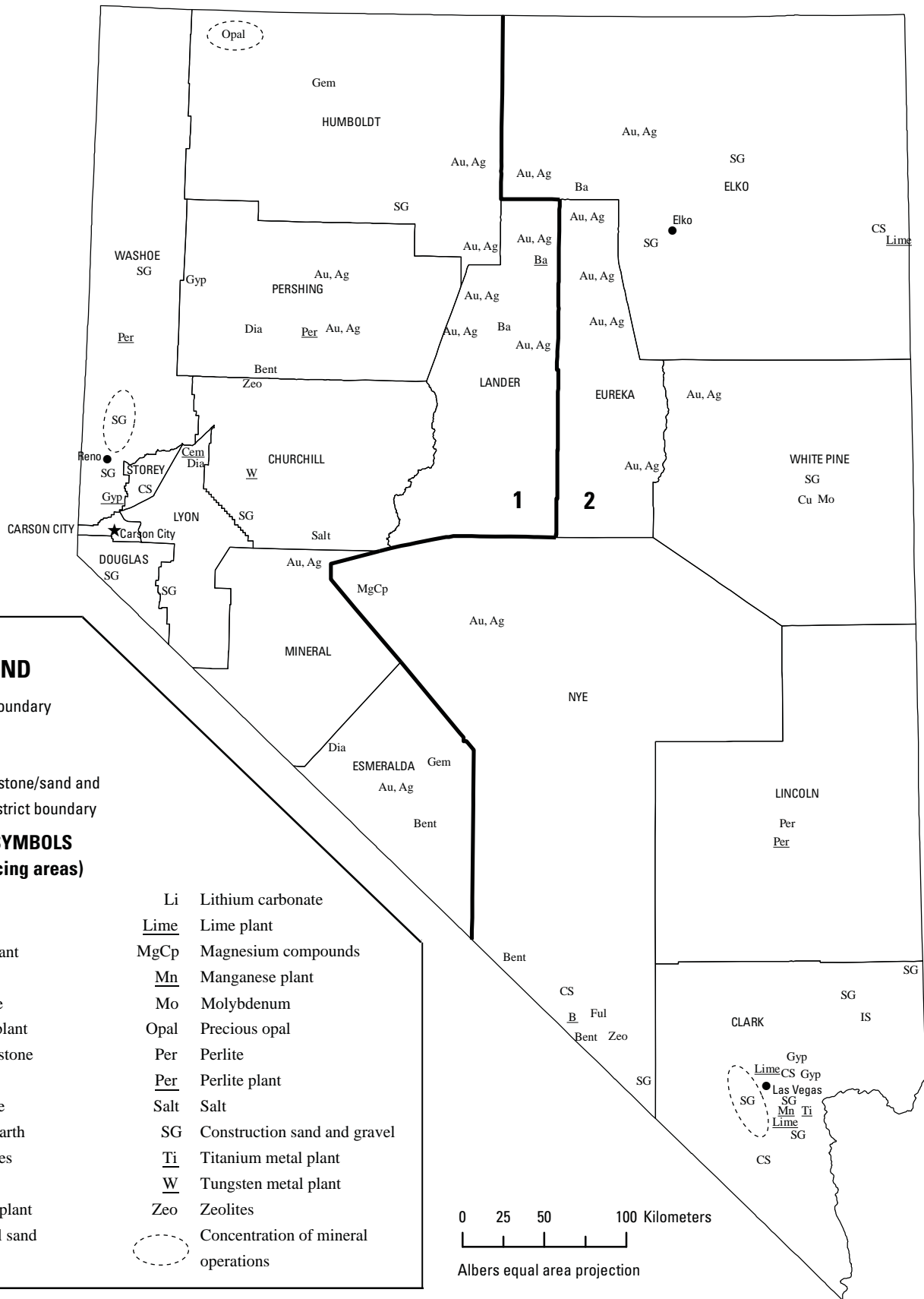




2006 Minerals Yearbook

NEVADA

NEVADA



LEGEND

- County boundary
- ★ Capital
- City
- 1** — Crushed stone/sand and gravel district boundary

MINERAL SYMBOLS (Major producing areas)

- | | | | |
|------------|-----------------|-------------|-------------------------------------|
| Ag | Silver | Li | Lithium carbonate |
| Au | Gold | <u>Lime</u> | Lime plant |
| <u>B</u> | Borate plant | MgCp | Magnesium compounds |
| Ba | Barite | <u>Mn</u> | Manganese plant |
| Bent | Bentonite | Mo | Molybdenum |
| <u>Cem</u> | Cement plant | Opal | Precious opal |
| CS | Crushed stone | Per | Perlite |
| Cu | Copper | <u>Per</u> | Perlite plant |
| Dia | Diatomite | Salt | Salt |
| Ful | Fuller's earth | SG | Construction sand and gravel |
| Gem | Gemstones | <u>Ti</u> | Titanium metal plant |
| Gyp | Gypsum | <u>W</u> | Tungsten metal plant |
| <u>Gyp</u> | Gypsum plant | Zeo | Zeolites |
| IS | Industrial sand | ○ | Concentration of mineral operations |
| Ka | Kaolin | | |

0 25 50 100 Kilometers

Albers equal area projection

THE MINERAL INDUSTRY OF NEVADA

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Nevada Bureau of Mines and Geology for collecting information on all nonfuel minerals.

In 2006, Nevada's nonfuel raw mineral production¹ was valued at \$5.14 billion, based upon annual U.S. Geological Survey (USGS) data. This was an increase of \$1.25 billion, a 32% rise from that of 2005, following a \$420 million, or 12%, increase from 2004 to 2005. This again set an alltime high for the State, principally being the result of increases in the price of gold, a substantial increase in the annual average price of copper, and a significant increase in the annual average price of silver. The State rose in rank back to second from third in the Nation in total nonfuel mineral production value in 2006, which followed rankings of second 1994–97 and 1999–2004 and first in 1992–93 and 1998. Nevada accounted for more than 7.7% of the U.S. total nonfuel value in 2006.

Nevada, which has led the Nation in gold production since 1981, provided 82% of the Nation's gold in 2006. In 2006, gold accounted for 78% of the State's total nonfuel raw mineral production value, followed by copper (data withheld—company proprietary data), construction sand and gravel with nearly 4.5%, and silver, lime, and crushed stone with somewhat less than 2% each. For the fourth consecutive year, Nevada ranked second in silver production (first from 1987–2001) accounting for more about 21.5% of the silver produced from U.S. mines, down from 22% in 2005, 24% in 2004, 26% in 2003, and 30% in 2002.

In 2006, while the production of gold dropped slightly, down about 2.5%, its total value rose by 32%, or up by nearly \$1 billion. A relatively small increase in copper production at the Quadra Mining Ltd.'s Robinson Mine, just west of Ely, White Pine County, resulted in a near doubling of its 2005 total value, owing to the commodity's increase in unit value. Although silver production in the State decreased by nearly 12%, nevertheless, total value rose by \$26 million, or up by 40%. A modest increase in crushed stone production led to a nearly \$20 million increase in its value. Smaller yet significant increases of somewhat more than \$5 million each took place in the nonfuel mineral commodities of barite, diatomite, fuller's earth clay, gypsum (crude), molybdenum concentrates, and portland cement. The largest decreases in value took place in construction sand and gravel, down by \$6 million, and lime, down by about \$3 million. Although not significantly affecting the State's overall total nonfuel mineral value, the value of gemstone production was down about 40% (table 1).

In 2006, while Nevada continued to lead the Nation in the quantity of gold produced, it also continued to be the only State

¹The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the mineral products. Production may be measured by mine shipments, mineral commodity sales, or marketable production (including consumption by producers) as is applicable to the individual mineral commodity.

All 2006 USGS mineral production data published in this chapter are those available as of March 2008. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>.

to produce magnesite and lithium carbonate minerals (minerals listed in descending order of value) and remained first of two barite-producing States, second in silver and diatomite, third in gypsum, fourth in copper, and sixth in lime. Nevada was sixth in the production of pumice and pumicite with the resumption of mining since last reported production of 1980. The State decreased to 9th from 6th in the production of construction sand and gravel, to 9th from 7th in gemstones (gemstones ranking based upon value), and was the producer of significant quantities of crushed stone and industrial sand and gravel. Mercury was produced as a byproduct of gold-silver processing at several mines, but no data were reported to the USGS. Mercury has not been mined domestically as a primary mineral commodity since the closure of the McDermitt Mine in 1992 (Brooks and Matos, 2005).

The following narrative information was provided by the Nevada Bureau of Mines and Geology² (NBMG). Production data in the text that follows are those reported by the NBMG as measured by mine shipments, sales, or marketable production (including consumption by producers) and were compiled by the Nevada Commission on Mineral Resources Division of Minerals (NDM) and the Nevada Bureau of Mines and Geology, based upon the surveys and canvasses of and estimates made by those State agencies, including information gathered from company annual reports (Price and Meeuwig, 2007, p. 3). The NBMG data are reported by that agency to be nonproprietary and may differ from some USGS production figures as reported to and estimated by the USGS.

Industry Overview and Trends

The value of mineral production in Nevada reached an alltime high in 2006, primarily as a result of increases in the price of gold and most all other commodities. Although production of gold continued to decrease from its high of nearly 277,000 kilograms (kg) (8.9 million troy ounces) in 1998 to 196,000 kg (6.3 million troy ounces) in 2006, nonetheless, 2006 represented the 18th consecutive year in which production was in excess of 156,000 kg (5 million troy ounces). Production of gold was derived from 22 major mining operations. The Carlin trend in northeastern Nevada accounted for 51% of the total production. Nine additional mining operations, not on the Carlin trend, each produced more than 3,100 kg (100,000 troy ounces) of gold. Most of this gold was sold on the international market for artistic items, bullion, and jewelry. The conductive and noncorrosive qualities also were applied in computers, other electronics, and dental-related items.

²Jonathan G. Price, Director and State Geologist, Richard O. Meeuwig, Editor and Webmaster, Stephen B. Castor, Research Geologist, and John L. Muntean, Research Economic Geologist, coauthored the text of the State mineral industry information provided by the Nevada Bureau of Mines and Geology.

Through 2006, cumulative gold production in Nevada (beginning with the Comstock lode in 1859) was about 5,280 metric tons (t) (170 million troy ounces). Nearly 86% of this total was produced after the Carlin Mine began production in 1965, of which 83% was produced in the period from 1981 to the present. During this period, 45% of the gold was produced in the decade from 1997 to 2006. Total gold production in the United States, primarily since 1835, has been estimated to be about 16,200 t (521 million troy ounces, nearly 11% of total world gold production) with total Nevada production nearly 3% of total world production. The Carlin trend alone has accounted for 1.3% of total world production of gold.

The State's industrial minerals mining industry served to appreciably support the State's economic growth. Aggregate production reached an alltime high in 2006 as a result of Nevada's expanding population and the need for construction materials for airports, business structures, highways, homes, resort hotels, roads, and schools. Population growth was particularly strong in the Las Vegas metropolitan area (Clark County), where the influx of 9 to 10 new residents per hour resulted in approximately one hectare per hour of land development for businesses, homes, and roads (Ronald Lynn, Clark County building official, oral commun., December, 2006). New cement plants were planned for both the greater Las Vegas and Reno markets. Demand for construction raw materials was likely to remain strong as a result of the expected continuation of the State's growth in population. Gypsum production declined in 2006, relative to 2005, in part because of the closure of the Blue Diamond Mine on the perimeter of the Las Vegas Valley.

A trend occurring in the Las Vegas area, as well as nationwide, that combines post-mining use of aggregate quarries with its use in land development operations continued during the year. The eventual use of quarries for landfill operations, recreation sites, and suburban development has become vital in areas where urban expansion encroaches on the mineral resources.

Consolidation of Nevada's metal mining industry continued in 2006. Barrick Gold Corp. completed its acquisition of Placer Dome Inc. that included Placer's interests in the Bald Mountain, Cortez, and Turquoise Ridge Mines. In addition, Goldcorp Inc. acquired Glamis Gold Ltd., the operator of the Marigold Mine. Also, Midway Gold Corp. announced plans to acquire Pan-Nevada Gold Corp.

Employment

The mining industry directly employed 11,516 people in 2006. The industry also was responsible for another 52,000 jobs related to providing the goods and services needed by the industry and its employees (Driesner and Coyner, 2007a). Productivity of Nevada mining operations remained exceptionally high. Measured simply by the value of the commodities produced divided by the number of employees, each employee in the nonfuel mineral industry produced, on average, approximately \$426,000 in mined products in 2006, an alltime high figure.

Exploration Activities, Discoveries, and Mine Development Activities

According to a survey of exploration activities by the Nevada Division of Minerals, exploration activity has been steadily increasing since 2001, when companies reported \$51.2 million in expenditures in Nevada (Driesner and Coyner, 2007b). The 28 companies responding to the survey reported spending \$164.9 million on exploration in Nevada in 2006, substantially higher than the \$121.3 million reported in 2005 or the \$79.7 million reported in 2004, and well above the level of \$138.8 million in 1995.

Industrial Minerals

Developments in the industrial minerals sector continued in 2006. Notable exploration and mine staking activities took place in several commodities including barite, cement, clays, diatomite, gypsum, sand and gravel, stone (crushed), stone (dimension), and vermiculite (Castor, 2007, p. 63).

Barite.—After a sharp decline in barite mining in the 1980s and continuing weak sales of barite, exploration for barite was resumed in 2006. Excalibar Minerals Inc. (a division of Newpark Resources Inc.) with barite processing plants in Louisiana and Texas, staked nine claims near the southend of the Independence Mountains in Elko County. The claims are in the vicinity of the Heavy Spar barite prospect, which was explored by Eisenman Chemical Co. in the 1970s, and are near the Maggie Creek portion of the Carlin gold trend. Excalibar had staked 30 claims in another Elko County barite district in 2005. Spirit Minerals, LP filed an application for a reclamation permit to explore the Big Ledge Mine area in the Snake Mountains of Elko County, an area that was explored by Chromalloy American Corp. in the late 1970s and later mined by Circle A Construction Inc. in the 1990s. Spirit Minerals planned to begin milling 68,000 t of stockpiled ore mined in the 1980s by Old Soldier Minerals from another property in the area, and also staked 38 mill site claims on the east side of the Snake Range. Heemskirk Canada Ltd., which operates a barite processing plant in Alberta, Canada, using barite produced in Nevada, leased the Monitor barite property in the Northumberland District of Nye County. Milchem Inc. had produced barite from the Monitor Mine in the late 1970s.

Cement.—Nevada Cement Co., Fernley, Lyon County (part of Eagle Materials Inc., Dallas, Texas) staked claims in several areas near its Fernley cement plant. Twenty-five claims were staked on limestone deposits along the southwest edge of the Trinity Range in Pershing County, about 64 kilometers (km) northeast of the cement plant. A similar group of seven claims was staked in the Hot Creek Range, Churchill County, about 32 km northeast of the plant. A third group of four claims also was staked about 32 km south of Fallon, Churchill County. In addition, Nevada Cement prepared plans during the year for operation of a limestone quarry on claims staked in the early 1990s near Rye Patch Reservoir in Pershing County, about 113 km northeast of the Fernley plant. A plan of operations

for this mine was to be submitted to the U.S. Bureau of Land Management (BLM) in early 2007. It was not disclosed to what extent the limestone properties staked in 2006 would be integrated with this plan.

Clay.—The Moltan Company staked nine placer claims over the San Emidio clay deposit near Empire in Washoe County in 2006.

Diatomite.—The Moltan Company also filed a block of about 100 claims, mostly placer claims, over diatomite in the Desert Peak area, Churchill County, about 40 km northeast of Fernley. The company also staked 18 claims over the Black Butte diatomite deposit near Hazen. EP Minerals LLC filed 35 placer claims over the Trinity diatomite deposit about 48 km northeast of Fernley in Churchill County in 2006.

Gypsum.—The site of the former Bpb Gypsum Inc. Blue Diamond Mine was slated to become a housing development, as a result of its location in the vicinity of metropolitan growth around the Las Vegas area. The Blue Diamond area had been the site of gypsum mining since 1925. The adjacent Blue Diamond wallboard plant continued production in 2006, using gypsum imported from northern Arizona. During the year, Bpb also filed five mill site claims adjacent to the wallboard plant.

Ready Mix Inc., a Las Vegas construction material supplier, staked eight placer claims in the area of the White Star gypsum prospect near Logandale, Clark County. It was unclear if gypsum was the commodity sought since decorative sandstone was known to be mined in the area.

Sand and Gravel and Stone, Crushed.—Objections to certain mining claims acquired by Rinker Materials Inc. in 2001 continued in 2006. Rinker had acquired claims on carbonate rock in the Sloan area south of Las Vegas, but in 2005, the BLM challenged these claims in Federal court. In 2006, the case was still under consideration, although a final ruling by the court was not expected to be imminent.

Nevada Aggregate Holdings continued to assemble a large block of claims in an area mostly underlain by carbonate rock about 24 km northeast of Las Vegas. In 2006, the company recorded more than 400 one-member placer claims in this area, and by yearend had more than 15 sections of land under claim. These claims are south of the Apex Landfill, which, in addition to accepting the Las Vegas metropolitan area's refuse, is the site of aggregate production for the Las Vegas metropolitan area. Las Vegas Paving Corp. staked a small number of eight-member placer claims to the north of the landfill. Frehner Inc. added 12 millsite claims to its patented claim block in the Sloan area south of Las Vegas, where it produces crushed carbonate aggregate. Companies that held claims on carbonate rock or other aggregate material in the Las Vegas area in 2006 include Diamond Generating Corp. and Sierra Ready Mix in the Ivanpah area, Frehner Inc. in the Sloan area, and Las Vegas Paving in the Dry Lake area.

Stone, Dimension.—Two small claim groups were staked for the probable purpose of dimension stone mining. State Stone Corp., a Salt Lake City wholesale construction materials supplier, staked three lode claims in Lincoln County about 48 km southeast of Caliente. Nevada Rock LLC, Carson City, staked seven claims in Nye County about 32 km east of Tonopah. The Nevada Rock claims are in the vicinity of the

McKinney Tanks zeolite occurrence, and may have been staked for that commodity instead of stone.

Vermiculite.—In 2006, Rio Tinto Industrial Minerals exercised an option to acquire the IBI Corp. interest in vermiculite deposits near Mica Peak, Clark County. Under the agreement, Rio Tinto may acquire IBI's interest until 2008 for \$1.25 million and is required to spend \$250,000 on exploration and property development during the option period. The vermiculite occurs in altered Precambrian mafic and ultramafic rock in three claim blocks that include claims originally staked in 1993 and 1994. However, the presence of the vermiculite deposits near Mica Peak has been known since the 1930s. A mill was constructed there in the 1940s.

Zeolites.—The Moltan Company filed 15 lode claims in 2006 near a zeolite deposit in Churchill County about 56 km northeast of Fernley. In addition, Moltan staked 12 lode claims near the Ash Meadows Zeolite LLC mill in Nye County.

Metals

Metals exploration in Nevada continued in 2006 at an even greater pace than in 2005. County recorders registered 180,568 filings of mining claims in 2006, an 8.2% increase compared with that of 2005. These included filing new claims as well as maintaining existing claims. The BLM recorded the filing of 26,512 new claims in 2006. The predominant claiming areas were in the Humboldt Range, the Union Pass region of the Sulphur Springs Range, and the general vicinity surrounding the inactive Rosebud and Hycroft Mines north of Lovelock. Exploration drilling was carried out at 117 mining projects during the year. The main exploration activity continued to be directed toward gold, although an increasing number of projects focused on copper, molybdenum, silver, and tungsten. For example, 12 of the 117 projects drilled in 2006 targeted metals other than gold compared with that of 2005, when only 5 of 110 projects were drilled for metals other than gold.

Gold.—Most of the exploration drilling for gold, in terms of footage, continued to be conducted by major or midtier companies³ in and near their active mines (Muntean, 2007, p. 14). As in 2005, most new mine reserves were the result of drilling that converted resources to reserves. Barrick Gold Corp. carried out a major drilling program in and near its Goldstrike Mine, both on the surface and underground. Barrick continued to drill at its South Arturo discovery northwest of Goldstrike on the Dee property at the northern end of the Carlin trend. A 40% interest in the Dee property is held by Goldcorp Inc. In addition to its drilling activities, Barrick initiated prestripping of the East Archimedes deposit where mining was scheduled to begin in 2007. With the acquisition of Placer Dome Inc., Barrick also completed major drilling programs at the Bald Mountain

³As determined by the NBMG, the classification of companies into major, midtier, or junior in this section of the report is arbitrarily based on gold production and market capitalization. The loose criteria were as follows: 1) major companies produce greater than 1 million troy ounces of gold worldwide, and have market capitalization of more than \$3 billion, 2) midtier companies produce between 50,000 and 1 million troy ounces of gold and have market capitalization less than \$3 billion but more than \$500 million, and 3) junior companies produce less than 50,000 troy ounces of gold and have market capitalization less than \$500 million.

Mine and the Cortez Joint Venture in which Kennecott Minerals Co. has a 40% interest. The Cortez Joint Venture consists of the Cortez Mine and the Cortez Hills development project. Although no new discoveries were announced at the Cortez Mine, Barrick continued to expand the Cortez Hills deposit, especially the deep, high-grade lower zone. Barrick planned to begin production at Cortez Hills in 2009, which was expected to help alleviate declining production from Barrick's nearby Pipeline Mine. Major drill programs also were carried out by Newmont Mining Corp. at its Leeville, Gold Quarry, Genesis, Carlin, Pete, Phoenix, Twin Creeks, and Midas gold deposits. In addition, Newmont continued the permitting process for its Emigrant deposit. Other active mines with major drill programs in 2006 included Turquoise Ridge (75% Barrick, 25% Newmont), Marigold (67% Goldcorp, 33% Barrick), Jerritt Canyon (Queenstake Resources Inc.), and Robinson (Quadra Mining Ltd.).

Substantial drill programs also were carried out by major or midtier companies outside their active mine areas. Newmont continued to evaluate Northumberland, and by yearend 2006, had spent about \$6 million toward the \$25 million it was obligated to spend by 2010. The total expenditure would earn Newmont a 60% interest from its joint-venture partner NewWest Gold Corp. Centerra Gold Inc. continued to drill its REN project, a joint venture with Barrick, in the northern Carlin trend. Hecla Mining Co., in a joint venture with Great Basin Gold Ltd., completed a total of 2,150 meters (m) of underground development and about 17,000 m of drilling at the Hollister Mine in the Ivanhoe District. Drill results established thickness and continuity of high grades along veins, but Hecla decided to discontinue its participation in the joint venture. Great Basin planned to complete a feasibility study, and then make a decision in 2007 as to whether the Hollister Mine should be placed into production. Newcrest Mining Ltd. completed a significant drill program at its Gabbs project, which included the Sullivan Mine just north of the Paradise Peak that was last operated in the early 1900s. U.S. Gold Corporation began its drill program at Tonkin Springs, completing 17,000 m of drilling, which primarily served to test for extensions of known deposits.

Much of the drilling for gold by junior companies took place around known, unmined deposits or inactive mines, commonly with outdated resource estimates. In addition to expanding a given resource beyond its margins, an important objective of this drilling was to upgrade the resource estimate with infill and confirmation drilling in order to produce a new resource estimate that was compliant with current U.S. Securities and Exchange Commission regulations. Several major drill programs were conducted at sites including Borealis (Gryphon Gold Corp.), Fire Creek (Klondex Mines Ltd.), Jessup and Pan (Pan-Nevada Gold Corp.), Robertson (Coral Gold Corp.), Sandman (NewWest), and Toiyabe (Golden Oasis Gold Corp.). At Fire Creek, Klondex continued to drill at depths below the historical resource, and released a new mineral resource estimate of about 31,000 kg (one million troy ounces of gold) (Klondex Mines Ltd., 2006). In addition, new resource estimates were released during the year for Goldfield (Metallic Ventures Gold, Inc.), Lookout Mountain (Stacatto Gold Resources Ltd.), Monte Cristo

(Gold Summit Corp.), New Pass (Bonaventure Enterprises Inc.), Pinson (Atna Resources), and Reward (Canyon Resources Corp.).

Junior companies also conducted drilling at sites without known historical resources. Midway Gold Corp. continued to drill a new vein discovered in 2005 at its Midway project and announced a resource estimate for its Spring Valley project (Midway Gold Corp., 2006). The diatreme-hosted Spring Valley deposit, which sparked a staking rush in the Humboldt Range, represents a potentially new type of exploration target in Nevada. In addition, joint-venture partners (NewWest and Agnico-Eagle Mines Ltd.) continued to drill AuEx's Pequop properties (Long Canyon and Pequop West) near Wells in northeast Nevada. A major implication of the recent discoveries at the Pequop properties is that the sedimentary rock-hosted mineralization is distant from any of the known Carlin-type gold deposits and would likely attract companies to this relatively under-explored area of Nevada.

Some junior companies also planned to begin mine production at sites containing small quantities of gold resource. Royal Standard Minerals Inc. completed the permitting process for its Gold Wedge underground deposit in the Manhattan District and conducted preliminary mining tests during the year. Firstgold Corp. began the permitting process to reopen the Relief Canyon gold mine near Lovelock, which closed in the early 1990s.

Silver.—Drilling by Silver Quest Resources Ltd. (joint venture with Bullion River Gold Corp.) at its Corcoran Canyon project east of Round Mountain, Nye County, revealed a new resource zone containing up to 795 grams per metric ton (g/t) of silver over a 2.2 m-thick intercept. Silver Quest initiated a program of permitting in preparation for a larger drill program directed at the new discovery as well as the area of known silver occurrence. The known resource estimate of 1.61 million metric tons (Mt) grading 175 g/t silver and 0.86 g/t of gold was determined by Echo Bay Exploration in 1988 (Silver Quest Resources Ltd., 2007).

Piedmont Mining Co., in a joint venture with AuEx Ventures Inc., completed approximately 1,100 m of core drilling at the old Trinity Silver Mine in Pershing County. The drilling was designed to confirm silver mineralization encountered through earlier drilling in the 1980s, as well as to provide geological information on the nature of faults controlling the mineralization. Assay results revealed four of the 10 new core holes contained 1.5- to 3-m-thick intercepts of about 340 g/t silver with a high value of 890 g/t silver. These high grade zones were commonly enclosed within or accompanied by broader zones of lower grade mineralization grading approximately 34 g/t silver (AuEx Ventures Inc., 2006).

Fury Explorations Ltd. conducted about 3,000 m of drilling at the Taylor Mine near Ely in White Pine County. Results reportedly demonstrated continuity within the high-grade fault zone. The drilling delineated 500 m of strike length on the fault zone, with widths of about 3 m of silver mineralization grading up to 150 g/t silver (Fury Explorations Ltd., 2006).

General Metals Corporation completed the first stage of drilling on the tailings at its Independence Mine project, Battle Mountain District, Lander County. The Independence claims, covering about 100 hectares, are completely surrounded by

Newmont Mining's Phoenix Mine, but with legal access. Drill results from the tailings and an estimated 59,000 t of stockpiled ore suggested that the combined tailings and stockpiled ore contained more than 124 kg (4,000 troy ounces) of gold and nearly 7,800 kg (250,000 troy ounces) of silver that were potentially available for recovery by using heap-leaching techniques (General Metals Corporation, 2006).

Other Metals.—Canyon Copper Corp.'s (formerly Aberdene Mines) New York Canyon project in the Gabbs Valley Range, Mineral County, remained the most significant copper exploration project in 2006. Drilling at the copper oxide skarn deposit confirmed and expanded the known extent of the copper oxide mineralization, which is exposed at the surface and has been tested to depths up to 120 m. A resource estimate for New York Canyon was expected to be released in 2007. Canyon Copper staked more than 900 new claims in 2006, including much of the pediment on the west side of the Gabbs Valley Range.

At Pumpkin Hollow, Lyon County, Nevada Copper Corp. drilled several core holes confirming high-grade copper mineralization and continuity in the Northwest deposit. Copper mineralization averaging up to 1% was observed over an intercept thickness of 213 m.

Nevada Pacific Gold Ltd. conducted 3,400 m of exploration drilling at its Timber Creek project in Lander County, south of the Buffalo Valley Mine. The drill program was designed to test geophysical and structural areas that extend away from the front of the mountain range and onto the pediment. Mineralization of up to 0.09% copper and 0.21% zinc was observed over an intercept thickness of 30 m. The mineralization lies on the southeast edge of what appears to be an area of zoned base-metal mineralization related to the copper-molybdenum porphyry exposed in trenching about 900 m north of the area drilled.

Pacific Magnesium Corp. Ltd. drilled core holes totaling 1,700 m near the Ann Mason resource in the Yerington District, Lyon County. Continuity of copper mineralization was demonstrated over a 480-m intercept containing 0.5% copper. Small quantities of molybdenum and silver also were detected in the mineralization. Results of drilling southwest of the known Ann Mason deposit revealed a 3-m intercept of 0.6% copper within a 9-m intercept of 0.37% copper.

Boxxer Gold Corp. explored the iron deposits in the Buena Vista hills, Pershing County, for copper and gold mineralization. The downdip extension of a copper-bearing magnetite replacement body assayed 0.75% copper over a 1-m width at a depth of 94 to 103 m.

Quadra Mining Ltd. completed the molybdenum recovery circuit at its Robinson copper-molybdenum mine in White Pine County and began producing molybdenum, in addition to copper, gold, and silver. Quadra also continued exploration efforts to identify additional copper and molybdenum resources at Robinson (Quadra Mining Ltd., 2006).

Idaho General Mines, Inc. continued the permitting process for the Mount Hope porphyry molybdenum deposit north of Eureka. The company submitted a plan of operations to the BLM and initiated various baseline studies necessary to complete an environmental impact statement for Mount Hope.

Idaho General also expanded its land position by staking 651 claims around Mount Hope in 2006. In addition, it acquired the Hall deposit north of Tonopah and began to assess whether production of the remaining resources at Hall was economically feasible. Idaho General expanded its land position by staking 417 claims around Hall in 2006 (Idaho General Mines, Inc., 2007).

After nearly 20 years of inactivity, interest in the production of tungsten was resumed in the State. Galway Resources began an evaluation of the Indian Springs tungsten skarn deposit north of Wells, Elko County. Indian Springs had undergone extensive exploration drilling and metallurgical testing during the period 1968 through 1986. The deposit contains both high-recovery, scheelite-bearing mineralization and lower-recovery, non-scheelite, iron-oxide-bearing tungsten mineralization. In 2006, Galway conducted a 2,100-m drilling program at Indian Springs that served to verify earlier ore grade intercepts and extend the known mineralization.

Golden Predator Mines, Inc. acquired the Springer Tungsten Mining and Milling Complex near Imlay from General Electric Company in November 2006. The Springer Mine and mill had opened in early 1982 at a cost of \$55 million through a joint venture between General Electric and Utah International, but was closed in October 1982 as a result of declining tungsten prices. The facilities had remained on care-and-maintenance status since that time. Although acquisition of Springer allows Golden Predator the opportunity to potentially produce tungsten, a planned addition of a separate gold processing circuit and utilization of existing water rights and tailings infrastructure could make the Springer complex the only independent operating gold mill in northern Nevada.

Gold Canyon Resources, Inc. continued to explore for gallium near the historic Cordero mercury mine near McDermitt, Humboldt County. Gold Canyon completed a 4,700-m drilling program and released an inferred resource for the Cordero project of 6.45 Mt grading 52.3 g/t gallium (Gold Canyon Resources, Inc., 2006).

Commodity Review

Industrial Minerals

Barite.—Three major operations in Lander and Elko Counties combined to produce more than 95% of the barite mined in the United States. M-I SWACO, which is jointly owned by Smith International Inc. and Schlumberger Ltd., was the leading Nevada barite producer in 2006. Production of crude and ground barite was derived from the company's Greystone Mine and Battle Mountain processing plant, both in Lander County. M-I SWACO introduced a new grade of barite with lower specific gravity of 4.1 (compared with the American Petroleum Institute specific gravity specification of 4.2) following cost and performance analyses. The specific gravity adjustment was intended to extend barite reserves in Nevada. Baroid Drilling Fluids Inc. (a subsidiary of Halliburton Co.) was the second leading producer in Nevada. The company mined barite from the Rossi Mine in Elko County, which was then processed at Baroid's Dunphy Mill in Eureka County. Baker Hughes INTEQ,

the third leading producer, shipped barite from its Argenta operation near Battle Mountain in Lander County. Most of the barite sold domestically is used as a weighting agent in oil and gas well drilling fluids. On the basis of data supplied by Schlumberger Ltd., the total oil and gas drill rig count for Canada and the United States declined by about 2% in 2006, compared with a drill rig count increase of 12% in 2005.

Boron.—American Borate Co. processed borate minerals at the Lathrop Wells mill in Nye County. Until 2005, the feed was colemanite mined from the Billie Mine in Death Valley, CA. In 2006, however, the feed for the Lathrop Wells mill was imported. The mill capacity is about 20,000 metric tons per year (t/yr) boron trioxide basis.

Cement.—Nevada Cement Co., Fernley, Lyon County, was the sole producer of cement in the State during the year. Nevada Cement is a wholly subsidiary of Eagle Materials Inc., Dallas, TX. The cement is manufactured from Tertiary lacustrine limestone mined a few miles south of Fernley, and from other raw materials acquired from locations in northern Nevada.

Ash Grove Cement Co., a Kansas corporation, planned to begin construction of a major cement plant in late 2007. The plant, under consideration since 2004, is to be located northeast of Las Vegas on the Moapa Indian Reservation. Annual production capacity of the plant is expected to be about 1.4 Mt. Limestone feed for the plant is to be acquired from a quarry on the reservation. Although the plant site is on an Indian reservation, which is not subject to as many State and Federal laws as other lands, Ash Grove will adhere to environmental regulations required by the U.S. Environmental Protection Agency (EPA), and has applied for an air quality permit. The EPA has determined that the use of proposed control devices and emission limits for the plant meet the requirements of 40 CFR 52.21 (prevention of significant deterioration of air quality) and that the proposed plant project will not violate any of the National Ambient Air Quality Standards. It is anticipated that production of cement from the new plant will assist in significantly reducing cement shortages that have affected Las Vegas concrete suppliers and construction firms periodically in the 1990s and as recently as 2005.

Clay.—IMV Nevada (owned by Mud Camp Mining Company, LLC) produced bentonite, saponite, and sepiolite from deposits in lacustrine sediments in the Ash Meadows-Amargosa Flat area of Nye County. The clay occurs in shallow, flat-lying deposits in Pliocene lacustrine rocks. The clay is processed at a plant in Amargosa Valley, after which the clay products are exported worldwide. The saponite and sepiolite deposits have unusual geology, in that they are considered to have originated in a Pliocene playa with an area of at least 57 square kilometers (km²). The sepiolite, which yields most of the profits for the company, occurs in an almost continuous bed with an average thickness of about 2 m.

Two companies 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 Arizona, California, and Nevada. In 2006, Vanderbilt shipped clay from the Blanco Mine in Esmeralda County, the Buff and Satin Mines in

Pershing County, and the New Discovery Mine near Beatty. The American Colloid Co. mines white bentonite from its Nassau property in Coal Canyon in Pershing County for use in specialty clay products. Information was not available on whether the company shipped clay from Nevada in 2006.

Diatomite.—The United States is the leading producer of diatomite worldwide. Nevada accounts for more than 30% of domestic diatomite production. About two-thirds of the diatomite produced in Nevada is used in filtration systems, and the remainder is mainly used in absorbents, fillers, and cement. Emerging small-scale uses include pharmaceutical processing and nontoxic insecticides.

EP Minerals LLC, the second leading diatomite producer in the world, produced most of Nevada's diatomite. EP Minerals' Colado operation in Pershing County produced filtration materials at its Lovelock plant from diatomite mined about 24 km to the northwest. Filler and absorbent materials were produced at its Clark plant from diatomite mined in Storey County about 32 km east of Reno, and insulation materials were produced from diatomite mined near Hazen in Lyon County. EP Minerals' former parent company, Eagle-Picher Holdings, filed to reorganize under Chapter 11 of the U.S. Bankruptcy Code in April 2005. In 2006, the company emerged from restructuring under the name Eagle Picher Incorporated.

The Celite Corp. operated a mine at Hazen and a plant in Fernley that produced diatomite for use as fillers. Celite is a subsidiary of World Minerals Inc., the world's leading diatomite producer, and a subsidiary of Imerys, a large French industrial minerals company. The Moltan Company shipped absorbent products, cat litter, and soil conditioner under several labels from a mine and plant complex in Churchill County about 32 km northeast of Fernley. Grefco Minerals' relatively small diatomite operation near the Esmeralda/Mineral County line continued to produce diatomite in 2006. American Diatomite Inc. holds claims in Esmeralda County near the Shu Fly diatomite deposit about 16 km north of Coaldale.

Gemstones.—Precious opal is produced from several mines in the Virgin Valley area of northern Humboldt County. The best known are the Bonanza, Hidden Valley, Rainbow Ridge, and Royal Peacock Mines. The Rainbow Ridge and Royal Peacock Mines reported production in 2006 to the Nevada Division of Minerals. Virgin Valley is a well-known source of gemstones in North America, but much of the opal comes from pay-to-dig operations and is unreported. In addition, Nevada is estimated to have produced more than \$30 million worth of turquoise, mostly during the first half of the 20th century when as much as 4,500 kg was produced in a single year. In 2006, less than 23 kg of turquoise was shipped from the Blue Ridge Mine, a family-owned property in the Bullion District of Lander County.

Gypsum.—Nevada's gypsum production declined for the third consecutive year. This decline was mainly the result of cessation of mining in 2004 at the Bpb Gypsum, Inc. Blue Diamond's operation south of Las Vegas was one of the State's leading producers. The two leading Nevada producers in 2006, PABCO Gypsum and USG Corp., utilized most of the gypsum mined in Nevada in the production of wallboard at plants adjacent to their mining operations. Processing of gypsum ore at PABCO's Clark County plant yielded a product that was about

70% by weight gypsum. The ore was recovered from a nearly flat-lying late Miocene gypsite blanket atop a 13-km² mesa. Results of drilling have indicated that the gypsum ore is at least 36-m thick in the area of current mining. USG mined gypsum in western Pershing County and processed it into wallboard and plaster at its plant in Empire, Washoe County. The gypsum is of Triassic or Jurassic age and forms several masses in a 5-km² area. The largest mass, the Selenite orebody, contains 85% to 95% gypsum.

The Art Wilson Company, Carson City, shipped anhydrite and gypsum from the Adams Mine in Lyon County, and the D.L. Denman Construction Company mined gypsum at the Pioneer Mine about 16 km east of Las Vegas. Material from these relatively small operations was used in agricultural and cement applications. The Adams deposit is a folded body associated with limestone in Triassic metavolcanic rocks. The Pioneer Mine exploits the same late Miocene gypsite deposit as the PABCO operation about 8 km to the north.

Lime, Limestone, and Dolomite.—The Pilot Peak high-calcium lime operation of Graymont Western US, Inc. (formerly Continental Lime, Inc.) 16 km northwest of Wendover, Elko County was Nevada's leading lime producer, mainly marketing to gold-mining operations for use in cyanide-solution pH control. The Pilot Peak plant has three kilns with a combined capacity of more than 635,000 t/yr of quicklime, and a hydrated lime plant capable of producing about 320 metric tons per day (t/d).

Chemical Lime Co. produced lime at Apex, about 32 km northeast of Las Vegas. The operation manufactured high-calcium quicklime used in metallurgical processing, paper manufacturing, and environmental markets. The company also produced dolomitic lime and hydrated high calcium lime at Apex, mainly for construction uses. Chemical Lime's Henderson plant processed Type S hydrated dolomitic lime for building and home construction.

In addition to lime, Graymont Western and Chemical Lime also shipped crushed limestone. The limestone used by Chemical Lime and Graymont Western was recovered from two sites that are nearly at opposite ends of the State. However, the high-calcium limestone mined at both sites is from the same Devonian limestone unit.

Min-Ad, Inc. and Nutritional Additives Corp. near Winnemucca produced dolomite for use in agricultural and nutritional products. The Min-Ad operation (a subsidiary of Inter-Rock Minerals Inc., Toronto, Ontario, Canada) has increased production by about 70% during the past 10 years. The dolomite is distributed mainly to locations in midwestern United States, but also is distributed as far as New York State and Alberta, Canada, for use in beef and dairy feed.

Lithium.—Nevada was the only State with domestic production of lithium raw materials. Chemetall Foote Co. (a subsidiary of Chemetall GmbH) produced lithium carbonate, lithium hydroxide monohydrate, and lithium hydroxide anhydrite at its Silver Peak facility in Esmeralda County. The lithium chemicals were produced by solar evaporation/preconcentration and subsequent refining techniques from brine that was pumped from beneath Clayton Valley playa. Lithium imports have increased about 75% since 2001, principally of growth in the lithium-based rechargeable battery market.

Magnesium.—Magnesium minerals, brucite, and magnesite have been mined at Gabbs Valley in Nye County since 1935. In the 1940s, the minerals were processed in Henderson, NV, to produce magnesium metal. From the 1950s to the 1980s, mining and processing was carried out by Basic Industries, a major producer of refractory magnesia. Premier Chemicals LLC, Cleveland, OH, currently owns the Gabbs operation. During the 1990s, the availability of inexpensive foreign refractory magnesia caused production at Gabbs to be shifted to light-burned (caustic) magnesia that was marketed mainly for wastewater treatment and agricultural uses. Although production of magnesia at Gabbs was well below the peak reached in 1981, magnesia shipments from the Gabbs operation increased steadily between 1996 and 2005. Production in 2006 was somewhat lower than in 2005.

The Gabbs operation currently is the only location in the United States where magnesite is mined. Brucite, which is shipped in relatively small amounts from the Gabbs operation, is also mined in Texas. Slightly less than 50% of domestic magnesia production is derived from brucite and magnesite. The remainder comes from seawater and natural brines. Brucite and Magnesite at Gabbs occur as complex replacement bodies in Triassic dolomite in a large area. The resource is thought to be sufficient for more than 50 years of production at present mining rates.

Perlite.—Although Nevada has significant perlite resources and several deposits of perlite that have been mined extensively, 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 that produce less than 1% of the domestic total.

Wilkin Mining and Trucking Inc. mines perlite from the Tenacity Perlite Mine about 40 km west of Caliente in Lincoln County. The company has been mining perlite in the area for more than 25 years. In 2006, Wilkin also operated a small popping plant in Caliente where expanded perlite was produced for horticultural purposes.

EP Minerals LLC produced expanded perlite at its Colado diatomite plant in Pershing County. The perlite was marketed as a filter aid. Plant capacity was about 7,300 t/yr. The crude perlite was obtained from the Popcorn Mine about 24 km south of Fallon in Churchill County.

Potassium Alum.—A small amount of potassium alum (kalinite) was shipped in 2006 from a deposit in Esmeralda County about 16 km north of Silver Peak. The kalinite, which occurs with sulfur as veins and stringers in rhyolitic rock, was being marketed for horticultural use.

Salt.—The Huck Salt Company produced salt for use mainly in the deicing of roads. Production in 2006 was down nearly 50% compared with that of 2005, consistent with the production level being weather dependent. The salt was mined from a playa on Fourmile Flat about 40 km southeast of Fallon in Churchill County. Salt has been harvested almost continuously since the 1860s from this site, when it was hauled to the mills to process Comstock silver and gold ore.

Silica.—In 2006, Nevada's major silica producer, Simplot Silica Products, Overton, Clark County, shipped a quantity of silica sand equivalent to that shipped in 2004 and 2005.

The sand was mined from a large open pit in the relatively friable Cretaceous Baseline Sandstone, washed in the pit, and transported via an 8-km slurry pipeline to a plant where it was screened and bagged. Simplot planned to upgrade its processing facilities in the near future. The upgrade was expected to increase production of silica products to nearly 770,000 t/yr.

American Cement and Aggregate produced silica sand from the Ordovician Eureka Quartzite about 5 km southeast of Mercury in Nye County. A plan of operations submitted to the BLM in 2001 called for annual production of nearly 73,000 t. The product, which contains about 98% silicon dioxide (SiO₂), is used mainly as construction sand. The company also holds claims that cover an abandoned quarry in Eureka Quartzite that contains more than 99% SiO₂ in Clark County.

Sand and Gravel and Stone, Crushed.—Production from sand and gravel deposits accounted for about 65% of aggregate production statewide, with crushed stone and lightweight aggregate making up the balance. Construction aggregate produced in the Las Vegas area in 2006, estimated to be about 30 Mt, was slightly lower than in 2005. Sand and gravel operations accounted for about 75% of the aggregate used in the Las Vegas metropolitan area in 2006. As in past years, the Lone Mountain area in northwest Las Vegas remained the most important source of sand and gravel aggregate, accounting for more than 9 Mt in 2006. Significant production also came from sand and gravel pits and stone quarries south and northeast of Las Vegas, and in the El Dorado Valley area west of Boulder City. 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 0.9 Mt of aggregate in 2006 were American Sand and Gravel, CTC Crushing, Frehner Construction Company, Inc., Las Vegas Paving Corp., Nevada Ready Mix Corp., Rinker Materials, and Wells Cargo. Companies with production in excess of 450,000 t/yr were Granite Construction and Hollywood Sand and Gravel. Las Vegas Paving, a major producer of asphalt concrete, produced sand and gravel from its Blue Diamond and Lone Mountain pits. The company also produced crushed stone from the Apex landfill about 16 km 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 the Swiss company Holcim) mined and crushed limestone from its Sloan property a few miles south of Las Vegas. Rinker Materials (a subsidiary of the Australian-based CSR Group) produced crushed granite from the El Dorado pit near Railroad Pass. Community pits and other aggregate mining facilities administered by the BLM and operated by several companies contributed about 7.3 Mt to the Las Vegas area total in 2006. American Sand and Gravel and Hollywood Sand and Gravel produced aggregate from community pits. The Southern Nevada Lightweight operation near Jean produced aggregate for lightweight concrete block and sand for use in stucco. Lightweight aggregate was also shipped to the Las Vegas market by the Cind-R-Lite Block Company from a cinder operation near Amargosa Valley in Nye County.

More than 8 Mt of construction aggregate was produced in

the Reno-Sparks-Carson City area in 2006, about 15% more than in 2005. Companies in the area that produced more than 0.9 Mt of aggregate were Granite Construction Co., Martin Marietta Materials Inc., and RMC Nevada. Granite Construction produced aggregate from several pits in the area, but the bulk of the company's production was of crushed andesite and crushed granitic rock from its Lockwood and Hidden Canyon pits, respectively. RMC Nevada owns the former All-Lite Aggregate crushed rhyolite operations and Paiute Pit Aggregates sand and gravel operations. Most of Martin Marietta's production came from the Rocky Ridge Quarry north of Sparks, which produced crushed granitic rock. A & K Earthmovers also produced more than 0.9 Mt, but much of this was fill material. Rilite Aggregate Co. and Frehner Construction Co., Inc. were also important producers. Crushed rock accounted for about 60% of the aggregate used in 2006 in the Reno-Sparks-Carson City area. Lightweight aggregate, an important component of crushed rock production in the area, was produced by Basalite Concrete Products LLC, Rilite Aggregate Co., and RMC Nevada.

More than 4.5 Mt of aggregate was likely produced outside of the major metropolitan areas in Nevada in 2006. Operators in Nye County together produced more than 1.8 Mt of aggregate in 2006, mostly in the Pahrump area. Elko and Lyon Counties each produced more than 270,000 t. Lincoln and Churchill Counties each produced more than 180,000 t, and Lander and Douglas Counties each produced more than 90,000 t. Other rural Nevada counties are thought to have produced less than 90,000 t of aggregate each in 2006.

Stone, Dimension.—Mt. Moriah Stone Quarries, LLC mined flaggy quartzite of several colors from the Cambrian Prospect Mountain Quartzite at a quarry about 24 km north of Baker in White Pine County. This material, which naturally splits into large slabs, is used for ashlar (uncut facing stone), flagstone, and other types of uncut building stone.

Las Vegas Rock produced ashlar, boulders, crushed landscape rock, and flagstone from its Rainbow Quarries near Goodsprings, about 32 km southwest of Las Vegas. The stone was mined from the Jurassic Aztec Sandstone.

Zeolites.—Nevada contains large known resources of zeolite. However, zeolite production has been small and no zeolite was mined in 2006. Ash Meadows Zeolite LLC (a subsidiary of Badger Mining Corp.) ships 1,000 to 5,000 t/yr of clinoptilolite used in water filtration, odor control, and nuclear cleanup from a plant in Amargosa Valley in Nye County. The clinoptilolite is mined from a small open pit in California in a large area of zeolite deposits that extends into Nevada.

Metals

As reported by the NBMG and the NDM, Nevada produced 194,000 kg (6.32 million troy ounces) of gold, 264,000 kg (8.49 million troy ounces) of silver, 58,000 t (127.5 million pounds) of copper, and 259 t (570,500 pounds) of molybdenum in 2006.

Gold.—Gold production was down 16,700 kg (537,000 troy ounces) compared with that of 2005, marking the sixth consecutive year of declining production. Twenty-four mines in Nevada reported gold production in 2006. Fifty-one percent of production came from mines on the Carlin trend. A 55%

decrease in production from the Cortez Mine (60% Barrick, 40% Kennecott) contributed significantly to the decline in Nevada's gold productions in 2006. The decrease in production at Cortez was attributed to the mining of some lower grade ore from the remaining reserves at the Pipeline openpit complex.

Barrick Gold Corp., with production from its Betze Post, Meikle, Cortez (60% share), and Turquoise Ridge Mines (75% share), plus its 50% share of the Round Mountain Mine's production, and 33% share of the Marigold Mine's production, produced a total of 92,900 kg (2.99 million troy ounces) of gold, the highest in Nevada. Barrick was able to maintain its top spot by completing its acquisition of Placer Dome Inc. (including its Cortez, Bald Mountain, and Turquoise Ridge Mines) in 2006. For the seventh consecutive year, Barrick's Betze Post Mine was Nevada's most productive gold mine, with an output of 44,500 kg (1.43 million troy ounces). Barrick's Meikle Mine, the largest underground mine in Nevada, produced 14,930 kg (0.48 million troy ounces).

Newmont Mining Corp. reported production of 72,470 kg (2.33 million troy ounces) of gold, the second highest in Nevada, from its Carlin Trend Mine, and from the Twin Creeks, Lone Tree, Mule Canyon, Midas, and Phoenix Mines (plus its 25% share of the Turquoise Ridge joint venture with Barrick). Newmont's Carlin Trend Mine produced 40,750 kg (1.31 million troy ounces).

Royal Standard Minerals Inc. completed the permitting process and began preliminary mining tests at its Gold Wedge underground deposit in the Manhattan District, Nye County. Ore is hosted predominantly by the Ordovician Zanzibar Limestone. The first gold production was expected in 2007 with a planned throughput of 450 to 635 t/d.

Silver.—Nevada's production of silver in 2006 accounted for 24% of the U.S. total and 1.4% of the world total. Much of Nevada's silver production, which totaled 264,000 kg (8.49 million troy ounces), was a coproduct or byproduct of gold mining. Coeur d'Alene Mines Corp.'s Rochester Mine maintained its place as the leading silver mine in Nevada with production of 159,000 kg (5.11 million troy ounces). The Rochester Mine was considered a primary silver operation in that the silver production value from the mine exceeded that of gold, based upon the average price of gold and silver at a ratio of 52:1 in 2006. The quantity of silver produced from the Rochester Mine in 2006 was 71 times greater than that of gold. Mining at Rochester was expected to end in 2007, although leaching recovery was to continue until 2011.

As in 2005, Newmont's Midas Mine was the second leading silver producer at 52,700 kg (1.70 million troy ounces). The Round Mountain Mine followed in third place, producing 20,000 kg (0.64 million troy ounces) of silver.

Other Metals.—In 2006 Idaho General Mines, Inc. acquired its second large molybdenum project, the Hall-Tonopah project. The Hall-Tonopah property includes the former Hall molybdenum deposit, which was operated as an open pit mine between 1982 and 1991 by the Anaconda Company and Cyprus Minerals, Inc. Extensive diamond drilling during the Anaconda era resulted in finding and delineating a deposit estimated to contain 180 Mt at a grade of 0.091% molybdenum. During this period, approximately 45 Mt was mined and processed at an approximate grade of 0.11% molybdenum.

Golden Phoenix Minerals Inc., Vicksburg District, Humboldt County began production at its small underground Ashdown molybdenum mine and shipped its first concentrate in December 2006. The mineralization is hosted in a narrow quartz vein, the Sylvia vein, characterized by bands of high-grade molybdenite. Masses of nearly pure molybdenite, assaying up to 46% molybdenum were encountered in the Ashburn deposit. Diluted head grades delivered to the mill for processing averaged between 1.75% and 4.75% molybdenum.

Copper production was mainly from Quadra Mining Inc.'s Robinson Mine. Overall production was increased in 2006 with the opening of Newmont's Phoenix Mine, which produced 2,800 t of copper. Newmont expected Phoenix to produce 6,800 to 11,300 t/yr of copper when in full operation.

Mine Reclamation Award

Newmont Mining Corp. was presented an award in the category of Wildlife Habitat Enhancement for its work at the Bootstrap Mine in Elko County near Carlin. Newmont's unique design revegetation strategy served to create a very wildlife friendly site. Newmont's use of variable topography and native seed mixes allowed wildlife to rapidly repopulate the mine area. The waste rock disposal areas at the Bootstrap Mine were considered to be an excellent example of proactive concurrent mine reclamation and successful post-mining land use for enhanced wildlife habitat. The Nevada Excellence in Mine Reclamation Award is given cooperatively by the Nevada Division of Minerals, Nevada Division of Environmental Protection, Nevada Division of Wildlife, U.S. Bureau of Land Management, and the U.S. Forest Service. There have been 51 projects and 6 individuals recognized since the awards program began in 1990 (Dreisner and Coyner, 2006).

Government Programs

Through a survey conducted early in 2007, the Nevada Division of Minerals collected data for NBMG Special Publication P-18, Major Mines of Nevada 2006. 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. The publication also contains a section on economic impacts of the industry. The full contents of this 28-page publication are available, free of charge, at www.nbmgs.unr.edu. Additional information about the Nevada mineral industry and the overall United States gold industry, including the contents of selected publications, also are available at this Web site, as well as the Nevada Division of Minerals Web site (<http://minerals.state.nv.us/>). In 2006, the NBMG also released Map 149, Gold and Silver Resources in Nevada, which illustrates the locations of 943 deposits and is supported by a database with coordinates and references (Davis and others, 2006).

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TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN NEVADA^{1,2}
(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	2004		2005		2006		
	Quantity	Value	Quantity	Value	Quantity	Value	
Clays:							
Bentonite	W	W	7	W	W	W	
Fuller's earth	W	W	25	W	W	W	
Gold ³	kilograms	216,000	2,850,000	212,000	3,030,000	206,000	4,010,000
Sand and gravel, construction		43,100	197,000	52,300	230,000	45,500	224,000
Silver ³	kilograms	302,000	65,000	276,000	65,200	245,000	91,300
Stone, crushed		9,760	72,800	9,460 ^r	67,900 ^r	10,200	87,500
Combined values of barite, brucite (2004), cement (portland), clays (kaolin), copper, diatomite, gemstones (natural), gypsum (crude), lime, lithium carbonate, magnesite, molybdenum concentrates, perlite (crude), pumice and pumicite (2006), salt, sand and gravel (industrial), zeolites, and values indicated by the symbol W		XX	286,000	XX	488,000	XX	724,000
Total		XX	3,470,000	XX	3,890,000 ^r	XX	5,140,000

^rRevised. W Withheld to avoid disclosing company proprietary data. Withheld values included in "Combined values" data. XX Not applicable.

¹Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Recoverable content of ores, etc.

TABLE 2
NEVADA: CRUSHED STONE SOLD OR USED, BY KIND¹

Kind	2005			2006		
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)
Limestone	6	4,710	\$26,700	6	5,220	\$36,200
Dolomite	3	W	W	3	W	W
Granite	5 ^r	3,240	23,400	5	3,410	28,000
Volcanic cinder and scoria	2	W	W	2	W	W
Miscellaneous stone	4 ^r	1,080 ^r	6,790 ^r	4	1,110	9,880
Total	XX	9,460 ^r	67,900 ^r	XX	10,200	87,500

^rRevised. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 3
NEVADA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2006, BY USE¹

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate, graded, concrete aggregate (coarse)	W	W
Coarse and fine aggregates, other	W	W
Agricultural, other	W	W
Chemical and metallurgical:		
Cement manufacture	W	W
Lime manufacture	W	W
Sulfur oxide removal	W	W
Special, mine dusting or acid water treatment	W	W
Unspecified ²		
Reported	2,810	20,200
Estimated	4,800	44,000
Total	7,630	63,700
Grand total	10,200	87,500

W Withheld to avoid disclosing company proprietary data; included in "Grand total."

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Reported and estimated production without a breakdown by end use.

TABLE 4
NEVADA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2006, BY USE AND BY DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2	
	Quantity	Value	Quantity	Value
Construction:				
Coarse aggregate graded ²	--	--	W	W
Coarse and fine aggregates ³	W	W	--	--
Agricultural ⁴	W	W	--	--
Chemical and metallurgical ⁵	W	W	W	W
Special ⁶	--	--	W	W
Unspecified: ⁷				
Reported	2,070	14,900	739	5,300
Estimated	880	6,500	3,900	37,000
Total	3,880	38,500	6,290	49,000

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes concrete aggregate (coarse).

³Includes other coarse and fine aggregates.

⁴Includes other agricultural uses.

⁵Includes cement and lime manufacture and sulfur oxide removal.

⁶Includes mine dusting or acid water treatment.

⁷Reported and estimated production without a break down by end use.

TABLE 5
NEVADA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2006,
BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	1,820	\$14,700	\$8.06
Plaster and gunite sands	108	992	9.19
Concrete products (blocks, bricks, pipe, decorative, etc.)	125	1,120	8.98
Asphaltic concrete aggregates and other bituminous mixtures	623	5,980	9.59
Road base and coverings ²	2,920	14,700	5.04
Fill	1,170	5,600	4.81
Snow and ice control	31	208	6.71
Other miscellaneous uses ³	617	2,910	4.71
Unspecified: ⁴			
Reported	13,100	36,600	2.80
Estimated	25,100	142,000	5.65
Total or average	45,500	224,000	4.93

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes road and other stabilization (lime).

³Includes filtration and railroad ballast.

⁴Reported and estimated production without a breakdown by end use.

TABLE 6
NEVADA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2006, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregates and concrete products ²	496	4,080	1,430	11,600	125	1,100
Asphaltic concrete aggregates and road base materials ³	1,290	9,500	2,260	11,200	--	--
Fill	921	4,670	245	939	--	--
Other miscellaneous uses ⁴	600	2,650	49	467	--	--
Unspecified: ⁵						
Reported	3,340	15,600	134	2,500	9,570	18,500
Estimated	4,940	28,000	20,100	114,000	--	--
Total	11,600	64,500	24,200	140,000	9,700	19,600

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes plaster and gunite sands.

³Includes road and other stabilization (lime).

⁴Includes filtration, railroad ballast, and snow and ice control.

⁵Reported and estimated production without a breakdown by end use.