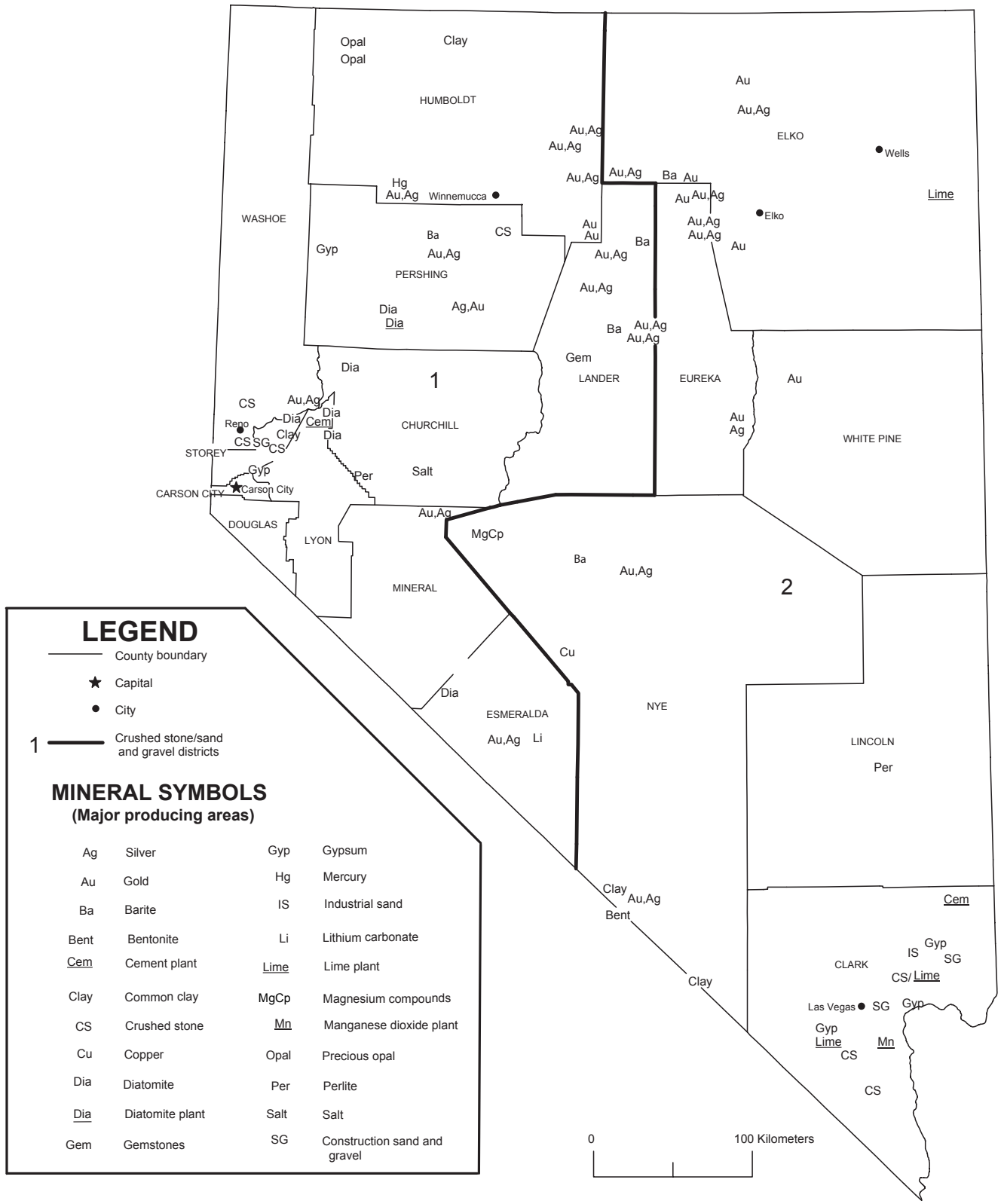
NEVADA



LEGEND

- County boundary
- ★ Capital
- ● City
- 1 — Crushed stone/sand and gravel districts

MINERAL SYMBOLS
(Major producing areas)

Ag	Silver	Gyp	Gypsum
Au	Gold	Hg	Mercury
Ba	Barite	IS	Industrial sand
Bent	Bentonite	Li	Lithium carbonate
Cem	Cement plant	Lime	Lime plant
Clay	Common clay	MgCp	Magnesium compounds
CS	Crushed stone	Mn	Manganese dioxide plant
Cu	Copper	Opal	Precious opal
Dia	Diatomite	Per	Perlite
Dia	Diatomite plant	Salt	Salt
Gem	Gemstones	SG	Construction sand and gravel

Source: Nevada Bureau of Mines and Geology/U.S. Geological Survey (2002)

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 2002, the estimated value[1] of nonfuel raw mineral production for Nevada was $2.9 billion, based upon preliminary U.S. Geological Survey (USGS) data. This was a 5% increase from that of 2001[2] and followed a 7.6% decrease in 2001 from 2000. The State continued to be second in the Nation in nonfuel mineral production value, of which Nevada accounted for more than 7.5% of the U.S. total.

Nevada, which has led the Nation in gold production since 1981, provided nearly 81% of the Nation's gold in 2002. After being first in silver production from 1987-2001, the "Silver State" was second in 2002 and provided nearly 31% of the silver produced from U.S. mines. In 2002, gold accounted for 82% of Nevada's nonfuel raw mineral production value, followed by construction sand and gravel with about 6% and silver with about 2% of the State's total value. The increase in gold value (production down slightly) accounted for most of the State's increase in value in 2002; crushed stone and bentonite had smaller yet significant increases (table 1).

In 2001, decreases in the values of gold, down $190 million, and silver, down about $41 million, accounted for most of the State's decrease in nonfuel mineral value. There were significantly smaller decreases in copper and lithium carbonate of $4 million and about $2 million, respectively. The largest increases in value were those of lead, up more than $4 million, crushed stone, up about $3 million, and lime, up about $2 million. Nevada's other nonfuel minerals showed changes in value of $1 million or less (table 1).

Based upon USGS estimates of the quantities produced in the 50 States during 2002, Nevada continued to be the only State to produce magnesite and lithium minerals (descending order of value). The State remained first in gold, first of two barite-producing States and first of two States that produce brucite, second of four diatomite-producing States, third in gypsum, fifth in perlite, and seventh in lime. While Nevada rose in rank to 10th from 11th in construction sand and gravel, it dropped to 2d from 1st in silver.

The following narrative information was provided by the Nevada Bureau of Mines and Geology (NBMG).[3] Production data in the following text are those reported by the NBMG, based upon its own surveys, estimates, and information gathered from company annual reports. The NBMG data are reported by that agency to be nonproprietary data and may differ from some USGS preliminary estimates and production figures as reported to and estimated by the USGS.

Exploration and Development Activities

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

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

More than 13,500 mining claims were staked in Nevada in 2002, three times the number recorded in 2001. Claim staking activity was scattered across the State, but two districts, Rye Patch (with 1,605 claims) and South Buckhorn (with 1,498 claims), ranked far ahead of all others in total claims staked. Newmont staked more than 1,800 claims in the State, with more than 1,100 of these in the vicinity of its Midway property in the Rye Patch district, Nye County. Pacific Intermountain Gold Co. staked more than 1,200 claims, mostly in the Rye Patch and surrounding districts in Nye and Esmeralda Counties. Anglo Gold and Cordex staked claim blocks in the Iron Point district, Humboldt County, and Idaho Resources Corp., Nevada North Resources (USA) Inc., and Placer Dome each staked claims in the South Buckhorn area of Eureka County. Barrick Gold staked ground in the Divide district of Elko County and in the

[1]The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the minerals or 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 2002 USGS mineral production data published in this chapter are preliminary estimates as of July 2003 and are expected to change. For some mineral commodities, such as construction sand and gravel, crushed stone, and portland cement, estimates are updated periodically. To obtain the most current information, please contact the appropriate USGS mineral commodity specialist. Specialist contact information may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals/contacts/comdir.html; alternatively, specialists' names and telephone numbers may be obtained by calling USGS information at (703) 648-4000 or by calling the USGS Earth Science Information Center at 1-888-ASK-USGS (275-8747). All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals.

[2]Values, percentage calculations, and rankings for 2001 may differ from the Minerals Yearbook, Area Reports: Domestic 2001, Volume II, owing to the revision of preliminary 2001 to final 2001 data. Data for 2002 are preliminary and are expected to change; related rankings may also change.

[3]Joseph V. Tingley and Stephen B. Castor, Research Geologists, coauthored the text of the State mineral industry information provided by the Nevada Bureau of Mines and Geology.

Goldbanks and Kennedy districts of Pershing County. An independent prospector vied with the large gold companies and picked up more than 700 new claims in several districts in Elko and Eureka Counties.

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

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

Vermiculite deposits occur in the Gold Butte area in Clark County about 80 kilometers (km) east of Las Vegas. The deposits were of interest because they contain high-quality vermiculite and are near potential markets in southern California. In recent years, Stansbury Holdings Corp., which mines vermiculite in Montana and exfoliates it in California, explored for vermiculite in the Gold Butte area. However, the company was concentrating on deposits in Montana.

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

Commodity Review

Industrial Minerals

The total value of industrial minerals produced in Nevada in 2002, an estimated $420 million, was slightly lower than that of 2001. In order of estimated value, the most important Nevada industrial minerals in 2002 were construction aggregates, lime, diatomite, cement, gypsum, magnesia, silica, clay, and barite, each valued at more than $10 million. Commodities with values of less than $10 million were dimension stone, dolomite, gemstones, lithium, perlite, potassium alum, salt, and zeolite. Borate and zeolite were processed in Nevada but mined in California. Data used for these estimates and data reported for individual commodities below were obtained from the Nevada Division of Minerals, the U.S. Bureau of Land Management, or directly from the companies that produced the commodities.

Aggregate (Sand and Gravel, Crushed Stone).—In 2002, Nevada's statewide construction aggregate production was estimated at 32 million metric tons (Mt), which was unchanged from 2001. This production had an approximate value of $158 million, well below that of gold but higher than that of any other of the State's mined commodities. Production from sand and gravel deposits accounted for about 78% of aggregate production statewide, with crushed stone and lightweight aggregate making up the balance.

Construction aggregate produced in the Las Vegas area was estimated to be 24 Mt, which was about the same as that of 2002. Continued growth in the Las Vegas area will likely maintain demand and production, while the planned new Ivanpah Valley Airport and attendant urbanization south of Las Vegas constitute major new markets.

Sand and gravel operations accounted for about 80% of the aggregate used in the Las Vegas metropolitan area in 2002, with crushed stone and lightweight aggregate making up the balance. The most important source of sand and gravel aggregate for Las Vegas was the Lone Mountain area northwest of Las Vegas, which accounted for 4.5 Mt in 2001. Significant production also came from sand and gravel pits in the southwest part of Las Vegas. Since about 1994, portable crushers operating at construction sites have become increasingly important producers of base aggregate; recent estimates by industry personnel put portable crusher production at as much as 30% of the total aggregate production for Las Vegas. Crushed stone, mostly crushed carbonate rock mined from outlying areas, has gained importance in the Las Vegas construction aggregate market in recent years, particularly as concrete aggregate.

Companies in the Las Vegas area that produced more than 900,000 t of aggregate in 2002, ranked in approximate order of tonnage produced, were Las Vegas Paving Corp., Rinker Materials Corp., Nevada Ready Mix Corp., and Frehner Construction, Co., Inc. Other important producers were Wells Cargo Inc., CTC Crushing LLC, Hollywood Gravel Co., and Diamond Construction Co.

Nevada Ready Mix mined all of its aggregate from a complex of pits in alluvium in the Lone Mountain area; minor production also came from adjacent bedrock. Las Vegas Paving Corp. produced sand and gravel from its Blue Diamond pit (acquired from Rinker Materials in December 2001), its Lone Mountain pit, and portable crushing operations. The company also produced crushed stone from the Apex landfill about 16 km northeast of the metropolitan area. Rinker Materials Corp. (a subsidiary of the Australian-based CSR Group) produced sand and gravel from its Buffalo Road pit and crushed granite from the El Dorado pit near Railroad Pass. Frehner Construction mined and crushed limestone from its Sloan property a few kilometers south of Las Vegas. Community pits and other aggregate mining facilities administered by the U.S. Bureau of Land Management and operated by several companies contributed about 2.9 Mt to the Las Vegas area total in 2002. The Southern Nevada Lightweight operation near Jean mainly produced aggregate for lightweight cement block and sand for use in stucco. Lightweight aggregate also was shipped from Nye County into the Las Vegas market by Cind-R-Lite Block Co. from a cinder cone near Amargosa Valley.

Production of construction aggregate in the Reno-Sparks-Carson City area, at 5.4 Mt, was unchanged from that of 2001. Three companies in the area produced more than 900,000 t of aggregate in 2002—Martin Marietta Materials Inc., Granite Construction Co., and RMC Nevada Inc. Most of Martin Marietta's production comes from the old Rocky Ridge Quarry north of Sparks. Granite Construction produced aggregate from five pits in the area. RMC Nevada, part of a U.S. holding company for a U.K. group, now owns All-Lite Aggregate Co. and Paiute Pit Aggregates Co. Rilite Aggregate Co., Frehner Construction, and A&K Earthmovers Inc. were also important producers. Crushed rock, which accounted for about 60% of the aggregate used in 2001 in the Reno-Sparks-

Carson City area, included material from Martin Marietta Materials, Granite Construction, and Frehner operations and lightweight rhyolite aggregate from All-Lite, Rilite, and Naturalite Aggregate Corp.

Aggregate produced outside of the major metropolitan areas in 2002 totaled about 2.7 Mt. Operators in Nye County produced more than 450,000 metric tons (t) of aggregate in 2002 mostly in the Pahrump area. Elko and Lyon County each produced more than 180,000 t of aggregate. Much of the Lyon County material was sold into the Reno-Carson City metropolitan area. The other Nevada counties were estimated to have produced less than 180,000 t of aggregate each in 2002.

Barite.—Nevada produced about 342,000 t of barite in 2002, down considerably from the 434,000 t produced in 2001. About 98% of the barite sold in the United States was used as a weighting agent in oil- and gas-well-drilling fluids. Rises in oil and natural gas prices resulted in an increase in the number of domestic operating drilling rigs from 360 in 1999 to 1,270 in mid-2001 mostly for gas exploration. However, in 2002, only about 700 rigs were operating.

M.I. Drilling Fluids, which was jointly owned by Smith International Inc. and Schlumberger Ltd., was again the largest Nevada barite producer in 2002, with combined production of about 185,000 t of screened and crushed high-grade ore from the Greystone Mine and ground and bagged barite from its Battle Mountain plant, both of which are in Lander County.

Baroid Drilling Fluids (a subsidiary of Halliburton Co.) mined barite from the Rossi Mine about 60 km northwest of Elko in Elko County and processed it at the Dunphy Mill in Eureka County. Baker Hughes INTEQ (a division of Baker Hughes Inc.) produced barite from its Argenta property near Battle Mountain in Lander County. Standard Industrial Minerals Inc. shipped a small amount of barite from a deposit of white, paint-grade barite at the P and S Mine in Nye County to a processing plant in Bishop, CA. Nevada Drilling Fluids staked claims in the Northumberland district near the Monitor Mine about 8 km southeast of P and S Mine.

Boron.—American Borate Co. mined borate minerals at the Billie Mine in Death Valley, CA, for export. The ore was processed in Nevada at the Lathrop Wells mill in Nye County, but because the ore was mined from out of State, production was not included in the estimate of total value of Nevada minerals.

Cement.—The only major producer, the Nevada Cement Co. in Fernley, Lyon County, produced in excess of 450,000 metric tons per year (t/yr) of cement. The cement was manufactured from limestone mined from a deposit a few kilometers south of Fernley, and other ingredients that came from northern Nevada.

Clays.—Nevada clay production was about 30,000 t, the same level as that of 2001. It does not include halloysite clay mined in Washoe County for Nevada Cement Co., which was included in the cement figure.

IMV Nevada (owned by Mud Camp Mining Co. LLC) produced more than 27,000 t of sepiolite, saponite, and bentonite from deposits in lacustrine sediments in the Ash Meadows area of Nye County. The company had a processing plant in Amargosa Valley and exported a variety of clay products worldwide. Most of the value from the operation came from the sepiolite, which has specific uses in asbestos replacement and saltwater drilling. IMV Nevada owned the only commercial sepiolite deposit in North America.

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

The Moltan Co. used clay from a deposit near Empire in northern Washoe County to mix with diatomite in clumping cat litter produced at its plant near Fernley. In 2002, Oil-Dri Corp., the world's largest manufacturer of cat litter, was unable to proceed with development of a large calcium montmorillonite deposit in Hungry Valley north of Reno as a source of material for clumping cat litter. The company was not granted a special use permit for mining and processing by Washoe County despite getting the go-ahead from the U.S. Bureau of Land Management. In order to proceed with its plans to become a major west coast supplier of cat litter, the company purchased a mine and plant in Taft, CA, from the Clorox Co. Oil-Dri also holds the Capricorn clay deposit in northern Washoe County, but this deposit was considered to be too remote to be competitive at present. Specialty Clays Corp. has been evaluating a deposit of bentonite in Churchill County about 16 km southeast of Fallon. This bentonite was reported to have expansive qualities similar to that of Wyoming bentonite.

Diatomite.—Diatomite production in Nevada increased about 5% in 2002 compared with 2001 and accounted for more than 30% of domestic production. About two-thirds of the diatomite produced was used in filtration with the remainder largely used in absorbents, fillers, and cement. Emerging small-scale uses included pharmaceutical processing and nontoxic insecticides.

Eagle-Picher Minerals, Inc. (a division of Eagle-Picher Industries, Inc., a wholly owned subsidiary of Granaria Holdings Ltd. of the Netherlands) produced most of Nevada's diatomite at three different locations. The most productive was the Colado operation in Pershing County, which consisted of a plant at Lovelock that made diatomaceous earth filtration products from diatomite mined from pits about 24 km northwest of Lovelock. The company also produced diatomite used in fillers and absorbents at its Clark plant and mine in Storey County about 32 km east of Reno and diatomite used in insulation from a pit near Hazen in Lyon County.

Moltan Co. of Tennessee was the second largest diatomite producer in Nevada, producing absorbent products, cat litter, and soil conditioner at a mine and plant complex in Churchill County about 32 km northeast of Fernley. Moltan (a family-owned Tennessee company) shipped diatomaceous earth absorbents under several labels. The company produced two cat litter types in Nevada, a nonclumping diatomite product and a clumping product composed of diatomite and clay.

Other companies that mined diatomite in Nevada in 2002 were the Celite Corp. at Hazen in Lyon County and Grefco Inc. at Basalt near the Esmeralda/Mineral County line. Celite (a subsidiary of World Minerals Inc., which is part of the Alleghany Group) owns a large diatomite facility in California and recently acquired the CR Minerals mine at Hazen and a plant in Fernley, which produces

functional filler. The Grefco operation was being expanded and may become a second producer of filter-grade diatomaceous earth in Nevada.

Dimension Stone.—A recent attempt to market cut dimension stone processed from several varieties of ash flow tuff in the Beatty area was abandoned after several years because of competition in the Las Vegas market from Mexico. However, split dimension stone products were produced at two localities in Nevada, and new dimension stone operations may be underway.

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 is quartz-cemented sandstone that is part of the Jurassic Aztec Sandstone, which crops out extensively in Clark County, but is too friable at most localities for use as building stone. The company also marketed some cut stone and was planning to produce polished slabs and custom stone shapes.

Mt. Moriah Stone quarried flaggy, light-gray quartzite 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 slabs up to 1.5 meters (m) by 2.4 m by 10 centimeters thick, was used for flagstone and other types of uncut building stone. The company typically operated from April to December each year.

In 2001, Building Stone Associates quarried a small amount of purplish- to greenish-gray and blue mottled slate from the Precambrian McCoy Creek Group rocks in Egan Canyon west of Cherry Creek in White Pine County. It wasn't known if the operation was continued into 2002.

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

Gypsum.—Gypsum production in Nevada decreased to 1.7 Mt from 2.0 Mt in 2001. The State accounted for more than 10% of domestic production, ranking only behind Oklahoma and Iowa. Three large producers, PABCO Gypsum, BPB PLC, and USG, used most of this gypsum in local wallboard plants.

PABCO Gypsum in Clark County northeast of Las Vegas mined and processed more than 1 billion metric tons of gypsum ore in 2001. Although processing yields only about 70% by weight gypsum from the ore, the company still ranked as the largest producer in Nevada. The gypsum deposit, which was a nearly flat-lying blanket in excess of 37 m thick in places, occurs atop a 1,300-hectare (ha) mesa.

The Blue Diamond operation of BPB PLC (until recently owned by James Hardie Gypsum) southwest of Las Vegas in Clark County was the second largest producer at 493,000 t. The gypsum deposit was the largest of several Permian deposits in the Las Vegas area. It consisted of nearly flat-lying beds of pure gypsum as much as 9 m thick. The Blue Diamond area has been the site of gypsum mining since 1925, but was now in the path of the metropolitan growth, and gypsum mining there may give way to upscale housing development.

USG Corp., the Nation's largest wallboard producer, was the third largest Nevada producer in 2002 at 277,000 t. 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 was of Triassic or Jurassic age and forms several masses in a 500-ha area. The largest mass, the Selenite ore body, contains 85% to 95% gypsum and was generally well bedded with variable dips. Nearby in the San Emidio district in Washoe County, Sierra Cascade, a privately owned company that mined pumice in Oregon, staked claims and filed a plan of operations on a gypsum deposit.

The Art Wilson Co. of Carson City shipped gypsum and anhydrite from the Adams Mine in Lyon County, and the D.L. Denman Construction Co. mined gypsum at the Pioneer Mine about 16 km east of Las Vegas. Material from these relatively small operations was used in cement and agricultural applications. The Adams deposit was a folded, diapiric mass associated with limestone in Triassic metavolcanic rocks. The Pioneer Mine was in the same gypsum deposit as the nearby PABCO operation.

Lime, Limestone, and Dolomite.—In 1997, lime supplanted diatomite as Nevada's second most valuable industrial mineral. Limestone was mined for lime production at two sites in Nevada that were nearly at opposite ends of the State. The high-calcium limestone that was used at both sites was from the same Devonian limestone unit, although it was assigned to different stratigraphic formations. In addition to lime, relatively minor amounts of crushed limestone also were shipped from both sites, and dolomite was mined at one of the sites. Although domestic production of lime has slipped more than 8% during the past 5 years, Nevada's lime production has increased by an estimated 20% during the same period. After a slight downturn in 2001, the State's lime production rebounded nearly to the record levels of 2000 in 2002.

In Nevada, the Pilot Peak high-calcium lime operation of Graymont Western US, Inc. (formerly Continental Lime, Inc.) which is 16 km northwest of Wendover in Elko County, shipped the most lime in 2002 mainly to gold-mining operations for use in cyanide-solution pH control. The Pilot Peak plant had three kilns with a combined capacity of more than 640,000 t/yr of quicklime and a hydrated lime plant capable of producing 320 metric tons per day. In 2002, the Pilot Peak plant was rated the seventh largest producer in the country.

Chemical Lime Co. produced lime at Apex about 32 km northeast of Las Vegas. The operation produced high-calcium quicklime used in metallurgical processing, paper manufacturing, and environmental markets. The plant also produced high-calcium hydrated lime (mainly for environmental markets) and dolomitic quicklime, which was shipped to the company's Henderson plant for production of dolomitic hydrate type S for building and home construction.

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

Columbus SM LLC had planned to initiate production of food- and pharmaceutical-grade precipitated calcium carbonate by processing a large resource of near-surface calcium-rich sediments at the Columbus Salt Marsh in Esmeralda County. The company anticipates production from more than 180,000 t of material within 4 years.

Lithium.—Chemetall Foote Co. (a subsidiary of Chemetall GmbH) produced lithium carbonate, lithium hydroxide monohydrate, and anhydrous lithium hydroxide at Silver Peak in Esmeralda County. This operation was the only primary lithium producer in the United States. It produced these chemicals from brine that was pumped from beneath Clayton Valley playa and evaporated in nearby ponds. Production figures are confidential; the latest public information available, from 1998 Securities and Exchange Commission data, showed production of about 5,400 t of lithium carbonate and 2,300 t of lithium hydroxide. Lithium carbonate was the main feedstock for major uses of the element in aluminum production, ceramics, glass, and lubricants. The use of lithium in batteries, while relatively minor, was expanding. In 1998 lithium carbonate prices dropped significantly because of competition from South American brine operations, but have increased somewhat during the past 3 years.

Magnesium.—Magnesium minerals have been mined at Gabbs in Nye County since 1935, and in the 1940s, ore from Gabbs was used to make magnesium metal. From the 1950s to the 1980s, mining and processing was by Basic Industries, a major producer of refractory magnesia. In 1991, Combustion Engineering Inc. sold Basic Industries to Premier Refractories Inc., which subsequently sold its U.S. magnesia chemicals business to Premier Chemicals LLC in 1999. During the 1990s, the availability of cheap foreign refractory magnesia caused production at Gabbs to be switched to light-burned (caustic) magnesia that was mainly marketed for wastewater treatment and agricultural uses. Although production of magnesia at Gabbs was still substantially below its peak in 1981, magnesia shipments from the Gabbs operation have increased steadily since 1996.

About 60% of U.S. magnesia production comes from seawater and natural brines, and the mine at Gabbs was the only place in the country where magnesite was mined. Brucite, which was only mined domestically at Gabbs and one place in Texas, was shipped in relatively small amounts from the Gabbs operation. It was mainly mined from pods adjacent to igneous rocks in magnesite pits. Magnesite and brucite at Gabbs occurred over an area of about 500 ha in complex replacement bodies in Triassic dolomite. The magnesite was thought to have formed by hydrothermal activity related to emplacement of granite, and the brucite, by alteration of the magnesite during later granodiorite intrusion.

Perlite.—Although the U.S. was the world's largest producer of perlite, domestic perlite suffers transportation cost disadvantages in some areas of the Eastern United States compared with Greek perlite, and domestic production has slipped for 3 years in a row while imports have increased.

Nevada had large perlite resources and several deposits of perlite that have been mined extensively. The largest producer was the Hollinger Mine near Pioche in Lincoln County. However, current (2002) perlite production in Nevada was restricted to relatively small-scale mining of two deposits for niche markets.

Wilkin Mining and Trucking Inc. mined perlite from the Tenacity Perlite Mine about 40 km west of Caliente in Lincoln County. In the past, most of the perlite was shipped as crude; however, the company had a small "popping" plant, the Tenacity Perlite Mill in Caliente, and present sales were almost exclusively expanded perlite that was mainly used for horticultural purposes. Eagle-Picher Minerals Inc. produced expanded perlite at its Colado diatomite plant in Pershing County from perlite mined at the Popcorn Mine about 24 km south of Fallon in Churchill County. The perlite was marketed as a filter aid, and plant capacity was reportedly about 7,300 t/yr.

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

Potash.—A small amount of potassium alum (kalinite) was mined from a deposit in Esmeralda County about 16 km north of Silver Peak by Rulco. The kalinite, which occurred within veins and stringers with sulfur in rhyolitic rock, was being marketed for horticultural use.

Salt.—The Huck Salt Co. produced about 12,900 t of salt in 2002, down 10% from that of 2000. The salt, mined from a playa in Fourmile Flat about 40 km southeast of Fallon in Churchill County, was mainly used for deicing roads. Salt has been harvested from this deposit almost continuously since the 1860s when it was hauled to the mills that processed Comstock silver and gold ore.

Silica.—The U.S. was by far the world's largest producer of silica sand, and domestic annual production has hovered around 28 Mt for the past 5 years, despite increases in recycled glass usage. Simplot Silica Products at Overton in Clark County shipped about 613,000 t of silica sand in 2002, a slight increase over that of 2001. The sand was mined from an open pit 2.4 km long and 91 m deep in the relatively friable Cretaceous Baseline Sandstone, washed in the pit, and transported via 8-km slurry pipeline to a plant where it was screened and bagged. Silica sand has been produced from the deposit since the 1930s; Simplot acquired the operation in 1955. The company planned to upgrade its processing facilities in the near future, with a view toward increasing production from current levels to as much as 770,000 t/yr.

In 2001, Silica LLC submitted a plan of operations to the BLM to mine as much as 73,000 t/yr of quartzite from the Sugar mining claims about 5 km southeast of Mercury in Nye County. The quartzite was strongly brecciated and fractured and could be mined without blasting.

Zeolites.—Ash Meadows Zeolite LLC (a subsidiary of Badger Mining Corp.) shipped 900 to 1,800 t/yr of clinoptilolite that was used in water filtration, odor control, and nuclear cleanup of a plant in Amargosa Valley in Nye County. The clinoptilolite was mined from a large deposit in California that extended into Nevada.

Moltan Co. mined mordenite from a deposit in the Trinity Range in Churchill County about 60 km northeast of Fernley. The company used the zeolite mineral to make absorbents at its Fernley plant.

Metals

Gold.—Nevada produced 240 t of gold in 2002, falling below year 2001 production by 12 t. Silver production was 423 t, about 118 t lower than that of 2001. Even with the production decreases, Nevada maintained its place as the leading gold- and silver-producing State in the United States with 25 mines reporting gold production and 24 mines reporting silver production during 2002.

Newmont Mining Corp.'s Nevada operations (the Carlin trend mines, Lone Tree, the Midas Mine in the Gold Circle district, Mule Canyon, the Phoenix property at Battle Mountain, Trenton Canyon, and Twin Creeks) reported a total production of 84 t of gold in 2002. With this production, Newmont maintained its place as Nevada's largest gold producer. Barrick Gold Corp. remained in second place with production of 80 t of gold. Barrick's production total includes its Goldstrike property in the Carlin trend as well as Homestake's former properties (Ruby Hill and a 50% share of Round Mountain's output).

For the third consecutive year, Barrick Gold's Betze-Post Mine was Nevada's most productive gold mine, producing 44 t in 2002. Newmont's Carlin trend mines produced 42 t, and Placer Dome's Cortez operation (Pipeline Mine) produced 34 t in 2002. Barrick's Meikle Mine, the largest underground mine in the State, reported 2002 production of 20 t of gold.

Silver.—The Rochester Mine, operated by Coeur d'Alene Mines Corp., remained first in silver production in Nevada, producing 200 t in 2002. Newmont's Midas Mine moved into second place with 89 t, displacing Echo Bay's McCoy/Cove Mine, which dropped into third place with 62 t.

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

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

Government Programs

Through a survey conducted early in 2003, the Nevada Division of Minerals collected data for NBMG Special Publication P-14, Major Mines of Nevada 2002. This publication includes, in handbook form, location maps, names and telephone numbers of operators, numbers of employees, and preliminary, nonproprietary, production figures for most mines in Nevada. It also contains a section on economic impacts of the industry. The 28-page publication was available on the Internet in the online documents section at URL www.nbmg.unr.edu. Also available at the same Web site are annual reviews of the Nevada mineral industry.

TABLE 1

NONFUEL RAW MINERAL PRODUCTION IN NEVADA[1, 2]

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral		2000		2001		2002[p]	
		Quantity	Value	Quantity	Value	Quantity	Value
Clays:							
Bentonite		6	804	5	758	34	4,640
Fuller's earth		28	3,870	28	3,870	--	--
Gold[3]	kilograms	268,000	2,410,000	253,000	2,220,000	242,000	2,380,000
Sand and gravel:							
Construction		36,800	172,000	34,000	173,000	33,200	172,000
Industrial		609	W	609	W	608	W
Silver[3]	metric tons	734 [r]	118,000 [r]	544	76,800	449	63,300
Stone, crushed		7,640	37,300	8,230	40,400	9,700	48,600
Zeolites	metric tons	(4)	NA	(4)	NA	(4)	NA
Combined values of barite, brucite, cement (portland), clays [common (2002), kaolin], copper (2000-01), diatomite, gemstones, gypsum (crude), lead (2000-01), lime, lithium carbonate, magnesite, mercury (2000), perlite (crude), salt, and values indicated by symbol W		XX	250,000	XX	248,000	XX	233,000
Total		XX	2,990,000 [r]	XX	2,760,000	XX	2,900,000

[p]Preliminary. [r]Revised. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined values" data.

XX Not applicable. -- Zero.

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

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

[3]Recoverable content of ores, etc.

[4]Value excluded to avoid disclosing company proprietary data.

TABLE 2

NEVADA: CRUSHED STONE SOLD OR USED, BY KIND[1]

Kind	2000				2001			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	4	4,800	$18,900	$3.93	6	5,250	$21,900	$4.17
Dolomite	4	W	W	33.11	4	W	W	17.19
Granite	1	W	W	3.58	1	W	W	3.86
Traprock	14	93	419	4.51	14	93	430	4.62
Volcanic cinder and scoria	2	W	W	5.11	2	W	W	6.21
Miscellaneous stone	4	1,390	10,800	7.77	4	1,250	10,200	8.20
Total or average	XX	7,640	37,300	4.88	XX	8,230	40,400	4.91

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

[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

TABLE 3

NEVADA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2001, BY USE[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate, graded, concrete aggregate (coarse)	W	W	$8.22
Coarse and fine aggregates, unpaved road surfacing	W	W	4.40
Agricultural, other agricultural uses	W	W	34.17
Chemical and metallurgical:			
Cement manufacture	W	W	4.35
Lime manufacture	W	W	3.93
Special, mine dusting or acid water treatment	W	W	5.31
Other miscellaneous uses and specified not listed	W	W	4.68
Unspecified:[2]			
Reported	3,660	$16,700	4.57
Estimated	2,600	15,000	5.82
Total or average	8,230	40,400	4.91

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

[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

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

TABLE 4

NEVADA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2001, BY USE AND BY DISTRICT[1]

(Thousand metric tons and thousand dollars)

Use	District 1		District 2	
	Quantity	Value	Quantity	Value
Construction:				
Coarse aggregate, graded[2]	--	--	83	680
Coarse and fine aggregate[3]	--	--	(4)	(4)
Agricultural[5]	2	87	--	--
Chemical and metallurgical[6]	657	2,860	1,140	4,480
Special[7]	--	--	5	26
Other miscellaneous uses	--	--	38	176
Unspecified:[8]				
Reported	2,220	10,800	1,440	5,890
Estimated	290	2,300	2,400	13,000
Total	3,170	16,100	5,060	24,400

-- Zero.

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

[2]Includes concrete aggregate (coarse).

[3]Includes unpaved road surfacing.

[4]Less than 1/2 unit.

[5]Includes other agricultural uses.

[6]Includes cement manufacture and lime manufacture.

[7]Includes mine dusting or acid water treatment.

[8]Reported and estimated production without a breakdown by end use.

TABLE 5

NEVADA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2001, BY MAJOR USE CATEGORY[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregates and concrete products[2]	4,550	$27,400	$6.02
Asphalt concrete aggregates and other bituminous mixtures	1,570	17,200	11.01
Road base and coverings[3]	3,760	14,300	3.80
Fill	969	3,630	3.75
Snow and ice control	45	231	5.13
Other miscellaneous uses	769	2,760	3.59
Unspecified:[4]			
Reported	8,540	33,400	3.91
Estimated	14,000	74,000	5.37
Total or average	34,000	173,000	5.09

[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

[2]Includes plaster and gunite sands.

[3]Includes road and other stabilization (cement).

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

TABLE 6

NEVADA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2001, BY USE AND DISTRICT[1]

(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]	855	4,920	3,690	22,500	(3)	2
Asphaltic concrete aggregates and other bituminous mixtures	W	W	W	W	30	1,050
Road base and coverings[4]	814	3,730	2,840	9,980	101	560
Fill	637	2,640	332	995	(3)	(3)
Other miscellaneous uses[5]	915	8,220	1,400	10,700	33	199
Unspecified:[6]						
Reported	419	2,060	5,650	26,400	2,480	4,920
Estimated	2,600	14,000	11,000	60,000	--	--
Total	6,220	35,600	25,100	131,000	2,640	6,730

W Withheld to avoid disclosing company proprietary data; included with "Other miscellaneous uses." -- Zero.

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

[2]Includes plaster and gunite sands.

[3]Less than 1/2 unit.

[4]Includes road and other stabilization (cement).

[5]Includes snow and ice control.

[6]Reported and estimated production without a breakdown by end use.