13, T9N, R56E	4,329	25,542		365
Munson Ranch No. 13-14	623	09/91	Prod; SI 2001-2006	SW/4, SW/4, S13, T9N, R56E	5,245	98,470		353
Munson Ranch No. 13-21X	640	05/92	Prod	NE/4, NW/4, S13, T9N, R56E	4,844	24,022		365
Munson Ranch No. 13-24	218	08/79	Prod	SE/4, SW/4, S13, T9N, R56E	266	117		37
Munson Ranch No. 13-31	382	07/84	Prod	NW/4, NE/4, S13, T9N, R56E	2,955	17,141		365
Munson Ranch No. 13-32	373	08/84	Prod	SW/4, NE/4, S13, T9N, R56E	5,992	44,855		365
Munson Ranch No. 13-33	211	11/78	Prod	NW/4, SE/4, S13, T9N, R56E	1,716	5,688		365
Munson Ranch No. 13-41X	448	09/85	Prod	NE/4, NE/4, S13, T9N, R56E	9,722	66,269		365
Munson Ranch No. 13-42	222	11/78	Prod	SE/4, NE/4, S13, T9N, R56E	1,742	84,900		365
Munson Ranch No. 14-23	313	08/81	Prod	NE/4, SW/4, S14, T9N, R56E	2,315	33,932		363
Munson Ranch No. 14-24	354	10/83	SI 1996	SE/4, SW/4, S14, T9N, R56E	0	0		0
Munson Ranch No. 14-32	455	09/87	Prod	SW/4, NE/4, S14, T9N, R56E	4,831	79,254		365
Munson Ranch No. 14-34	287	11/80	SI 2009	SW/4, SE/4, S14, T9N, R56E	0	0		122
Munson Ranch No. 14-34X	522	08/88	Prod	SW/4, SE/4, S14, T9N, R56E	2,736	11,184		365
Munson Ranch No. 14-41	538	07/89	Prod	NE/4, NE/4, S14, T9N, R56E	10,117	64,817		365
Munson Ranch No. 14-44	528	08/89	Prod	SE/4, SE/4, S14, T9N, R56E	3,276	101,500		362
Trap Spring No. 2	185	02/77	Prod	SE/4, SW/4, S27, T9N, R56E	8,309	383		319
Trap Spring No. 3	188	04/77	Prod	NW/4, NE/4, S34, T9N, R56E	12,278	956,185		318
Trap Spring No. 8	196	09/77	Prod	SE/4, SW/4, S23, T9N, R56E	916	206		104
Trap Spring No. 9	197	09/78	Prod	NW/4, NW/4, S26, T9N, R56E	22,746	354,304		365
Trap Spring No. 16	232	09/78	Prod	NW/4, SE/4, S23, T9N, R56E	2,400	248,540		364
Trap Spring No. 19	219	12/77	Prod	SE/4, NW/4, S23, T9N, R56E	13,913	8,353		365
Trap Spring No. 23-41	574	06/90	Prod	NE/4, NE/4, S23, T9N, R56E	2,007	220		355
Zuspann No. 24-1	198	06/77	SI 1986	NW/4, SW/4, S24, T9N, R56E	0	0		0
Zuspann No. 24-3	208	09/77	Prod	NE/4, NW/4, S24, T9N, R56E	54	0		12
<b>CURRENT (Nye Co., 1979)</b>								
<b>Makoi, Inc.</b>								
Current No. 1	241	10/78	Prod; SI 2005-2007	SE/4, SW/4, S26, T10N, R57E	109	2		14
<b>BACON FLAT (Nye Co., 1981)</b>								
<b>Breck Energy (Nevada), LLC</b>								
Bacon Flat No. 1	316	07/81	SI 1988	C, SW/4, S17, T7N, R57E	0	0		0
Bacon Flat Federal No. 23-17	657	09/92	SI 1993	NE/4, SW/4, S17, T7N, R57E	0	0		0
Bacon Flat Federal No. 23-17A	710	01/94	Prod	NE/4, SW/4, S17, T7N, R57E	6,169	5,331		295

FIELD/OPERATOR/WELL	NEVADA PERMIT	DATE COMPLETED	STATUS	LOCATION	PRODUCTION OIL (BBL)	PRODUCTION WATER (BBL)	PRODUCTION GAS (MCF)	PRODUCTION DAYS
<b>BLACKBURN (Eureka Co., 1983)</b>								
<b>Grant Canyon Oil and Gas, LLC</b>								
Blackburn No. 3	324	03/82	SI 1998	SW/4, SW/4, S8, T27N, R52E	0	0		0
Blackburn No. 10	350	09/83	Prod	SW/4, NW/4, S8, T27N, R52E	6,071	16,334		328
Blackburn No. 14	442	07/85	Prod; SI 2001-2008	NE/4, SE/4, S7, T27N, R52E	23,576	16,229		331
Blackburn No. 16	458	12/85	SI 2009	SE/4, NE/4, S7, T27N, R52E	0	0		0
Blackburn No. 18	660	11/92	Prod	NE/4, SE/4, S7, T27N, R52E	11,615	604,901		364
Blackburn No. 19	724	06/94	Prod	NW/4, SW/4, S8, T27N, R52E	14,617	776,299		361
Blackburn No. 21	802	09/97	Prod	NE/4, SE/4, S7, T27N, R52E	1,381	209,575		301
<b>GRANT CANYON (Nye Co., 1983)</b>								
Grant Canyon No. 4	376	07/84	PA 1992	NE/4, NW/4, S21, T7N, R57E				
Grant Canyon No. 5	400	08/84	PA 1995	E/2, NE/4, S20, T7N, R57E				
<b>Grant Canyon Oil and Gas, LLC</b>								
Grant Canyon No. 3	375	08/84	SI 1992	SW/4, SW/4, S16, T7N, R57E	0	0		0
Grant Canyon No. 7	625	08/91	Prod; SI 1993-2007	NW/4, NW/4, S21, T7N, R57E	36,271	281,470		355
Grant Canyon No. 9	642	04/92	Prod	NW/4, NW/4, S21, T7N, R57E	11,267	8,760		291
Grant Canyon No. 10	706	07/11	Prod; PA 1993-2010	NW/4, NW/4, S21, T7N, R57E	13,679	174,721		116
Grant Canyon No. 22-21	705	01/94	Prod	SE/4, NW/4, S21, T7N, R57E	7,502	244,967		340
<b>KATE SPRING (Nye Co., 1986)</b>								
<b>Makoil, Inc.</b>								
Kate Spring No. 12-2	544	08/89	Prod	NW/4, NW/4, S2, T8N, R57E	7,502	103,791	1,499	361
<b>Western General, Inc.</b>								
Kate Spring No. 1	436	01/86	Prod	W/2, SW/4, S2, T8N, R57E	5,600	50,000	281	N/A
Kate Spring No. 1A	560	12/89	Prod	NW/4, SW/4, S2, T8N, R57E	17,168	158,330	1,891	N/A
Kate Spring No. 1C	592	09/91	SI 1997	SW/4, SW/4, S2, T8N, R57E	0	0	0	0
Taylor Federal No. 1	497	10/87	Prod	NE/4, SE/4, S3, T8N, R57E	3,555	182,484	338	N/A
Taylor Federal No. 2	536	06/89	SI 1993	SE/4, NE/4, S3, T8N, R57E	0	0	0	0
<b>TOMERA RANCH (Eureka Co., 1987)</b>								
Tomera Ranch No. 33-1	591	10/90	PA 1997	SW/4, SW/4, S33, T31N, R52E				
Southern Pacific Land Co. No. 1-5R	647	05/92	PA 2007	NE/4, NE/4, S5, T30N, R52E				
Tomera Ranch No. 33-2RR	841	01/02	PA 2007	SW/4, SW/4, S33, T31N, R52E				
<b>Foreland Corp.</b>								
Southern Pacific Land Co. No. 1-5	492	08/87	WD 1992	NE/4, NE/4, S5, T30N, R52E				
<b>NORTH WILLOW CREEK (Eureka Co., 1988)</b>								
North Willow Creek No. 5-27	646	06/93	PA 1998	SE/4, NW/4, S27, T29N, R52E				
<b>Berry Petroleum Co.</b>								
North Willow Creek No. 6-27	648	09/93	SI 2008	NE/4, SW/4, S27, T29N, R52E	0	0		0
Southern Pacific Land Co. No. 1-27	633	01/92	SI 2002	NW/4, SE/4, S27, T29N, R52E	0	0		0
<b>THREE BAR (Eureka Co., 1990)</b>								
Three Bar Federal No. 24-13A	566	09/90	PA 2000	SW/4, SW/4, S24, T28N, R51E				
Three Bar Federal No. 5	679	07/93	PA 2001	SE/4, NE/4, S25, T28N, R51E				
Three Bar Federal No. 25-A	556	10/90	PA 2001	C, NE/4, S25, T28N, R51E				
<b>DUCKWATER CREEK (Nye Co., 1990)</b>								
<b>Makoil, Inc.</b>								
Duckwater Creek No. 19-11	542	03/90	Prod	NW/4, NW/4, S19, T9N, R57E	118	1,080		12
<b>SANS SPRING (Nye Co., 1993)</b>								
<b>Breck Energy (Nevada), LLC</b>								
Federal No. 5-14	635	02/93	SI 1998	SW/4, NW/4, S14, T7N, R56E				
Sans Springs No. 5-14A	792	05/97	Prod	SW/4, NW/4, S14, T7N, R56E	1,494	0		39
Federal No. 12-14	673	06/93	SI 1993	SW/4, SW/4, S14, T7N, R56E				
<b>GHOST RANCH (Nye Co., 1996)</b>								
<b>Makoil, Inc.</b>								
Ghost Ranch Springs No. 2-21X	800	08/97	Prod	NE/4, NW/4, S2, T8N, R57E	8,550	106,435		365
<b>Berry Petroleum Co.</b>								
Ghost Ranch Springs No. 38-35	793	01/97	Prod	SE/4, SW/4, S35, T9N, R57E	4,088	130,718		364
Ghost Ranch Springs No. 47-35	799	03/97	Prod	SE/4, SW/4, S35, T9N, R57E	5,489	172,662		364
Ghost Ranch Springs No. 48-35	779	07/96	Prod	SE/4, SW/4, S35, T9N, R57E	3,505	119,619		364
<b>DEADMAN CREEK (Elko Co., 1996)</b>								
Deadman Creek No. 44-13	342	01/96	PA 1998	SE/4, SE/4, S13, T39N, R65E				
<b>SAND DUNE (Nye Co., 1998)</b>								
<b>Berry Petroleum Co.</b>								
Sand Dune Federal No. 88-35	816	07/98	Prod	SE/4, SE/4, S35, T9N, R57E	3,687	37,398		363
<b>TOANO DRAW (Elko Co., 2007)</b>								
Toano Draw No. 15-19	856	12/06	PA 2008	NW/4, SW/4, S19, T39N, R66E				

## Nevada oil producers and refinery (Nevada Oil Patch; unpublished well files)

Company	Field/Refinery	Contact	Addresses, Phone and FAX Numbers, and Websites
Berry Petroleum Company	Eagle Springs Ghost Ranch North Willow Creek Sand Dune	Robert F. Heinemann	1999 Broadway, Suite 3700 Denver, CO 80202 Phone: 303-999-4400 FAX: 303-999-4401 Website: <a href="http://www.bry.com">http://www.bry.com</a>
Breck Energy (Nevada), LLC	Bacon Flat Sans Spring	Stephen Barnes	717 17th Street, No. 1400 Denver, CO 80202 Phone: 303-295-1906 FAX: 303-298-0049
Frontier Exploration Company	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 Ghost Ranch Kate Spring Trap Spring	Gregg Kozlowski	25391 Commercentre Drive, No. 120 Lake Forest, CA 92630 Phone: 949-462-9010 FAX: 949-462-9012 Website: <a href="http://www.makoil.com">http://www.makoil.com</a>
Grant Canyon Oil and Gas, LLC	Blackburn Grant Canyon	Michael O'Neal Rod Prosceno	717 17th Street, No. 1400 Denver, CO 80202 Phone: 303-297-2777
Western General	Kate Spring	Rick Taylor	801 Noahs Star Street Las Vegas, NV 89145-0609 Phone: 702-233-1490
Foreland Refining Corporation	Currant Refinery		HC 34 Box 34830 Ely, NV 89301 Phone: 775-863-0229

3,700 and 3,782 feet and recovered a small amount of 30-gravity oil. They drilled another 93 feet and encountered a large number of oil shows before losing circulation in an apparently highly fractured zone of volcanic rock (*IHS Drilling Wire, Southeastern Edition*, Section I, August 26, 2010; *IHS Drilling Wire, Four Corners Edition*, Section I, November 10, 2010).

### TRANSFERS

Effective March 5, 2010, Meritage Energy Corporation transferred ownership of its Nevada holdings to Berry Petroleum Corporation. Both companies have their main headquarters in Denver, CO, and Berry Petroleum Corporation also has regional headquarters in Bakersfield, CA. Effective November 22, 2010, Empire Petroleum Corporation, of Tulsa, OK, transferred ownership of the Paradise Unit No. 2-12 well to Desert Discoveries, LLC, of Carson City, NV.

On May 11, 2010, Desert Discoveries, LLC, entered into an option agreement granting American Liberty Petroleum Corp. of Bakersfield, CA, the option to purchase the former's interest in five oil and gas leases in Nye and Mineral Counties (<http://biz.yahoo.com/e/110701/oreo.ob8-k.html>).

### OTHER DEVELOPMENTS

In 2008, Ruby Pipeline, LLC, a subsidiary of the El Paso Corporation of Houston, TX, North America's largest pipeline company and a major natural gas producer, initiated cultural and environmental studies for its Ruby Pipeline Project. In 2009, an application was filed with the Federal Energy Regulatory Commission (FERC) for a certificate of convenience and necessity authorizing the construction and operation of the pipeline, and a draft environmental impact statement (EIS) was completed. In January 2010, a final EIS was completed followed by FERC's approval and

## Oil well drilling activity in 2010

Company	Well	Permit No.	Location	Permit Date	Spud Date	Completion Date	Depth (Ft.)	Status
<b>ELKO COUNTY</b>								
Rock Investment Group	Isaiah 16-1	912	SW/4, NW/4, S16, T34N, R54E	MAR 09				Not Drilled
Fasken Oil and Ranch, LP	Papoose Canyon 14 Federal No. 1	913	SE/4, SE/4, S14, T29N, R52E	OCT 09	MAY 10	AUG 10	8,894	P&A
<b>HUMBOLDT COUNTY</b>								
KBE Energy	Well No. 1	900	NE/4, NW/4, S10, T34N, R43E	APR 08	MAY 08		*5,500	TA
<b>LINCOLN COUNTY</b>								
Cabot Oil and Gas Corp.	Lake Valley No. 10-29	915	NW/4, NW/4, S29, T8N, R66E	APR 10	SEP 10	OCT 10	9,515	P&A
<b>NYE COUNTY</b>								
Breck Energy (Nevada), LLC	Federal No. 12-14	673	NW/4, SW/4, S14, T7N, R56E	APR 93	MAY 93	JUN 93	6,106	TA
Grant Canyon Oil and Gas, LLC	Grant Canyon No. 10	706	NW/4, NW/4, S21, T7N, R57E	SEP 93	JAN 10 R	FEB 10	6,150	Producer
Wester Oil Co.	Gigante No. 1-4	837	NW/4, NE/4, S4, T12N, R35E	MAY 01	AUG 01	DEC 03	7,707	TA
Tri Valley Oil and Gas	Midland Trail No. 1-32	861	SW/4, SW/4, S32, T6N, R56E	SEP 04	JUN 05	JAN 06	7,063	Testing
Makoil, Inc.	Radio No. 6-31	865	NE/4, NW/4, S6, T9N, R57E	SEP 04	MAY 05	MAY 05	3,433	Drilled
V. F. Neuhaus Properties, Inc.	Currant Creek Ranch 31-1	872	SE/4, SW/4, S31, T10N, R57E	JUL 05	JUL 05		*2,200	TA
Petro World Nevada Corp.	Cobble Questa No. 1-12	876	NW/4, SE/4, S12, T12N, R34E	DEC 05	SEP 06	APR 07	5,200	Shut in
Makoil Inc.	Trap Spring No. 27-41	899	NE/4, NE/4, S27, T9N, R56E	APR 08	DEC 08	JAN 09	7,294	Idle
Richardson Operating	RR Valley Federal No. 2	906	SW/4, SW/4, S1, T7N, R55E	SEP 08				Expired
Richardson Operating	RR Valley Federal No. 3	907	SW/4, SW/4, S23, T7N, R56E	SEP 08				Expired
Makoil Inc.	Munson Ranch No. 13-34	910	SW/4, SE/4, S13, T9N, R56E	DEC 08				Expired
Makoil Inc.	Munson Ranch No. 12-23X	911	NE/4, SW/4, S12, T9N, R56E	DEC 08				Not Drilled
True Oil, LLC	DY Federal 43-36	914	NE/4, SE/4, S36, T7N, R56E	NOV 09	DEC 09	JAN 10	6,521	P&A
Desert Discoveries, LLC	Paradise Unit No. 2-12	916	S12, T12N, R34E	APR 10	JUL 10	NOV 10	*6,000	Drilled
Geyser Petroleum	Santa Maria de Los Angeles No. 2	917	NE/4, SW/4, S32, T10N, R57E	JUL 10				Not Drilled
<b>PERSHING COUNTY</b>								
Evans-Barton Ltd.	Kyle Spring No. 12-13D	759	NW/4, SW/4, S12, T29N, R36E	JUL 95	JUL 95	AUG 95	1,000	Testing
Evans-Barton Ltd.	Kyle Spring No. 11-42A	838	NE/4, SE/4, S11, T29N, R36E	JUL 01	AUG 01		*625	Testing
Evans-Barton, Ltd	Kyle Spring No. 12-12	868	SW/4, NW/4, S12, T29N, R36E	OCT 04	DEC 04	NR	905	P&A
<b>WHITE PINE COUNTY</b>								
Geyser Petroleum	Pipeline Canyon No. 1	870	NE/4, SW/4, S28, T15N, R62E	JAN 05	MAR 05	SEP 05	5,280	Drilled
Makoil, Inc.	Cabin Spring No. 18-44	905	SE/4, SE/4, S18, T21N, R59E	SEP 08				Expired
Emergent Value Group, LLC	FLT-1	918	NE/4, NW/4, S11, T16N, R55E	OCT 10				Not Drilled

P&A: Plugged and abandoned, TA: Temporarily abandoned, \*: Permitted depth given when the actual depth is not available, NR: Not reported, R: Redrilled

certification of the project in April and the beginning of construction at the end of July. The Ruby Pipeline went into service on July 28, 2011. It is a 680-mile, 42-inch pipeline carrying natural gas from the Opal Hub, WY, to the Malin, OR, interconnect where it supplies Nevada and west coast markets. The summertime capacity is between 1.2 and 1.5 billion cubic feet per day. The pipeline crosses into Nevada from Utah approximately near Tecoma, passes through Elko County north of Wells and Elko and Humboldt County north of Winnemucca and the Black Rock Wilderness and south of the Sheldon National Refuge, and crosses into Oregon near the far northwest corner of Washoe County (<http://www.rubypipeline.com>).

In 2009, the BLM solicited for the nomination of parcels to be leased for Research, Development, and Demonstration of oil shale recovery technologies in the states of Colorado, Utah, and Wyoming (*Federal Register*, vol. 74, no. 211, Tuesday, November 3, 2009, p. 56867-56869). In early 2010, the BLM received two nominations for parcels in Colorado and one in

Utah

([http://www.blm.gov/wo/st/en/info/newsroom/2010/october/NR\\_10\\_13\\_2010b.html](http://www.blm.gov/wo/st/en/info/newsroom/2010/october/NR_10_13_2010b.html)). Though the solicitation is specific to Colorado, Wyoming, and Utah, it should be noted that northeastern Nevada has an estimated 600 million barrels of shale oil in the lacustrine Eocene Elko Formation (12,000 barrels were produced between 1917 and 1924) and a potentially large but unestimated resource in related rocks (L. J. Garside, 1983, *Nevada Oil Shale*, Nevada Bureau of Mines and Geology Open-File report 83-5; S. W. Moore, H. B. Madrid, and G. T. Server, Jr., 1982, *Results of Oil-Shale Investigations In Northeastern Nevada*, U.S. Mineral Management Service Administrative Report; G. T. Server, Jr., and B. J. Solomon, 1983, *Geology and Oil Shale Deposits of the Elko Formation, Pinion Range, Elko County, Nevada*, U.S. Geological Survey Map MF-1546; B. J. Solomon and S. W. Moore, 1982, *Geology and Oil Shale Deposits of the Elko West Quadrangle, Elko County, Nevada*, U.S. Geological Survey Map MF-1410; B. J. Solomon

## Federal oil and gas leases in effect in fiscal years 2009 and 2010<sup>1</sup>

County	NUMBER OF LEASES						ACREAGE					
	Competitive		Noncompetitive		Simultaneous <sup>2</sup>		Competitive		Noncompetitive		Simultaneous <sup>2</sup>	
	FY09	FY10	FY09	FY10	FY09	FY10	FY09	FY10	FY09	FY10	FY09	FY10
Carson City	0	0	0	0	0	0	0	0	0	0	0	0
Churchill	2	2	0	0	0	0	5,100	5,100	0	0	0	0
Clark	0	0	1	1	0	0	0	0	480	480	0	0
Douglas	0	0	0	0	0	0	0	0	0	0	0	0
Elko	196	190	283	215	0	0	303,753	299,717	693,924	475,282	0	0
Esmeralda	19	19	6	6	0	0	37,625	37,625	10,812	10,812	0	0
Eureka	134	131	65	58	0	0	236,531	220,838	220,606	168,999	0	0
Humboldt	0	0	0	0	0	0	0	0	0	0	0	0
Lander	0	0	0	0	0	0	0	0	0	0	0	0
Lincoln	43	48	38	74	0	0	81,837	90,464	74,264	238,193	0	0
Lyon	0	0	0	0	0	0	0	0	0	0	0	0
Mineral	2	2	9	8	0	0	4,149	4,149	24,120	14,235	0	0
Nye	284	268	170	172	20	20	299,518	274,987	406,301	403,058	7,998	7,998
Pershing	0	0	0	0	0	0	0	0	0	0	0	0
Storey	0	0	0	0	0	0	0	0	0	0	0	0
Washoe	0	0	0	0	0	0	0	0	0	0	0	0
White Pine	157	152	365	364	0	0	274,752	264,753	834,326	797,807	0	0
<b>Total</b>	<b>837</b>	<b>812</b>	<b>937</b>	<b>898</b>	<b>20</b>	<b>20</b>	<b>1,243,265</b>	<b>1,197,633</b>	<b>2,264,833</b>	<b>2,108,866</b>	<b>7,998</b>	<b>7,998</b>

<sup>1</sup>Data from the U.S. Bureau of Land Management. Fiscal years (FY) run from October 1 through September 30.

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

and S. W. Moore, 1982, *Geology and Oil Shale Deposits of the Elko East Quadrangle, Elko County, Nevada*, U.S. Geological Survey Map MF-1421).

The U.S. Securities and Exchange Commission (SEC) passed a new set of reporting rules for oil companies that took effect in January 2010. The rules were published in the *Federal Register*, vol. 74, no. 9, Wednesday, January 14, 2009, p. 2158-2197, *Modernization of Oil and Gas Reporting*. They are also discussed in Industry Guide 2, which can be viewed at <http://www.sec.gov/about/forms/industryguides.pdf>, and in *Oil and Gas Reporting Modernization - A Small Entity Compliance Guide*, which can be viewed at <http://www.sec.gov/info/smallbus/secg/oilgasreporting-secg.htm>.

### U.S. OIL PRODUCTION AND CONSUMPTION

According to the Energy Information Agency of the U.S. Department of Energy

(<http://www.eia.doe.gov>), the total petroleum products supplied to the U.S. averaged 19.2 million barrels per day in 2010, up 2.2% from 18.8 million barrels per day in 2009 but still down 7.7% from the all time high of 20.8 million barrels per day in 2005. Domestic crude oil production averaged 5.47 million barrels per day in 2010, up 2.1% from 5.36 million barrels per day in 2009. The annual production for 2010 is the highest since 2003 and the first time since the early 1980s that production has increased two years in a row. Prior to 2003, the last time production was lower than in 2010 was 1950 when production was 5.41 million barrels per day. Imported crude oil averaged 9.21 million barrels per day in 2010, up 2.2% from 9.01 million barrels per day in 2009, but still down 9.1% from the all time high of 10.13 million barrels per day in 2005. Imported crude oil accounted for 62.7% of the total in 2010, the same as in 2009. The average price of domestic oil increased 28% to \$79.61 per barrel in 2010 from an average of \$62.09 per barrel in 2009.

# Directory of Mining and Milling Operations

By David A. Davis

Compiled from information supplied by the Nevada Div. of Minerals, Mine Safety and Training Section of the Div. of Industrial Relations, and companies. Except for larger BLM community pits, aggregate operations with less than 100,000 tons annual production are not listed.  
 CIL: carbon-in-leach, CIP: carbon-in-pulp, HL: heap leach, ML: mill, N/A: not available, OP: open-pit mine, OS: other surface, PL: placer, UG: underground

Mine/Mill Name	Operator	Location	Commodity	Type	Activity	Company/ Contract Employees	Address
<b>CARSON CITY</b>							
Black and Red Cinder Pits	Cinderlite Trucking, Inc.	S21, 22, T16N, R20E	cinder decorative stone	OP, ML	mining screening	2	1665 South Sutro Terrace Carson City, NV 89706 Phone: 775-882-4483 FAX: 775-882-1671 Web: <a href="http://www.cinderlite.com">http://www.cinderlite.com</a>
Goni Pit	Cinderlite Trucking Corp.	S28, T16N, R20E	decomposed granite sand gravel	OP, ML	mining crushing screening	6	1665 South Sutro Terrace Carson City, NV 89706 Phone: 775-882-4483 FAX: 775-882-1671 Web: <a href="http://www.cinderlite.com">http://www.cinderlite.com</a>
<b>CHURCHILL COUNTY</b>							
Hazen Pit	A and K Earthmovers	S3, T19N, R26E	aggregate sand	OP, ML	mining crushing screening	7	515 Windmill Rd. Fallon, NV 89406 Phone: 775-423-6085 FAX: 775-423-8410 Web: <a href="http://www.akearthmovers.com">http://www.akearthmovers.com</a>
Huck Salt	Huck Salt Co.	S11, 12, 13, T16N, R31E; S7, T16N, R32E	salt	OS	mining evaporation	9	2900 Phritzie Lane Fallon, NV 89406 Phone: 775-423-2055 FAX: 775-423-0467
Moltan Mine and Plant	Moltan Company, LP	S28, 32, T23N, R27E	diatomite	OP, ML	mining crushing drying packaging screening	44	P. O. Box 860 I-80 Frontage Rd. Fernley, NV 89408-0860 Phone: 775-423-6668 FAX: 775-423-6411 Web: <a href="http://www.moltan.com">http://www.moltan.com</a>
Nevada Cement Mine	Nevada Cement Co.	S34, T25N, R28E	limestone	OP	mining	2	P. O. Box 840 Fernley, NV 89408 Phone: 775-575-2281 FAX: 775-575-4387 Web: <a href="http://www.eaglematerials.com">http://www.eaglematerials.com</a>
Nightingale Pit	World Minerals, Inc.	S17, 18, 19, 20, T24N, R26E	diatomite	OP	mining	2	100 Front St. Fernley, NV 89408 Phone: 775-575-2536 FAX: 775-575-1570 Web: <a href="http://www.worldminerals.com">http://www.worldminerals.com</a>
Popcorn Mine	EP Minerals, LLC	S24, T16N, R28E; perlite S19, T16N, R29E		OP	mining	1	640 Clark Station Rd. Sparks, NV 89434 Phone: 775-824-7700 FAX: 775-824-7715 Web: <a href="http://www.epminerals.com">http://www.epminerals.com</a>
Salt Wells/ Eetza Mountain Community Pits	Various (U.S. Bureau of Land Management manages pit)	S27, 28, 34, T18N, R30E	sand gravel	OP	mining	N/A	Bureau of Land Management 5665 Morgan Mill Rd. Carson City, NV 89701 Phone: 775-885-6000 Web: <a href="http://www.blm.gov">http://www.blm.gov</a>
<b>CLARK COUNTY</b>							
Apex Landfill Pit	Las Vegas Paving Corp.	S19, T18S, R64E	sand gravel	OP, ML	mining crushing screening	30/1	4420 South Decatur Blvd. Las Vegas, NV 89103 Phone: 702-251-5800 FAX: 702-251-1968 Web: <a href="http://www.lasvegapaving.com">http://www.lasvegapaving.com</a>
Apex Quarry and Plant	Lhoist North America	S14, 22, 23, 26, 27, 34, 35, T18S, R63E	limestone	OP, ML	mining calcining crushing screening	119	P. O. Box 363068 North Las Vegas, NV 89036 Phone: 702-643-7702 FAX: 702-643-9517 Web: <a href="http://www.lhoist.us">http://www.lhoist.us</a>

# Directory of Mining and Milling Operations (continued)

Mine/Mill Name	Operator	Location	Commodity	Type	Activity	Company/ Contract Employees	Address
Blue Diamond Pit	Las Vegas Paving Corp.	S26, T22S, R60E	sand gravel	OP, ML	mining crushing screening	10	4420 South Decatur Blvd. Las Vegas, NV 89103 Phone: 702-251-5800 FAX: 702-251-1968 Web: <a href="http://www.lasvegaspaving.com">http://www.lasvegaspaving.com</a>
Boulder Ranch Quarry	Quarry 187, LLC	S15, 22, T23S, R63E	sand gravel	OP, ML	mining crushing screening	2	250 Pilot Rd., Suite No. 160 Las Vegas, NV 89120 Phone: 702-597-1010 FAX: 702-597-3406 Web: <a href="http://www.impactsandandgravel.com">http://www.impactsandandgravel.com</a>
Georgia-Pacific Gypsum Plant	Georgia-Pacific Gypsum, LLC	S34, 35, T18S, R63E	gypsum	ML	crushing	99	P. O. Box 337350 11401 U. S. Highway 91 North Las Vegas, NV 89033 Phone: 702-643-8100 FAX: 702-643-2049 Web: <a href="http://www.gp.com">http://www.gp.com</a>
Henderson Community Pits	Various (U.S. Bureau of Land Management manages pit)	S14, T21S, R62E	sand gravel	OP	mining	N/A	Bureau of Land Management 4701 North Torrey Pines Dr. Las Vegas, NV 89130-2301 Phone: 702-515-5000 Web: <a href="http://www.blm.gov">http://www.blm.gov</a>
Henderson Plant	Lhoist North America	S12, T22S, R62E	lime	ML	calcining	20	P. O. Box 127 BMI Complex 8000 West Lake Mead Dr. Henderson, NV 89015 Phone: 530-878-7368 Phone: 530-878-7368 Web: <a href="http://www.lhoist.us">http://www.lhoist.us</a>
Jericho Pit	Vista Landscape Center	S2, 3, T23S, R63E	landscape rock	OP, ML	mining crushing screening	N/A	951 Wigwam Pkwy. Henderson, NV 89014 Phone: 702-565-6611 FAX: 702-566-5118 Web: <a href="http://www.vistalandscape.com">http://www.vistalandscape.com</a>
KMI Zeolite Plant	KMI Zeolite, Inc.	S3, T25S, R57E	zeolite	ML	processing	4	HCR 37 Box 52 3100 East Sandy Valley Road Sandy Valley, NV 89019 Phone: 702-723-5415 Web: <a href="http://www.kmizeolite.com">http://www.kmizeolite.com</a>
Lone Mountain	Impact Sand and Gravel	S24, 36, T19S, R59E	sand gravel	OP, ML	mining crushing screening	30	250 Pilot Rd., Suite No. 160 Las Vegas, NV 89120 Phone: 702-597-1010 FAX: 702-597-3406 Web: <a href="http://www.impactsandandgravel.com">http://www.impactsandandgravel.com</a>
Lone Mountain	Las Vegas Paving Corp.	S35, 36, T19S, R59E; S2, T20S, R60E	sand gravel	OP, ML	mining crushing screening	6	4420 South Decatur Blvd. Las Vegas, NV 89103 Phone: 702-251-5800 FAX: 702-251-1968 Web: <a href="http://www.lasvegaspaving.com">http://www.lasvegaspaving.com</a>
Lone Mountain	Nevada Ready Mix Corp.	S36, T19S, R59E	sand gravel	OP, ML	mining crushing screening	80	601 West Bonanza Las Vegas, NV 89106 Phone: 702-457-1115 Web: <a href="http://www.nevadareadymix.com">http://www.nevadareadymix.com</a>
Lone Mountain Community Pit	Various (U.S. Bureau of Land Management manages pit)	S36, T19S, R59E; S1, T20S, R59E	sand gravel	OP	mining	N/A	Bureau of Land Management 4701 North Torrey Pines Dr. Las Vegas, NV 89130-2301 Phone: 702-515-5000 Web: <a href="http://www.blm.gov">http://www.blm.gov</a>
Mesquite Community Pit	Various (U.S. Bureau of Land Management manages pit)	S20, T13S, R71E	sand gravel	OP	mining	N/A	Bureau of Land Management 4701 North Torrey Pines Dr. Las Vegas, NV 89130-2301 Phone: 702-515-5000 Web: <a href="http://www.blm.gov">http://www.blm.gov</a>
Mesquite Community Pit	Rees's Enterprise	S20, T13S, R71E	sand gravel	OP, ML	mining crushing screening	5	1045 South Hoytsville Road Coalville, UT 84017-9741 Phone: 801-359-9781

## Directory of Mining and Milling Operations (continued)

Mine/Mill Name	Operator	Location	Commodity	Type	Activity	Company/ Contract Employees	Address
North Jean Community Pit	Various (U.S. Bureau of Land Management manages pit)	S15, 22, T24S, R60E	sand gravel	OP	mining	N/A	Bureau of Land Management 4701 North Torrey Pines Dr. Las Vegas, NV 89130-2301 Phone: 702-515-5000 Web: <a href="http://www.blm.gov">http://www.blm.gov</a>
NV Energy Pit	NV Energy, Inc.	S7, T24S, R66E	sand gravel	OP, ML	mining	N/A	1737 Hankins Dr. North Las Vegas, NV 89030 Phone: 702-402-5555 Web: <a href="http://www.nvenergy.com">http://www.nvenergy.com</a>
PABCO Gypsum-Apex Pit	Pacific Coast Building Products, Inc.	S7, 18, T20S, R64E	gypsum	OP, ML	mining crushing washing	92/1	P. O. Box 364329 North Las Vegas, NV 89036 Phone: 702-407-3700 FAX: 702-643-6249 Web: <a href="http://www.paccoast.com">http://www.paccoast.com</a>
Pioneer Gypsum Mine	Pioneer Gypsum Mining Co.	S19, 20, 29, 30, T20S, R64E	gypsum	OP, ML	mining crushing screening	8/1	4880 Donovan Way North Las Vegas, NV 89081 Phone: 702-399-5939 FAX: 702-399-8353
Rainbow Quarries	Las Vegas Rock, Inc.	S34, T25S, R58E	gravel stone	OP, ML	mining crushing sawing	11	2 Prison Rd. P. O. Box 19118 Jean, NV 89019 Phone: 702-791-7625 FAX: 702-874-1881 Web: <a href="http://www.vegasrock.com">http://www.vegasrock.com</a>
Salt Lake Highway Pit	Various (U.S. Bureau of Land Management manages pit)	S13, 24, T19S, R62E; S17, 18, 19, T19S, R63E	sand gravel	OP	mining	N/A	Bureau of Land Management 4701 North Torrey Pines Dr. Las Vegas, NV 89130-2301 Phone: 702-515-5000 Web: <a href="http://www.blm.gov">http://www.blm.gov</a>
Searchlight Pit	Vista Landscape Center	S15, 22, T28S, R63E	landscape rock	OP, ML	mining crushing washing	0/3	951 Wigwam Pkwy. Henderson, NV 89014 Phone: 702-565-6611 FAX: 702-566-5118 Web: <a href="http://www.vistalandscape.com">http://www.vistalandscape.com</a>
Sierra Ready Mix Quarry	Sierra Ready Mix, LLC	S6, 7, T25S, R60E	sand gravel	OP, ML	mining crushing screening	3	4150 Smily Rd. North Las Vegas, NV 89081 Phone: 702-664-3000 FAX: 702-664-1736 Web: <a href="http://www.sierrareadymix.com">http://www.sierrareadymix.com</a>
Simplot Silica Products Pit	J. R. Simplot Co.	S11, T17S, R67E	silica sand	OP, ML	mining drying flotation screening	35	P. O. Box 308 Overton, NV 89040 Phone: 702-397-2667 FAX: 702-397-2798 Web: <a href="http://www.simplot.com">http://www.simplot.com</a>
Sloan Quarry and Mill	Aggregate Industries	S13, T23S, R60E	sand gravel	OP, OS, ML	mining crushing screening	43	3101 East Craig Rd. North Las Vegas, NV 89030 Phone: 702-649-6250 FAX: 702-642-2213 Web: <a href="http://www.aggregate-us.com">http://www.aggregate-us.com</a>
South Jean Community Pit	Various (U.S. Bureau of Land Management manages pit)	S28, 33, T25S, R60E	sand gravel	OP	mining	N/A	Bureau of Land Management 4701 North Torrey Pines Dr. Las Vegas, NV 89130-2301 Phone: 702-515-5000 Web: <a href="http://www.blm.gov">http://www.blm.gov</a>
Speedway Pit	American Sand and Gravel, LLC	S24, T19S, R62E	sand gravel	OP, ML	mining gravity	12	5260 Beesley Dr. Las Vegas, NV 89115 Phone: 702-452-1900 FAX: 702-651-0375 Web: <a href="http://americansandandgravel.com">http://americansandandgravel.com</a>
Speedway Pit	Various (U.S. Bureau of Land Management manages pit)	S24, T19S, R62E; S19, T19S, R63E	sand gravel	OP	mining	N/A	Bureau of Land Management 4701 North Torrey Pines Dr. Las Vegas, NV 89130-2301 Phone: 702-515-5000 Web: <a href="http://www.blm.gov">http://www.blm.gov</a>

# Directory of Mining and Milling Operations (continued)

Mine/Mill Name	Operator	Location	Commodity	Type	Activity	Company/ Contract Employees	Address
Spring Mountain Pit and Mill	Wells Cargo, Inc.	S10, 15; T21S, R60E	sand gravel	OP, ML	mining gravity	6	P. O. Box 81170 7770 West Spring Mountain Rd. Las Vegas, NV 89160 Phone: 702-876-5090 FAX: 702-876-3977 Web: <a href="http://www.wciv.com">http://www.wciv.com</a>
DOUGLAS COUNTY							
Bing Materials Pit and Mill	Bing Materials Co.	S16, T12N, R20E	sand gravel	OP, ML	mining crushing screening	9	P. O. Box 487 Minden, NV 89423 Phone: 775-265-3641
ELKO COUNTY							
Big Ledge Mine and Dry Creek Jig Plant	National Oilwell Varco	S26, T42N, R61E	barite	OP, ML	mining gravity jigging	14/15	P. O. Box 900 Wells, NV 89935 Phone: 775-752-2300 FAX: 775-752-2303 Web: <a href="http://www.nov.com">http://www.nov.com</a>
Elburz Pit	Vega Construction and Trucking Co.	S9, T33N, R52E	sand gravel	OP, ML	mining crushing screening	24	P. O. Box 1630 Elko, NV 89803 Phone: 775-738-5381 FAX: 775-738-6311
Hollister Mine	Rodeo Creek Gold, Inc., and Great Basin Gold, Inc.	S4, 5, T37N, R48E; S32, T38N, R48E	gold silver	UG	mining	192/67	P. O. Box 2610 Winnemucca, NV 89446 Phone: 775-623-6912 FAX: 775-623-5767 Web: <a href="http://www.greatbasingold.com">http://www.greatbasingold.com</a>
Jerritt Canyon Mine	Yukon-Nevada Gold Corp.	T39-41N, R52-54E	gold silver mercury	UG, ML, CIL	mining heap leach milling roasting	188	HC31 Box 78 Elko, NV 89801 Phone: 775-738-5006 FAX: 775-758-9231 Web: <a href="http://www.yukon-nevadagold.com">http://www.yukon-nevadagold.com</a>
Meikle Mine	Barrick Goldstrike Mines, Inc.	S12, 13, T36N, R50E	gold silver	UG, ML	mining milling roasting	568	P. O. Box 29 Elko, NV 89803 Phone: 775-778-8858 FAX: 775-778-8865 Web: <a href="http://www.barrick.com">http://www.barrick.com</a>
Midas Mine	Newmont Mining Corp.	S21, 22, 27, 28, 33, 34; T39N, R46E	gold silver	UG, ML	mining milling	256/47	HC66 Box 125 Midas, NV 89414 Phone: 775-635-6423 FAX: 775-635-6460 Web: <a href="http://www.newmont.com">http://www.newmont.com</a>
Pilot Peak Quarry and Plant	Graymont Western US., Inc.	S14, 15, 22, 23, 26, T34N, R68E	limestone	OP, ML	mining calcining rotary kiln	54/1	P. O. Box 2520 West Wendover, NV 89883 Phone: 775-483-5463 FAX: 775-483-5149 Web: <a href="http://www.graymont.com">http://www.graymont.com</a>
Rossi Mine	BAROID/Halliburton Energy Services, Inc.	S14-16, 21-23, 26-28, 34-35, T37N, R49E	barite	OP, ML	mining	36/58 (Mine and plant combined)	912 Dunphy Ranch Rd. Battle Mountain, NV 89820 Phone: 775-468-0515 FAX: 775-468-2060 Web: <a href="http://www.halliburton.com">http://www.halliburton.com</a>
Storm Mine	Barrick Goldstrike Mines, Inc.	S12, 13, T36N, R49E	gold	UG, ML	mining roasting	7	P. O. Box 29 Elko, NV 89803 Phone: 775-778-8858 FAX: 775-778-8865 Web: <a href="http://www.barrick.com">http://www.barrick.com</a>
ESMERALDA COUNTY							
Basalt Plant	Grefco Minerals, Inc.	S29, T2N, R34E	diatomite	OP, ML	drying milling	8	36994 Summit Lake Rd. Burney, CA 96013 Phone: 775-573-2422 FAX: 775-573-2422 Web: <a href="http://www.dicalite.com">http://www.dicalite.com</a>

# Directory of Mining and Milling Operations (continued)

Mine/Mill Name	Operator	Location	Commodity	Type	Activity	Company/ Contract Employees	Address
Blanco Mine	Vanderbilt Minerals Corp.	S22, T1N, R37E	clay	OP	bagging grinding screening	4	3561 East Burgundy Dr. P. O. Box 6660 Pahrump, NV 89048 Phone: 775-537-6976 FAX: 775-537-6879 Web: <a href="http://www.rtvanderbilt.com">http://www.rtvanderbilt.com</a>
Silver Peak Operations	Chemetall Foote Corp.	T2S, R39-40E	lithium carbonate	OS, ML	mining evaporation precipitation	50/8	P. O. Box 98 Silver Peak, NV 89047 Phone: 775-937-2222 FAX: 775-937-2250 Web: <a href="http://www.chemetall.com">http://www.chemetall.com</a>
<b>EUREKA COUNTY</b>							
Betze/Post Mine	Barrick Goldstrike Mines, Inc.	S23-26, T36N, R49E; S12, 20, 29, 30; T36N, R50E	gold	OP, CIL, HL, ML	mining heap leach milling roasting	1003	P. O. Box 29 Elko, NV 89803 Phone: 775-778-8858 FAX: 775-778-8865 Web: <a href="http://www.barrick.com">http://www.barrick.com</a>
Carlin North - Genesis Complex	Newmont Mining Corp.	S33, T36N, R50E	gold	OP, HL, ML	mining bioleaching heap leach milling roasting	1941 (Combined Newmont Carlin Trend Operations)	1655 Mountain Hwy. Elko, NV 89801 Phone: 775-778-4000 FAX: 775-778-4751 Web: <a href="http://www.newmont.com">http://www.newmont.com</a>
Carlin North - Post and adjacent mines	Newmont Mining Corp.	S19, T36N, R50E	gold	OP, HL, ML	mining bioleaching heap leach milling roasting	1941 (Combined Newmont Carlin Trend Operations)	1655 Mountain Hwy. Elko, NV 89801 Phone: 775-778-4000 FAX: 775-778-4751 Web: <a href="http://www.newmont.com">http://www.newmont.com</a>
Carlin South - Carlin and adjacent mines	Newmont Mining Corp.	S14, T35N, R50E	gold	UG, HL, ML	mining bioleaching heap leach milling roasting	1941 (Combined Newmont Carlin Trend Operations)	1655 Mountain Hwy. Elko, NV 89801 Phone: 775-778-4000 FAX: 775-778-4751 Web: <a href="http://www.newmont.com">http://www.newmont.com</a>
Carlin South - Gold Quarry and adjacent mines	Newmont Mining Corp.	S3, T33N, R51E	gold	OP, HL, ML	mining bioleaching heap leach milling roasting	1941 (Combined Newmont Carlin Trend Operations)	1655 Mountain Hwy. Elko, NV 89801 Phone: 775-778-4000 FAX: 775-778-4751 Web: <a href="http://www.newmont.com">http://www.newmont.com</a>
Dunphy Mill	BAROID/Halliburton Energy Services, Inc.	S26, T33N, R48E	barite	ML	crushing gravity grinding	36/58 (Mine and plant combined)	912 Dunphy Ranch Rd. Battle Mountain, NV 89820 Phone: 775-468-0515 FAX: 775-468-2060 Web: <a href="http://www.halliburton.com">http://www.halliburton.com</a>
Nevada Barth Iron Mine and Mill	Saga Exploration Co.	S7, T31N, R51E	iron	OP, ML	screening	3	2339 Dickerson Road Reno, NV 89503 Phone: 775-322-9994
Ruby Hill Mine	Barrick Goldstrike Mines, Inc.	S9-11, 14, 15, T19N, R53E	gold silver	OP, CIL, CIP, HL, ML	heap leach milling	128/11	P. O. Box 676 Eureka, NV 89316 Phone: 775-237-6060 FAX: 775-237-5408 Web: <a href="http://www.barrick.com">http://www.barrick.com</a>
<b>HUMBOLDT COUNTY</b>							
Ashdown Mine	Win-Eldrich Mines, Ltd.	S14, T45N, R29E	molybdenum gold	UG, ML	mining flotation milling	35	P. O. Box 210 Denio, NV 89404 Phone: 775-941-0274 FAX: 775-941-0271 Web: <a href="http://www.win-eldrich.com">http://www.win-eldrich.com</a>
Bonanza Opal Mine	Bonanza Opal Mines, Inc.	S6, 7, T45N, R26E	precious opal	OP	mining	1	P. O. Box 127 Denio, NV 89404 Phone: (Summer) 775-941-0111 Phone: (Winter) 864-597-1421 Web: <a href="http://www.bonanzaopals.net">http://www.bonanzaopals.net</a>
Hycroft Mine	Hycroft Resources and Development, Inc.	S26, T35N, R29E	gold silver	OP, HL	mining heap leach	209/150	P. O. Box 3030 Winnemucca, NV 89446 Phone: 775-623-5260 FAX: 775-623-0215 Web: <a href="http://www.alliednevada.com/">http://www.alliednevada.com/</a>

# Directory of Mining and Milling Operations (continued)

Mine/Mill Name	Operator	Location	Commodity	Type	Activity	Company/ Contract Employees	Address
Lone Tree Mine	Newmont Mining Corp.	S1, 11, 13, 15, 23, T34N, R42E	gold silver	OP, HL, ML	flotation heap leach milling	53/25	P. O. Box 388 Valmy, NV 89438-0388 Phone: 775-635-6423 FAX: 775-635-6460 Web: <a href="http://www.newmont.com">http://www.newmont.com</a>
Marigold Mine	Goldcorp, Inc.	S8, 9, 18-20; T33N, R43E	gold silver	OP, HL, ML	mining heap leach milling	273/39	P. O. Box 160 Valmy, NV 89438 Phone: 775-635-2317 FAX: 775-635-2551 Web: <a href="http://www.goldcorp.com">http://www.goldcorp.com</a>
MIN-AD Mine	MIN-AD, Inc.	S28, T35N, R38E	dolomite	OP, ML	mining grinding	20/4	P. O. Box 39 Winnemucca, NV 89446 Phone: 775-623-5944 FAX: 775-623-9028 Web: <a href="http://www.min-ad.com">http://www.min-ad.com</a>
Rainbow Ridge Opal Mine	Rainbow Ridge Opal Mines, Inc.	S22, 23, T45N, R26E	opalized wood precious opal	OP	mining	1	P. O. Box 97 Denio, NV 89404 Phone: (Summer) 775-941-0270 Phone: (Winter) 541-548-4810 Web: <a href="http://www.nevadaopal.com">http://www.nevadaopal.com</a>
Royal Peacock Opal Mine	Walter Wilson	S30, T45N, R26E	precious opal	OP	mining	1	P. O. Box 165 Denio, NV 89404 Phone: (Summer) 775-941-0374 Phone: (Winter) 775-272-3201 Web: <a href="http://www.royalpeacock.com">http://www.royalpeacock.com</a>
Turquoise Ridge Joint Venture	Barrick Gold Corp.	S33, T39N, R42E	gold silver	UG	mining	347/165	HC 66 Box 220 Golconda, NV 89414-9702 Phone: 775-529-5001 FAX: 775-529-0753 Web: <a href="http://www.barrick.com">http://www.barrick.com</a>
Twin Creeks Mine	Newmont Mining Corp.	S3-10, 15-22, 27-32, T39N, R43E	gold silver	OP, HL, ML	mining heap leach milling	589/56	P. O. Box 69 Golconda, NV 89414 Phone: 775-623-4300 FAX: 775-635-4602 Web: <a href="http://www.newmont.com">http://www.newmont.com</a>
<b>LANDER COUNTY</b>							
Argenta Mill	Baker Hughes Oilfield Operations, Inc.	S6, T32N, R47E	barite	ML	gravity grinding	0/31	P. O. Box 277 Battle Mountain, NV 89820 Phone: 775-635-5441 FAX: 775-635-5455 Web: <a href="http://www.bakerhughes.com">http://www.bakerhughes.com</a>
Argenta Mine	Baker Hughes Oilfield Operations, Inc.	S13, 14, T32N, R46E; S18, 19, T32N, R47E	barite	OP	mining	35	P. O. Box 277 Battle Mountain, NV 89820 Phone: 775-635-5441 FAX: 775-635-5455 Web: <a href="http://www.bakerhughes.com">http://www.bakerhughes.com</a>
Battle Mountain Grinding Plant	M-I Swaco	S18, T32N, R45E	barite	ML	gravity grinding	44	P. O. Box 370 2 North Second Street Battle Mountain, NV 89820 Phone: 775-635-5135 FAX: 775-635-2191 Web: <a href="http://www.miswaco.com">http://www.miswaco.com</a>
Cortez Hills Mine	Barrick Cortez, Inc.	S31, T27N, R48E	gold	UG, ML	mining milling	247	HC 66 Box 1250 Crescent Valley, NV 89821-1250 Phone: 775-468-4400 FAX: 775-468-4496 Web: <a href="http://www.barrick.com">http://www.barrick.com</a>
Cortez Pipeline Mine	Barrick Cortez, Inc.	S31, T28N, R47E	gold	OP, HL, ML	mining heap leach milling	801	HC 66 Box 1250 Crescent Valley, NV 89821-1250 Phone: 775-468-4400 FAX: 775-468-4496 Web: <a href="http://www.barrick.com">http://www.barrick.com</a>

## Directory of Mining and Milling Operations (continued)

Mine/Mill Name	Operator	Location	Commodity	Type	Activity	Company/ Contract Employees	Address
Greystone Mine	M-I Swaco	S35, T28N, R45E	barite	OP, ML	mining gravity	46	P. O. Box 370 2 North Second Street Battle Mountain, NV 89820 Phone: 775-635-5135 FAX: 775-635-2191 Web: <a href="http://www.miswaco.com">http://www.miswaco.com</a>
Mountain Springs Mine	M-I Swaco	S8, 9, T28N, R44E	barite	OP, ML	stockpile	N/A	P. O. Box 370 2 North Second Street Battle Mountain, NV 89820 Phone: 775-635-5135 FAX: 775-635-2191 Web: <a href="http://www.miswaco.com">http://www.miswaco.com</a>
Phoenix Mine	Newmont Mining Corp.	S22, 27, 33, 34, T31N, R43E	gold silver	OP, HL, ML	mining heap leach	458/68	P. O. Box 1657 Battle Mountain, NV 89820 Phone: 775-635-6423 FAX: 775-635-6460 Web: <a href="http://www.newmont.com">http://www.newmont.com</a>
LINCOLN COUNTY							
Robin Nos. 1 and 2	Altenberg Media International, Inc.	S4, T2S, R68E	trace minerals	OP	mining bagging screening	4	1127 Melville Dr. Las Vegas, NV 89102 Phone: 435-628-4493 FAX: 435-628-4492 Web: <a href="http://www.chelatedtraceminerals.com">http://www.chelatedtraceminerals.com</a>
Tenacity Perlite Mine and Mill	Wilkin Mining and Trucking Co., Inc.	S34, T4S, R62E	perlite	OP, ML	mining crushing	7	HC 34 Box 199 Caliente, NV 89008 Phone: 775-728-4463 FAX: 775-728-4456
LYON COUNTY							
Adams Claim Gypsum Mine	Art Wilson Co.	S25, T16N, R20E	gypsum limestone	OP, ML	mining crushing grinding screening pelletizing	44	P. O. Box 20160 Carson City, NV 89702-1160 Phone: 775-882-0700 FAX: 775-882-0790 Web: <a href="http://www.awgypsum.com">http://www.awgypsum.com</a>
Celite Plant	World Minerals, Inc.	S11, T20N, R24E	diatomite	ML	classification drying grinding milling	12/1	100 Front St. Fernley, NV 89408 Phone: 775-575-2536 FAX: 775-575-1570 Web: <a href="http://www.worldminerals.com">http://www.worldminerals.com</a>
Dayton Materials	Granite Construction Co.	S23, T16N, R21E	aggregate sand	OP, ML	mining crushing screening washing	12	P. O. Box 2087 1900 Glendale Ave. Sparks, NV 89432 Phone: 775-355-3434 FAX: 775-329-2803 Web: <a href="http://www.graniteconstruction.com">http://www.graniteconstruction.com</a>
Hazen Pit	EP Minerals, LLC	S6, 9, T19N, R26E	diatomite	OP	mining	2/4	640 Clark Station Rd. Sparks, NV 89434 Phone: 775-824-7700 FAX: 775-824-7715 Web: <a href="http://www.epminerals.com">http://www.epminerals.com</a>
Mound House Pit	BJ Rees's Enterprise	S19, T16N, R21E	sand gravel	OP, ML	mining crushing screening	7	1045 South Hoytsville Road Coalville, UT 84017-9741 Phone: 801-359-9781
Nevada Cement Mine	Nevada Cement Co.	S3-6, 9, T19N, R25E; S31-33, T20N, R25E	limestone	OP	mining	14	P. O. Box 840 Fernley, NV 89408 Phone: 775-575-2281 FAX: 775-575-4387 Web: <a href="http://www.eaglematerials.com">http://www.eaglematerials.com</a>
Nevada Cement Plant	Nevada Cement Co.	S10, 11, T20N, R24E	limestone clay	ML	crushing dry milling rotary kiln	86	P. O. Box 840 Fernley, NV 89408 Phone: 775-575-2281 FAX: 775-575-4387 Web: <a href="http://www.eaglematerials.com">http://www.eaglematerials.com</a>

# Directory of Mining and Milling Operations (continued)

Mine/Mill Name	Operator	Location	Commodity	Type	Activity	Company/ Contract Employees	Address
MINERAL COUNTY							
Denton-Rawhide Mine	Kennecott Rawhide Mining Co.	S4, 5, 8, 16, 17, T13N, R32E	gold silver	OP, HL	mining heap leach	24	P. O. Box 2070 Fallon, NV 89407 Phone: 775-945-1015 FAX: 775-945-1213
Esmeralda Mine	Antler Peak Gold, Inc.	S2-4, 7-11, 15-20, 29-32, T5N, R28E	gold silver	OP, HL	milling	23/21	P. O. Box 2570 Hawthorne, NV 89415 Phone: 775-546-1213
Lucky Boy Quarry	James Hardie Building Products Inc.	S34, T7N, R29E	quartzite	OP	mining	N/A	3000 Waltham Way McCarran, NV 89434 (775) 355-3000 Web: <a href="http://www.jameshardie.com">http://www.jameshardie.com</a>
NYE COUNTY							
Ash Meadows Plant	Zeox Mineral Materials Corp.	S25, T18S, R50E	unaltered ash zeolite	ML	crushing screening packaging	5	HCR 70 Box 7006 East Spring Meadows Rd. Amargosa Valley, NV 89020 Phone: 775-372-5524 FAX: 775-372-5524 Web: <a href="http://www.zeoxcorporation.com">http://www.zeoxcorporation.com</a>
Beatty Quarry	Kalamazoo Materials, Inc.	S16, T11S, R47E	landscape rock	OP, ML	mining crushing screening	4	6975 North Oracle Rd. Tucson, AZ 85704 Phone: 520-575-9601 FAX: 520-575-9604 Web: <a href="http://www.kalamazoomaterials.com">http://www.kalamazoomaterials.com</a>
Cinder Cone Pit	Allied Building Materials, Inc. and Cind-R-Lite Company	S36, T14S, R48E; S31, T14S, R49E; S1, T15S, R48E; S6, T15S, R49E	cinder	OP, ML	mining screening	5	4745 Mitchell St. North Las Vegas, NV 89081 Phone: 702-651-1550 FAX: 702-651-1551 Web: <a href="http://www.abmnv.com">http://www.abmnv.com</a>
Gamebird Pit	Wulfenstein Construction Co., Inc.	S2, T20S, R53E	sand gravel	OP	mining crushin screening	1	2281 East Postal Dr. P. O. Box 38 Pahrump, NV 89048 Phone: 702-727-5900 FAX: 702-727-6010
IMV Pits	Mud Camp Mining Co., LLC	S28, 29, T17S, R49E	clay	OP, ML	mining classification crushing grinding screening	25/1	HCR 70 Box 549 Amargosa Valley, NV 89020 Phone: 775-372-5341 FAX: 775-372-5640 Web: <a href="http://www.imvnevada.com">http://www.imvnevada.com</a>
New Discovery Mine and White Caps Mill	Vanderbilt Minerals Corp.	S13, 24, T12S, R46E; S18, 19 T12S, R47E	clay	OP, UG, ML	bagging grinding screening	9	3561 East Burgundy Dr. P. O. Box 6660 Pahrump, NV 89048 Phone: 775-537-6976 FAX: 775-537-6879 Web: <a href="http://www.rtvanderbilt.com">http://www.rtvanderbilt.com</a>
Pahrump Community Pit	Various (U.S. Bureau of Land Management manages pit)	S28, 29, T20S, R54E	sand gravel	OP	mining	N/A	Bureau of Land Management 4701 North Torrey Pines Dr. Las Vegas, NV 89130-2301 Phone: 702-515-5000 Web: <a href="http://www.blm.gov">http://www.blm.gov</a>
Premier Chemicals Mine	Premier Chemicals, LLC	S22, 23, 25-27, 34-36, T12N, R36E	magnesite	OP, ML	mining calcining sizing	92	P. O. Box 177 Gabbs, NV 89409 Phone: 775-285-260 FAX: 775-285-4021 Web: <a href="http://www.premierchemicals.com">http://www.premierchemicals.com</a>
Round Mountain Mine (Smoky Valley Common Operation)	Round Mountain Gold Corp.	S19, 20, 29, 30, T10N, R44E	gold silver	OP, HL, ML	mining gravity heap leach milling	708/63	P. O. Box 480 Smoky Valley Mine Rd. Round Mountain, NV 89405 Phone: 775-377-2366 FAX: 775-377-3224 Web: <a href="http://www.kinross.com">http://www.kinross.com</a>
Royston Claims	Dean Otteson and Danny Otteson	S36, T6N, R39E; S6, 8, T6N, R40E	turquoise	OP	mining	1	P. O. Box 564 Tonopah, NV 89049 Phone: 775-482-9889

## Directory of Mining and Milling Operations (continued)

Mine/Mill Name	Operator	Location	Commodity	Type	Activity	Company/ Contract Employees	Address
South BLM Pit	Wulfenstein Construction Co., Inc.	S11, T20S, R53E	sand gravel	OP	mining crushin screening	5	2281 East Postal Dr. P. O. Box 38 Pahrump, NV 89048 Phone: 702-727-5900 FAX: 702-727-6010
PERSHING COUNTY							
Buff-Satin Mine	Vanderbilt Minerals Corp.	S2, T27N, R32E	clay	OP	bagging grinding screening	4	3561 East Burgundy Dr. P. O. Box 6660 Pahrump, NV 89048 Phone: 775-537-6976 FAX: 775-537-6879 Web: <a href="http://www.rtvanderbilt.com">http://www.rtvanderbilt.com</a>
Coeur Rochester Mine	Coeur Rochester, Inc.	S9-11, 15, 16, 21, 27, 28, T28N, R34E	silver gold	OP, HL, ML	mining heap leach milling	35/10	P. O. 1057 Lovelock, NV 89419 Phone: 775-273-7995 FAX: 775-273-7423 Web: <a href="http://www.coeur.com">http://www.coeur.com</a>
Colado Mines	EP Minerals, LLC	S6, 7, 16, 18, 21, 25, T28N, R29E	diatomite perlite	OP, OS	mining	30	P. O. Box 959 150 Coal Canyon Road Lovelock, NV 89419 Phone: 775-824-7600 FAX: 775-824-7633 Web: <a href="http://www.epminerals.com">http://www.epminerals.com</a>
Colado Plant	EP Minerals, LLC	S33, T28N, R32E	diatomite perlite	ML	drying classification grinding calcining	87	P. O. Box 959 150 Coal Canyon Road Lovelock, NV 89419 Phone: 775-824-7600 FAX: 775-824-7633 Web: <a href="http://www.epminerals.com">http://www.epminerals.com</a>
Empire Quarry	United States Gypsum Co.	S31, T31N, R24E	gypsum	OP	mining	11	P. O. Box 130 Empire, NV 89405 Phone: 775-557-2341 FAX: 775-557-2212 Web: <a href="http://www.usg.com">http://www.usg.com</a>
Florida Canyon Mine	Florida Canyon Mining, Inc.	S1-4, 9-15, T31N, R33E; S37-39, T31.5N, R33E; S33-35, T32N, R33E	gold silver	OP, HL, ML	mining heap leach milling	148/35	P. O. Box 330 Imlay, NV 89418 Phone: 775-538-7300 FAX: 775-538-7324 Web: <a href="http://www.jipangu.co.jp">http://www.jipangu.co.jp</a>
Nassau (Section 8) Mine	American Colloid Co.	S8, T27N, R33E	clay	OP	mining shipping	N/A	P. O. Box 2010 Belle Fourche, SD 57717 Phone: 605-892-6371 FAX: 605-892-3178 Web: <a href="http://www.colloid.com">http://www.colloid.com</a>
Standard Mine	Florida Canyon Mining, Inc.	S1, 12, T30N, R33E; S35, T31N, R33E	gold silver	OP, HL, ML	heap leach	125	P. O. Box 330 Imlay, NV 89418 Phone: 775-538-7300 FAX: 775-538-7324 Web: <a href="http://www.jipangu.co.jp">http://www.jipangu.co.jp</a>
Sunrise Gold Placer Mine	Sunrise Minerals, LLC	S17, T33N, R36E	gold	PL	mining gravity	5	7343 South Alton Way, Suite 100 Centennial, CO 80112 Phone: 303-779-1800 FAX: 303-770-1995
W. Glen Sexton Family Trust	Nutritional Additives Corp.	S5, T34N, R38E	dolomite	OP, ML	mining milling	4	415 Wellington Street Winnemucca, NV 89445 Phone: 775-623-1151 FAX: 775-623-1153
STOREY COUNTY							
Basalite Dayton Pit	Basalite Concrete Products	S8, 9, 16, 17, T17N, R22E	sand gravel	OS, ML	mining crushing milling	3	2600 Boeing Way Carson City, NV 89701 Phone: 775-882-9336 FAX: 775-887-1025 Web: <a href="http://basalite.paccoast.com">http://basalite.paccoast.com</a>

## Directory of Mining and Milling Operations (continued)

Mine/Mill Name	Operator	Location	Commodity	Type	Activity	Company/ Contract Employees	Address
Clark Mill	EP Minerals, LLC	S35, T20N, R22E	diatomite	ML	calcining classification drying grinding	54	640 Clark Station Rd. Sparks, NV 89434 Phone: 775-824-7700 FAX: 775-824-7715 Web: <a href="http://www.epminerals.com">http://www.epminerals.com</a>
Clark Mine	EP Minerals, LLC	S27, 33, 34, T20N, R23E	diatomite	OP	mining	12	640 Clark Station Rd. Sparks, NV 89434 Phone: 775-824-7700 FAX: 775-824-7715 Web: <a href="http://www.epminerals.com">http://www.epminerals.com</a>
Sierra Stone Quarry and Plant	CEMEX	S26, 33, 34, T19N, R22E	sand plant	OS, ML	mining crushing screening	8/4	3005 Canyon Way Sparks, NV 89434 Phone: 775-342-0500 FAX: 775-342-0554 Web: <a href="http://www.cemexusa.com">http://www.cemexusa.com</a>
<b>WASHOE COUNTY</b>							
Bella Vista Pit	A and K Earthmovers	S3, 4, T18N, R20E; 33, 34, T19N, R20E	sand rock	OP, ML	mining crushing screening	4	515 Windmill Rd. Fallon, NV 89406 Phone: 775-423-6085 FAX: 775-423-8410 Web: <a href="http://www.akearthmovers.com">http://www.akearthmovers.com</a>
Empire Mill	United States Gypsum Co.	S11, 13, T31N, R23E	gypsum	ML	calcining crushing	98	P. O. Box 130 Empire, NV 89405 Phone: 775-557-2341 FAX: 775-557-2212 Web: <a href="http://www.usg.com">http://www.usg.com</a>
Lockwood Quarry	Granite Construction Co.	S17, T19N, R21E	aggregate	OP, ML	mining crushing screening washing	19	P. O. Box 2087 1900 Glendale Ave. Sparks, NV 89432 Phone: 775-355-3434 FAX: 775-329-2803 Web: <a href="http://www.graniteconstruction.com">http://www.graniteconstruction.com</a>
Mustang Pit	Sierra Nevada Construction, Inc.	S4, T19N, R21E	aggregate	OP, ML	mining crushing screening	8	P.O. Box 50760 2055 East Gregg St. Sparks, NV 89435-0760 Phone: 775-355-0420 FAX: 775-355-0535 Web: <a href="http://www.snc.biz">http://www.snc.biz</a>
Paiute Pit and Plant	CEMEX	S2, 27, 34, T21N, R24E	sand gravel	OP	mining	8	10 Hill Ranch Road Wadsworth, NV 89442 Phone: 775-575-1162 Web: <a href="http://www.cemexusa.com">http://www.cemexusa.com</a>
Rilite Aggregate	Rilite Aggregate Co.	S23, T18N, R20E	sand rock	OP, ML	mining crushing	6	3025 Mill St. Reno, NV 89502 Phone: 775-329-8842 FAX: 775-329-3593
Spanish Springs Quarry	Martin Marietta Materials, Inc.	S15, 22, T21N, R20E	aggregate	OP, ML	mining crushing screening	15	11059 Pyramid Lake Rd. Sparks, NV 89436 Phone: 775-425-4455 FAX: 775-425-5131 Web: <a href="http://www.martinmarietta.com">http://www.martinmarietta.com</a>
Terraced Hill Clay Mine	Nevada Cement Co.	S13, 14, T27N, R19E	clay	OP, ML	mining milling	3	P. O. Box 840 Fernley, NV 89408 Phone: 775-575-2281 FAX: 775-575-4387 Web: <a href="http://www.eaglematerials.com">http://www.eaglematerials.com</a>
Tracy (102 Ranch) Pit	BJ Rees's Enterprise	S27, 20N, 22E	sand gravel	OP	mining crushing	6	1045 South Hoytsville Road Coalville, UT 84017-9741 Phone: 801-359-9781
<b>WHITE PINE COUNTY</b>							
Bald Mountain Mine	Barrick Gold U.S., Inc.	S14, 15, 19, 20, T24N, R57E	gold silver mercury	OP, HL, ML	mining heap leach mining	261/200	P. O. Box 2706 Elko, NV 89803 Phone: 775-237-7100 FAX: 775-237-5818 Web: <a href="http://www.barrick.com">http://www.barrick.com</a>

## Directory of Mining and Milling Operations (continued)

Mine/Mill Name	Operator	Location	Commodity	Type	Activity	Company/ Contract Employees	Address
Mount Moriah Quarry	Mount Moriah Stone Quarries, LLC	S22, 23, 26, 27, 33-36, T16N, R70E	building stone landscape rock	OP	mining	29	P. O. Box 70 No. 10 Hatch Rock Rd. Baker, NV 89311 Phone: 435-855-2232 FAX: 435-855-2332 Web: <a href="http://mtmoriahstone.com">http://mtmoriahstone.com</a>
Robinson Mine	Robinson Nevada Mining Co.	S6, 8, 17, 18, T16N, R62E	copper gold silver molybdenum	OP, ML	mining milling	544	P. O. Box 382 Ruth, NV 89319 Phone: 775-289-7000 FAX: 775-289-7104 Web: <a href="http://www.quadramining.com">http://www.quadramining.com</a>

## Acknowledgments

We thank Alan R. Coyner with the Nevada Division of Minerals, John H. DeYoung, Jr., Florence Katrivanos, and others with the U.S. Geological Survey's National Minerals Information Center, and James E. Faulds with the Nevada Bureau of Mines and Geology for their reviews of a draft of this report. We also thank Daphne D. LaPointe for her assistance in handling the review process and editing the final document.

## Publication Design and Updates

This publication was designed for reading on the web. Updates and corrections may be made before publication of the volume for next year. This version was updated on March 27, 2012.