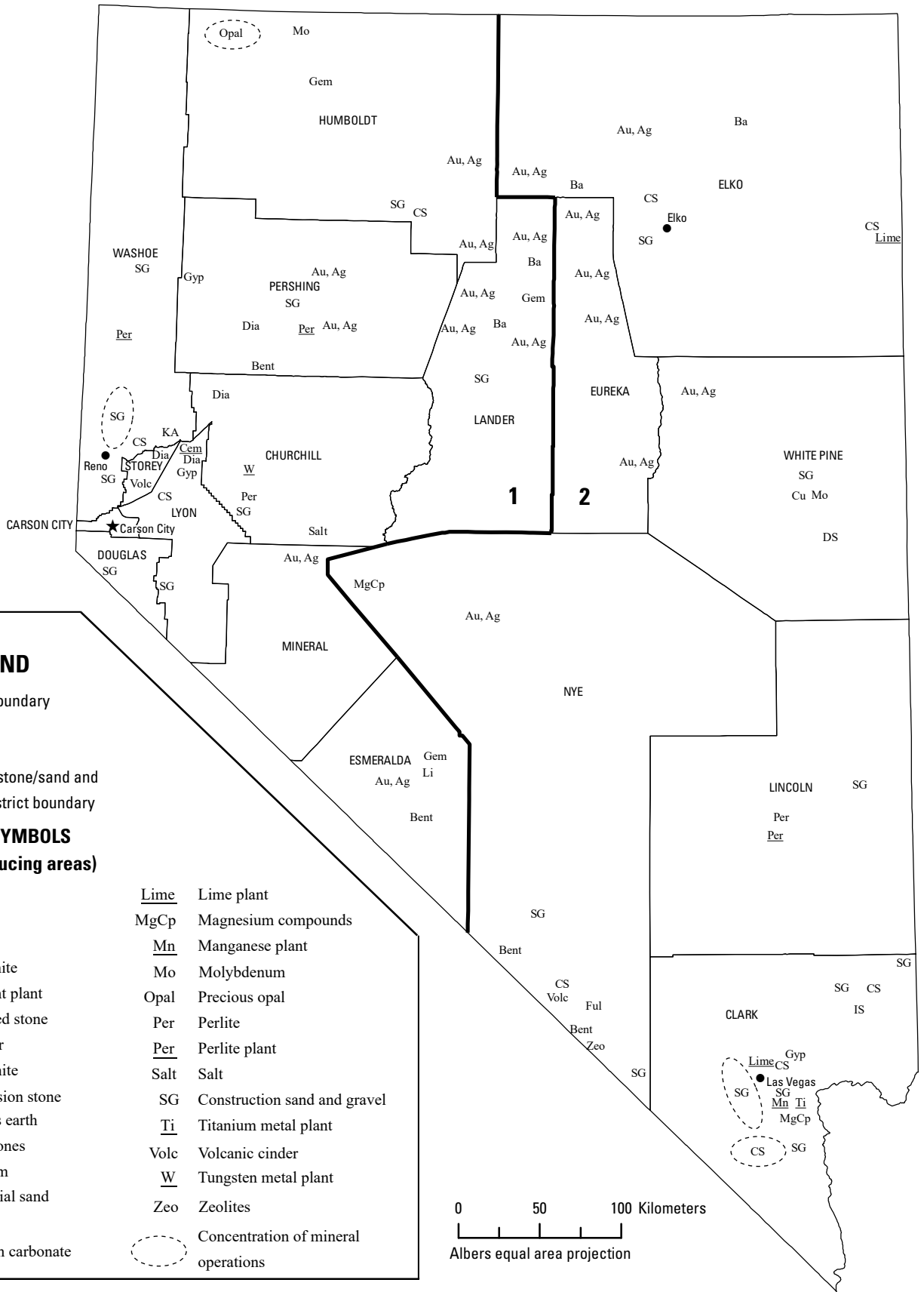




2010–2011 Minerals Yearbook

NEVADA

NEVADA



LEGEND

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

MINERAL SYMBOLS (Principal producing areas)

Ag	Silver	<u>Lime</u>	Lime plant
Au	Gold	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
DS	Dimension stone	SG	Construction sand and gravel
Ful	Fuller's earth	<u>Ti</u>	Titanium metal plant
Gem	Gemstones	Volc	Volcanic cinder
Gyp	Gypsum	<u>W</u>	Tungsten metal plant
IS	Industrial sand	Zeo	Zeolites
KA	Kaolin	○	Concentration of mineral operations
Li	Lithium carbonate		

0 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 2011, the value of Nevada's nonfuel mineral production¹ exceeded \$10 billion, the first time that production in any State had done so, based upon annual U.S. Geological Survey (USGS) data. This was a \$2.3 billion (30%) increase from the State's value of \$7.7 billion in 2010, which followed a \$1.7 billion (28%) increase from \$6 billion in 2009. In both years, this was primarily the result of increased production and rise in the price of gold. Nevada continued to lead the 50 States accounting for approximately 13.4% and 11.6% of the total U.S. nonfuel mineral production value in 2011 and 2010, respectively. Excluding 2005, when it ranked third in nonfuel mineral production value, the State has continuously occupied first or second place since 1992. On a per capita basis, Nevada was third in the Nation in nonfuel mineral production in 2011 with a value of \$3,690, more than 15 times the national average of \$240.

As it has been since at least 1980, gold remained the leading nonfuel commodity in Nevada during 2011 and 2010, accounting for roughly 85% of the State's total nonfuel mineral production value in each year. It was followed by copper (percentage withheld—proprietary company data) and silver, which made up about 2% of the total. Continuing a trend that has recurred since 2001, the production value of gold in Nevada increased in both 2011 and 2010. Gold production value in 2011 totaled \$8.7 billion, up 73% from \$5 billion in 2009. After consistently declining from 2001 to 2009, the production quantity of gold increased in each year as well, and in 2011 was 11,000 kilograms (kg) (6.9%) higher than in 2009. Although the amount of silver produced decreased in 2011 from the previous year, it increased in 2010 for the first time since 2000. The production value, however, climbed each year. In total, the quantity of silver produced increased 5,840 kg relative to 2009 (2.9%) while the production value gained \$141 million (147%). Copper production declined in quantity but increased in production value in 2011 and 2010; the quantity decreased by 17%, whereas the production value jumped by 40% from 2009 to 2011 (values withheld—proprietary company data). Other nonfuel mineral commodities were characterized by a mix of gains and losses in 2011 and 2010. The largest increases in value, during the same period, took place in the production of diatomite (59%), magnesite (65%), lime (23%), and molybdenum concentrates (403%) (values withheld—

proprietary company data). The largest decreases in production value between 2009 and 2011 took place in the sand and gravel and crushed stone industries, with the production value of industrial sand and gravel declining 71%, construction sand and gravel decreasing by \$34 million (28%), and crushed stone dropping \$2.8 million (3.4%).

During 2011 and 2010, Nevada continued to be the only State that produced magnesite and lithium carbonate minerals. It was also one of only two States to produce barite (99% of all U.S. barite produced in 2011 was from Nevada), one of only six States to produce perlite and zeolites (2010 only), and one of only seven States to produce molybdenum concentrates. Nevada has ranked first in the quantity of gold produced since 1981, producing 74% of the U.S. total in 2011 (out of 10 States). The State remained second in diatomite production out of 4 States, and second in silver production (out of 11 States) for the 9th and 10th consecutive years, accounting for 19% of the 2011 and 18% of the 2010 national total. In 2011, Nevada fell to 4th in copper production out of 8 States, down from 3d in 2009 and 2010, to 7th in lime out of 33 States from 5th in 2009; to 9th out of 16 States in the production of crude gypsum from 5th in 2009; and to 16th in construction sand and gravel from 13th in 2009. Nevada rose to second in the production of pumice and pumicite out of seven States, up from fifth in 2009, and remained a significant producer of bentonite, kaolin, gemstones, salt, industrial sand and gravel, crushed stone, dimension stone, and a small amount of portland cement. Mercury was also recovered as a byproduct at several precious metals mines in the State, but no data on the amount produced were available.

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). They were compiled by the Nevada Commission on Mineral Resources, Division of Minerals (NDOM), and the NBMG, based upon the surveys, canvasses, and estimates made by those State agencies, including information gathered from company annual reports. 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.

Exploration and Mine Development Activities

Nevada's exploration activities for industrial minerals continued in 2009 for barite, limestone for cement, diatomite, lithium, pozzolan, construction sand and gravel, crushed stone, and zeolites. Activities included exploration and the staking of

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 USGS mineral production data published in this chapter are those available as of May 2013. Data in this report are rounded to three significant digits and percentages are calculated from unrounded data. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at <http://minerals.usgs.gov/minerals>.

²Jonathan G. Price, Director and State Geologist, David A. Davis, Geologic Information Specialist, 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.

mining claims and mine development. There were significant exploration and mine development activities in the State for gold and minor exploration projects for copper and silver.

Industrial Minerals

Barite.—Baroid Drilling Fluids (Houston, TX), a subsidiary of Halliburton Co. (Dallas, TX), proposed an amendment to their Plan of Operation referred to as the Rossi Mine Expansion Project. This included continued mining at the Sage Hen and Queen Lode Mines (Elko County), construction of a waste rock disposal facility in the Queen Lode area, expansion of the waste rock disposal facility in the Sage Hen area, and continuation of surface exploration. Sage Hen is part of the main Rossi Mine area, and the Queen Lode is near the south end of the main Rossi Mine area. An Environmental Assessment (EA) was prepared, and on October 21, 2010, the Bureau of Land Management (BLM) issued a Record of Decision (ROD) and a Finding of No Significant Impact (FONSI).

In 2009, Baker Hughes proposed to expand their operations at the Argenta Mine in Lander County from a current disturbance area of 433 acres to 592 acres within the boundaries of their Plan of Operation. At the time, the open pits covered 83.6 acres. The BLM issued an EA for the project on August 30, 2010. Expansion was carried out on the Yuba Dump and F Pit North in 2010 and continued into 2011.

In 2011, Halliburton staked new claims in four areas containing barite deposits. Halliburton staked 13 new claims adjacent to 29 others that they owned as part of their REG claim group in the Bateman Canyon Mining District, Lander County. These claims are in the area of the Pleasant View Mine, which consisted of four pits and produced more than 90,700 metric tons (t) of barite between 1975 and 1984. The barite is bedded and up to 3 meters (m) (10 feet) thick in Devonian Slaven Chert. Halliburton staked eight claims (Tom claims) in the Ravenswood Mining District, Lander County. The claims are in the area of the old Allen Barite Mine, which included two large pits. Barite occurs as laminations to thin beds in chert and shale of the Ordovician Valmy Formation. Halliburton staked 12 claims (Ventura claims) in the Iowa Canyon Mining District, Lander County. The claims are in the area of the old Bird Mine, from which more than 900 t (1,000 short tons) of barite were mined from a 61-m-by-91-m (200-foot-by-300-foot) shallow pit between 1979 and 1980. Barite occurs in two units in shale, chert, and limestone of the Ordovician Valmy Formation. Halliburton staked 38 claims (Chris claims) in the Northumberland Mining District, Nye County. The claims are in the area of the Chris deposit, which underwent periods of trenching and drilling prior to 1981. The claims are also adjacent to claims held by Baker Hughes and Barium, Inc., Payette, Idaho. Barite occurs with chert, claystone, and mudstone, of apparent Devonian age (Papke, 1984).

Spirit Minerals has continued to keep its claims current and staked new ones in 2009. Spirit Minerals staked 42 lode claims adjacent to earlier claims in the Northumberland district in Nye County. These are in the area that includes the Monitor and Bluestone barite deposits described in Papke (1984). Spirit

Minerals also staked 18 lode claims adjacent to earlier claims in the Carico Lake District in Lander County. These are in the area of the Bald Mountain barite deposit in the Devonian Slaven Chert described in Papke (1984). Stardust Explorations, Inc., Elko, Nevada, entered into an agreement to acquire the Snow White barite property. According to NBMG Bulletin 98, the Snow White is located in the Sulphur Spring Range. A small open pit and old bulldozer trenching suggests pre-1978 production of less than 900 t (Bentz and others, 1983).

The deposit consists of three areas of barite vein replacement of quartzite and pebbly quartzite in the Lower Mississippian Diamond Peak Formation. Two samples of barite taken by the U.S. Bureau of Mines assayed 90% and 93% barium sulfate (BaSO_4).

Cement.—Infrastructure Materials Corporation of Reno, NV, staked a large number of claims in 2009, and owned 12 projects for cement-grade limestone in Nevada. The company dropped 118 of these claims in 2011. These projects were summarized in NBMG MI2009 (Nevada Bureau of Mines and Geology, 2010). In early 2010, Railroad Industries, Inc. prepared a report for Infrastructure Materials, titled Nevada Cement Study Update. Because of transportation costs and competitiveness issues of cement and aggregate materials, the report states the typical cement facility serves a market that a truck can reach within a 320-km (200-mile) radius. The report uses the conservative forecast that full recovery to the peak demand for cement, which was reached in 2005, will take until between 2022 and 2025, and stated that it takes 8 to 10 years to develop cement facilities. Therefore, the facilities would be coming on line as the demand for cement was recovering to prerecession levels. The report looked at the potential markets for two projects: Blue Nose in Lincoln County and Morgan Hill in Elko County. Blue Nose appeared to have the better potential of these two prospects and exploration has been concentrated in that area.

In 2011, Chaparral Limestone and Cement, Provo, UT, staked 25 lode and 6 associated placer claims in the Moapa district in Clark County (LR2000). The claims are in part underlain by limestone, dolomite, sandstone, and gypsum, of the Permian Toroweap and Kaibab Formations, Triassic Moenkopi and Chinle Formations, and Tertiary Horse Creek and Muddy Creek Formation (Longwell and others, 1965). The Company staked the claims to include the quarry on SR-167 near the I-15 Moapa Valley exit and attempted to acquire the old Royal Cement plant north of Logandale. However, problems with the plant hindered negotiations and acquisition attempts were dropped. The Royal Cement plant has been dismantled because it was small and did not produce acceptable quality cement.

Eagle Materials received permits from the State for its planned expansion of Nevada Cement plant at its Fernley facility, but the downturn in the economy caused the company to put the expansion plans on hold. Once started, the project is expected to take 18 to 24 months to complete.

Diatomite.—Global Silica, LLC of Las Vegas, NV, owns claims in the Monte Cristo Range in northern Esmeralda County where the company plans to mine diatomite and process it to sell as amorphous silica. In 2011, the NDOM processed new notice-level bonds and a bond increase for Global Silica

(NDOM Activity and Achievements, February 2012), and the BLM worked on a draft EA (BLM District Manager's Report, 2011, p. 4).

According to USGS Miscellaneous Field Studies Map MF-2260 (Stewart, 1994), the diatomite is abundant in the Miocene "sedimentary rocks of McLeans," which largely consist of siltstone, shale, and fine-grained clayey sandstone. In 2010, Global Silica met with Esmeralda County and BLM officials to discuss options over additional maintenance to the county road that would be used when mining operations started.

In 2011, EP Minerals (a subsidiary of Eagle Pitcher) staked 12 placer claims in the Russell Spit area about 18 miles south of Fallon (BLM LR2000). The area is partially underlain by the Pliocene Truckee Formation, which here consists of diatomite, silicic tuff, and tuffaceous shale and sandstone (Morrison, 1964). EP Minerals also staked 60 new placer claims in the Velvet District in the area of their Colado deposit (LR2000). On August 2, 2011, Golden Gate Capital of San Francisco, CA, acquired EP Minerals through their purchase of EP Management Corp. (Golden Gate Capital, 2011).

About two-thirds of the diatomite produced in Nevada is used in filtration, and the remainder is largely used in absorbents, fillers, and cement.

Gypsum.—The Meadow Valley Gypsum Project, also referred to as the Thrasher Gypsum Mine, is stalled because of a lack of access. The project is in Lincoln County about 40 km (25 miles) north of Moapa, and an EA, a FONSI, and a ROD were issued in 2006 and 2007. The project calls for an open pit and associated facilities, dump, and stockpiles on 4.9 hectares (ha) (12 acres) with production lasting about 5 years. In 2010, the BLM was in the process of issuing a new right-of-way for a county road.

Fluorspar.—In 2010, little if any exploration for fluorspar took place in Nevada, although the concern of potential shortages might spur some renewed interest. Nevada Fluorspar, Inc. of Burtonsville, MD, had 40 lode claims around the Bisoni deposit in Eureka County and 40 lode claims around the Bruno prospect in Pershing County. NBMG Bulletin 93 reported that drilling at Bisoni outlined several large low-grade deposits of probably "many millions of tons" but with an average grade of slightly more than 10% calcium fluoride (Papke, 1979).

Lithium.—In 2009, the U.S. Department of Energy (DOE) awarded to Chemetall Foote Corporation \$28.4 million in American Recovery and Reinvestment Act funds to expand and upgrade production of lithium materials for advanced transportation batteries. Part of those funds went to the expansion of lithium carbonate production at Silver Peak. The expansion began in July 2010 and continued through 2011. The expansion will include a well drilling project to double production, and the installation of a geothermal powerplant to make the operation self-sufficient for electrical power (Chemetall Foote Corp., 2010).

In 2009, Western Lithium Corp. of Vancouver, British Columbia, Canada, continued with exploration and evaluation of the lithium resources in their Kings River Valley Project, Humboldt County, NV. According to the company Web site and NI 43-101 report, Western Lithium has leased over 11,000 ha through almost 1,400 lode claims, mainly in the Disaster Peak

mining district in northern Humboldt County, from Western Energy Development Corporation for lithium exploration. The claims are within the McDermitt Caldera, and cover several areas containing inferred uranium resources and broader zones of uranium, molybdenum, and lithium mineralization. The lithium largely occurs in lithium-rich clays, including hectorite formed from the hydrothermal alteration of the volcanoclastic sedimentary rocks making up the moat deposits in the western part of the caldera. These lithium-bearing moat deposits extend north through the western Montana Mountains and Disaster Peak into Oregon. Significant lithium mineralization has been defined in five areas referred to as: PCD, North Lens, North Central Lens, South Lens, and South Central Lens by Chevron (who drilled the area for uranium in 1985), and Stages I through V by Western Lithium. In each area, the lithium-bearing clay hectorite occurs in thick, apparently continuous, accumulations with the zones of mineralization varying between about 0.9 m- and 91 m-thick. According to the company, drilling on the Stage I deposit in 2008 showed that it contained indicated resources of 48.1 Mt grading 0.27% lithium (668,000 t lithium carbonate equivalent) and inferred resources at 42.6 Mt grading 0.27% lithium (606,000 t lithium carbonate equivalent), both with a 0.2% cut-off grade. In 2009, Western Lithium started a drilling project on the Stage II deposit, which planned to include 38 core drill holes in the main part of the lens. Stage II is estimated by the company to be about seven times as large as Stage I. If all goes according to plan, Western Lithium proposes to have the deposits in production in 2014 (Western Lithium, 2009).

There were a number of other companies exploring for lithium, but most have encountered uncompetitive grades to date.

Magnesium.—During the summer of 2010, Molycor Gold Corp. of White Rock, British Columbia, Canada, conducted a geologic surface mapping and rock sampling program on their Tami-Mosi magnesium property, which consists of 119 claims covering about 1,092 ha (2,700 acres) in the western foothills of the Schell Creek Range between Tamberlain and Mosier Canyons about 10.5 km (6.5 miles) southeast of Ely in White Pine County. By 2011, the company had drilled 24 holes exploring for magnesium and gold. The company conducted a surface-mapping and channel sampling survey to explore the area north and east of the drill holes. In all, 55 samples were collected and analyzed, which indicated a mineralized zone in excess of 12% magnesium (Molycor Gold Corp, 2011). On September 15, 2011, the company issued "Preliminary Economic and Technical Assessment Report of the Tami-Mosi Project, Nevada," prepared by Wardrop Engineering. The magnesium is in the Simonson Dolomite. The dolomite consistently grades between 9% and 13% magnesium. The dolomite is interpreted to cover 126.5 ha (312.5 acres) with an average thickness of 143.8 m (472 feet) and a strike length of over 4.2 km (2.6 miles). The report notes an inferred resource of about 412 Mt (454 million short tons) of dolomite with an average grade of 12.3% magnesium. The dolomite has a high enough quality for potential use in the production of magnesium-based refractories, magnesium metal, cement, and agricultural products. The ore would be mined from an open pit in a mountainside above the water table and would be hauled

209 km (130 miles) north to a processing site at Wells next to Interstate 80, the railroad, and natural gas and electrical lines. The plant would process the ore into magnesium ingots using an updated and automated Bolzano Process. The ore would be mined at 800 metric tons per day (t/d) (880 short tons per day) over a mine life of 30 years (Tetra Tech, 2014).

Perlite.—Noble Perlite has eight placer claims about 32 km (20 miles) south-southeast of Fallon on the south side of the White Throne Mountains; however, these claims have not been mined by them. The perlite occurs as a gray vitrophyre with a few percent phenocrysts and an “onion-skin” texture. The unit is about 15 m (50 feet) thick and capped by Tertiary basalt (Willden and Speed, 1974).

Pozzolan.—In April 2010, the BLM issued an EA and FONSI on the plan of operation for Nevada Cement Co. to operate their proposed Mustache Pozzolan Quarry. The quarry, located about 4.8 km southwest of Fernley, is proposed to operate for 25 years and produce up to 90,000 t of material. The site is largely in Miocene to lower Pliocene Chloropagus Formation, which consists of mainly basaltic and andesitic lava flows and breccias interbedded with rhyolitic tuffs and minor shale sedimentary rocks. The shale will be hauled to the Nevada Cement Co. plant to be heated and turned into pozzolan. This locally produced pozzolan would lower costs.

Sand and Gravel, Construction, and Stone, Crushed.—The Federal Highway Administration, and the Nevada Department of Transportation (NDOT) acting on its behalf, proposed to expand their materials site located about 6.4 km southeast of Wells in the Wood Hills from 16 ha to 23 ha. The present site, which was acquired in 1994 and expanded in 2004, provides riprap, borrow, base, and shoulder material for the construction and maintenance of Interstate 80 and U.S. Route 93 near Wells. The purpose of the expansion is to gain access to underlying bedrock carbonates for the production of riprap and base not found at other NDOT material sites. The expansion is planned to provide an estimated 815,000 cubic meters (m³) of base, borrow, and (or) bituminous surface material for the construction and maintenance of State Routes 227 and 228, and Interstate 80 near Spring Creek and Elko. The Nye County Road Department proposed to expand the Duckwater Gravel Pit located along Nye County Road 379 from 4 ha to 8 ha. Presently, the pit has a stockpile of 23,000 m³ of gravel. The expansion would allow the mining of up to 191,000 m³ over a 10-year period for the continued maintenance of county roads.

Zeolites.—In 2008, Nevada Specialty Minerals, LLC was formed as a joint venture to explore and develop the Lovelock zeolite deposit 21 km (13 miles) northwest of Lovelock in the Trinity Range in the Gold Butte District of Pershing County. The new LLC’s joint-venture partners are listed as Castle Park Minerals, LLC of Holladay, UT; Steelhead Specialty Minerals, LLC of Spokane, WA; and Trabits Group, LLC of Wasilla, AK. The Nevada Specialty Minerals, LLC lease covers 518 ha (1,280 acres). The Lovelock zeolite deposit contains varying amounts of ferrierite, mordenite, and clinoptilolite and has an outcrop area about 1,220 m long from north to south, averaging 610 m wide, and up to 17 m thick near the center. The host rock is a series of Miocene or Pliocene unnamed sedimentary rocks and tuffs.

Trabits Group, LLC holds licensed intellectual property involving a zeolite-containing cement and drilling-fluid technology, which requires the use of ferrierite. It has a 45% working interest in Nevada Specialty Minerals, LLC, which is in the design and construction phase of a mine and processing facility at the Lovelock deposit. Steelhead Specialty Minerals, LLC makes zeolite-containing products for soil amendments, manure odor control, and radioactive wastewater treatment.

Metals

Exploration in Nevada rebounded considerably in 2011 and 2010 from the slump that started in the fall of 2008. Nevada county recorders registered a total of 196,977 claims in fiscal year 2011, a 3.8% increase from fiscal year 2010, which had 189,797 claims, an 11% decrease from fiscal year 2009. These included both new claims and annual maintenance of existing claims. The BLM listed 27,703 new claims (metal and industrial) that were located in calendar year 2011 and still active at the end of 2011, a 37% increase from 2010, and 17,356 new active claims that were located in calendar year 2010, a 10% increase from 2009.

Although junior companies still experienced difficulties raising money to finance drilling, they drilled 50% more projects in 2011 than they did in 2010, and drilled almost twice as many projects in 2010 as they did in 2009. Importantly, the number of drill programs completed by junior companies increased to 29 in 2011 from 8 in 2010. More projects were likely drilled than are reported here, especially small drill programs carried out by major or mid-tier companies, because these companies only occasionally release information on such projects.

Gold.—The main exploration objective in Nevada continued to be gold. Only 17 of the 130 projects drilled in 2011 and 10 of the 99 projects drilled in 2010 targeted metals other than gold. Eleven projects were drilled primarily for copper in 2011, with most of these also being tested for molybdenum and some for gold and silver, whereas six projects were drilled for copper in 2010. These included Contact (International Enxco Ltd.), New Boston (Pilot Gold Corp.), Copper Basin (Newmont Mining Corp.), Pine Tree (IEMR Resources Inc.), the Robinson Mine (Quadra FNX), Dolly Varden (Viking Minerals), Majuba Hill (Max Resource Corp.), and four in the Yerington district—Ann Mason (Entrée Gold Inc.), MacArthur and Yerington (Quaterra Resources Inc.), and Pumpkin Hollow (Nevada Copper Corp.). Other projects for metals other than gold drilled in 2011 and 2010 included Nivloc (International Millennium Mining Corp.), Rochester (Coeur d’Alene), Rose Mine (Navaho Gold Ltd.), Silver Queen (MGold Resources), Simon (International Millennium), and Taylor (Silver Predator, Inc.) for silver; Apex (AusAmerican Mining Corp.) and the Alibisu project (Concordia Resource Corp.) in northern Humboldt County for uranium; and Gibellini (American Vanadium Corp.) for vanadium, which has likely prospects of being mined in the near future. At Rochester, Coeur shifted from ore control to exploration in 2011, and conducted drilling programs in the Nevada Packard area and on the LM target just northwest of the Rochester Mine. Important molybdenum projects that were not drilled were General Moly Inc.’s Mount Hope project north of

Eureka and its Liberty project north of Tonopah. General Moly continued its permitting and financing efforts at Mount Hope, while continuing to leave Liberty idle for the time being.

In 2011 and 2010, Barrick carried out major drill programs for gold at Bald Mountain, Cortez, Goldstrike, Meikle, Rodeo, Turquoise Ridge and South Arturo. At Turquoise Ridge, Barrick kept defining and updating reserves and resources in support of the prefeasibility study of developing a large-scale open pit to mine the lower grade mineralization that envelops the high-grade ores currently being mined underground. In the Bullion and Cortez districts, Barrick also conducted drilling of the Gold Acres, Pipeline, and Cortez Hills areas. The company announced two gold discoveries, Red Hill and Goldrush, about 4 miles southeast of the Cortez Hills Mine, and continued drilling them. The company also spent \$7.6 million and continued drilling on the Spring Valley project (joint venture with Midway Gold Corp.) located near the Rochester Mine in Pershing County.

Newmont focused much of its effort on drilling the northern Carlin Trend, including the Leeville, Mike, Turf, and Exodus properties. The company spent \$52 million alone on underground development at Leeville and Turf. In addition, the company spent \$7 million at Twin Creeks and continued drilling the Fiberline deposit located adjacent and below the east high wall of the Megapit. In April 2011, Newmont acquired Frontier Gold, Inc. which included the Long Canyon deposit, comprising high-grade oxide ore. The company conducted a large drilling program at Long Canyon and issued a technical report for an open pit mine and processing facilities, with mining potentially starting in 2015. The company also continued exploration and drilling at the Phoenix and Copper Basin projects in the Battle Mountain area and at the Sandman project west of Winnemucca.

At Marigold, Goldcorp Inc. conducted development drilling at the Target II, Target III, and Red Dot deposits and claimed to have added 15.5 t (500,000 troy ounces) of gold to the reserve, mainly through the conversion of resources to reserves at Red Dot. Kinross Gold Corp. drilled the Deep Northwest deposit as a potential expansion of the Round Mountain pit. Deep Northwest is directly under the operation's administrative offices, but the high price of gold may make moving the buildings reasonable.

With an average gold price of \$1,572.48 per troy ounce in 2011, and \$1,227.51 per troy ounce in 2010, many projects long considered uneconomical, as well as some new deposits, have a reasonable chance of being put into production in the near future.

Not counting resources adjacent to operating mines, 21 new resource estimates were released in early 2011 and 2010, driven mainly by the high gold price. The 2011 average price marks a 463% increase since 1998 when the price had its last major "bottoming out" at \$278.98 per troy ounce and has increased annually since, although mine operating costs have also risen.

Rare-Earth Elements.—Elissa Resources, Ltd. of Vancouver, British Columbia, Canada, was created as a subsidiary of Red Hill Energy, Inc. and on April 16, 2010, received a number of Red Hill's assets, including the Thor Rare Earth Elements (REE) Property that is mostly in the Crescent district, Clark County, Nevada. Early in 2010, Red Hill conducted reconnaissance radiometric surface transverses and had completed a NI 43-101

technical report. A drilling program of at least 21 holes was planned for early 2012. The project area is thought to be similar to the Mountain Pass REE deposit 25.7 km (16 miles) to the west. The project area is in Precambrian rocks but, unlike Mountain Pass where the REEs occur in bastnaesite, the REEs occur in monazite, apatite, and xenotime (Elissa Resources, 2011).

Commodity Review

Industrial Minerals

Barite.—According to data from the Nevada Division of Minerals (NDOM), Nevada's barite production comes from four operations, three of which were actively mining in 2011 and 2010. According to USGS data, in 2011 production increased 7% to 704,000 t, and in 2010, production increased 69% to 656,000 t from 389,000 t produced in 2009. Although NDOM data indicates that this is considerably more than the recent low production of 342,000 t in 2002 and the highest since 663,000 t were produced in 1983, it is still far below the 2.25-Mt high in 1981. The difference in reported production from the figures given by the NDOM is that the USGS reports run-of-mine, flotation, or other beneficiated material that is sold or used by the producer, while the NDOM reports what is shipped, which can include some material from stockpiles. About 95% of the barite sold domestically is used as a weighting agent in oil and gas well drilling fluids. According to the USGS, shipments of ground barite from Nevada mostly went to Colorado, New Mexico, North Dakota, Utah, and Wyoming gas drilling customers. According to the Nevada Department of Taxation, the gross proceeds reported for 2011 were \$59.5 million, an increase of 21% from that in 2010.

The largest Nevada barite producer in 2011 and 2010 was M-I SWACO. Their production decreased 6% to 268,000 t shipped in 2011 compared to 2010, but their shipments increased 42% in 2010 to 285,000 t in 2009. This comprised crude and ground barite from the Greystone Mine and Battle Mountain plant, both in Lander County. This was the highest production since 288,000 t was shipped in 2004. A small amount of barite is also taken from old stockpiles in the nearby Mountain Springs Mine for blending at the plant. The barite of the Greystone Mine is in black chert and minor argillite and shale of the Middle to Late Devonian Slaven Chert. Smith International, Inc., and Schlumberger, Ltd. jointly owned M-I SWACO. In August 2010, Schlumberger acquired Smith International (Schlumberger, 2010).

Baroid Drilling Fluids, a subsidiary of Halliburton Co., was the second leading barite producer in Nevada. Their 2011 shipments increased 16% to 183,000 t shipped after increasing 1% to 158,000 t in 2010 from 155,000 t (171,331 short tons) shipped in 2009. The company mined barite from the Rossi Mine in Elko County and processed it at the Dunphy Mill in Eureka County. Heemskirk Canada, Ltd., a Canadian industrial minerals concern, acquired crude barite from the Rossi Mine and shipped it from Dunphy to their Lethbridge, Alberta, processing plant. The barite was then supplied to the western Canadian drilling mud market. The barite occurs in chert of the Ordovician Vinini Formation.

In 2010, Baker Hughes shipped 82,000 t of barite from its Argenta operation near Battle Mountain in Lander County. Baker Hughes proposed to expand their operations from a current disturbance area of 175 ha to 240 ha within the boundaries of their Plan of Operation. Currently, the open pits cover 34 ha. The proposed expansion would involve expanding their F Pit North by 20 ha and their Cuna Pit by 7 ha. The barite deposits are in black chert and minor argillite and shale of the Middle to Late Devonian Slaven Chert in the upper plate of the Roberts Mountain thrust.

The Big Ledge Mine, of Spirit Minerals, LP, apparently did not produce in 2009.

Cement.—The only cement producer in Nevada is the Nevada Cement Co. (a subsidiary of Eagle Materials, Inc. of Dallas, TX), which has a plant in Fernley, Lyon County. Production data are proprietary, but in 2011 their plant had a rated annual clinker capacity of 458,000 metric tons per year (t/yr) and a capacity to produce 508,000 t/yr of portland cement. The company Web site reported over 454,000 t of cement was produced annually. Also, according the Nevada Department of Taxation, the gross proceeds reported for 2011 were for \$1,998,000 for limestone, \$3,200,000 for the limestone mine and cement plant, and \$345,000 for clay at Flanagan. The plant produces Type I/II, low alkali, moderate sulfate-resistant portland cement. The cement is manufactured from limestone mined from two areas, and from other raw materials that come from northern Nevada and elsewhere. Most of the limestone comes from Tertiary lacustrine limestone deposits mined a few miles south of Fernley. Nevada Cement serves markets in northern Nevada and California, where they have a rail terminal in Sacramento. Both markets were hard hit by the housing slowdown.

In 2010, Eagle Materials reported their overall cement sales volume was up 2%, while their overall cement sales revenue was down 4%. Their average price declined 8% in 2010 (Muntean and others, 2013). Eagle Materials had planned to expand the Fernley facility, but based on the economic impact of new environmental regulations and the market conditions of northern Nevada and northern California, those plans were shelved in 2011.

Clay.—IMV Nevada, owned by Mud Camp Mining Company, LLC produced sepiolite, saponite, and bentonite (a rock consisting mostly of montmorillonite) from deposits in the Ash Meadows-Amargosa Flat area of Nye County. The clay occurs in shallow, flat-lying deposits in Pliocene lacustrine rocks. It is processed at a plant in Amargosa Valley, and clay products are exported worldwide. The sepiolite and saponite deposits have unusual geology; they are considered to have originated in a Pliocene playa with an area of at least 57 square kilometers (km²) (5,700 ha). The sepiolite, which yields most of the profits for the operation, occurs in an almost continuous bed with an average thickness of about 2 m. IMV Nevada is the only commercial producer of sepiolite and saponite in North America.

Two companies intermittently mine and ship relatively minor amounts of Nevada clay from several sites for use in high-value specialty products. At its White Caps Mill near Beatty in Nye County, Vanderbilt Minerals Co. processes small amounts of

clay stockpiled from several deposits in Nevada, Arizona, and California. The company did not actively mine but did ship smectite (a group of clay minerals including montmorillonite) from the New Discovery Mine just south of Beatty, the Blanco Mine about 64 km west-southwest of Tonopah in the Coaldale mining district in Esmeralda County, and the Buff and Satin Mines about 16 km northeast of Lovelock in the Willard mining district in Pershing County. The American Colloid Co. mined and shipped white bentonite from its Nassau property in Coal Canyon in the Willard mining district for use in specialty clay products. The clay is an altered rhyolite tuff-breccia of probable Miocene-Pliocene age. American Colloid also mined several thousand tons of hectorite, every few years, from their Disaster Peak Mine in the Disaster mining district about 48 km west of McDermitt in Humboldt County. The hectorite is in moat deposits of the McDermitt Caldera. The Art Wilson Company mined halloysite on an as-needed basis for the Nevada Cement Co., which owns the pit in the Terraced Hills about 13 km northwest of Pyramid Lake. Owing to its high alumina content, it is used in the production of portland cement at the Nevada Cement Co. plant at Fernley. Senator Minerals, Inc., and Kent Exploration, Inc., both of Vancouver, British Columbia, Canada, through a joint venture, continued to hold the Ivanhoe Creek bentonite property in Elko County. The property consists of lode and placer claims covering 57 ha in the Ivanhoe District about 19 km southeast of Midas. The company claimed that drilling in 2007 indicated a near-surface deposit containing about 1.9 Mt of high-quality bentonite. One bulk sample assayed at 93% calcium bentonite (Price and others, 2009, p. 125).

Kaolin is mined in Washoe County and used in cement production.

Diatomite.—Data on Nevada's production is proprietary, but according to the Nevada Department of Taxation, the gross proceeds reported for 2011 were \$38.8 million, a decrease of 55% from that in 2010. About two-thirds of the diatomite produced in Nevada is used in filtration and the remainder is largely used in absorbents, fillers, and cement. Emerging small-scale uses include pharmaceutical processing and nontoxic insecticides.

A subsidiary of Eagle Picher Corp., EP Minerals, LLC is the second leading diatomite producer in the world and produces most of Nevada's diatomite. The Colado operation of EP Minerals in Pershing County is the company's most productive Nevada operation. It consists of a plant at Lovelock that mostly makes filtration products from diatomite, which is mined about 24 km (15 miles) to the northwest in the Velvet mining district. The diatomite occurs in thick beds interbedded with freshwater tuffaceous sedimentary rocks of probable Miocene age. The company also produces diatomite used in fillers and absorbents at its Clark plant and mine in the Clark mining district, Storey County, about 32 km (20 miles) east of Reno, and diatomite used in insulation from a pit near Hazen in Lyon County. The diatomite at Clark occurs with diatomaceous shale and thin beds of volcanic tuff within the Miocene-Pliocene Kate Peak Formation.

The Celite Corp. operated a plant in Fernley that produced diatomite fillers and mined their Nightingale deposit north of Fireball Ridge in Churchill County. Their Hazen Pit, which

had been mined since 1950 and still has reserves, was placed on standby. 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 ships 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 in the Desert mining district. Diatomite deposits in western Churchill County are interbedded with Pliocene lacustrine tuffaceous shale, sandstone, and limestone and siliceous tuff. The Grefco Minerals, Inc., diatomite operation near the Esmeralda/Mineral County line is small relative to other Nevada diatomite companies but has been producing diatomite for many years for fillers. The deposit is in Miocene-Pliocene lacustrine sedimentary rocks consisting of diatomite, argillaceous and calcareous diatomite, clay, sand, and volcanic ash. Since 2004, production has been from stockpiled ore.

Gemstones.—Precious opal is produced from several mines in the Virgin Valley area of northern Humboldt County. The best known operations are the Royal Peacock, Rainbow Ridge, and Bonanza Mines. In 2011 and 2010, these mines produced from pay-to-dig operations. According to the Nevada Department of Taxation, the gross proceeds reported for opal in 2011 were \$151,000, a decrease of 23% from that in 2010. The opal occurs in lacustrine sedimentary rock, volcanic ash and tuff, and bentonite of the Miocene Virgin Valley Beds of Merriam.

In 2011 and 2010, a small amount of turquoise was shipped from the Royston claims in the Royston District of Nye County, but the Blue Ridge Mine in the Bullion District of Lander County did not produce. Both operations are family owned. In the Royston District, turquoise mainly occurs in greenstone, metachert, and quartzite of the Permian Pablo Formation. In the Bullion District, turquoise mainly occurs in chert, quartzite, and siliceous shale of the Ordovician Valmy Formation and in the Devonian Slaven Chert. In 2011, turquoise was also produced from the Damele Mine in Lander County. The Department of Taxation reported gross proceeds of about \$10,000 for this mine. The turquoise occurs mainly in argillized zones in shale of the Ordovician Vinini Formation.

Gypsum.—According to data from the Nevada Division of Minerals, Nevada's gypsum production decreased 5% in 2011 and decreased 12% in 2010, marking the seventh and eighth consecutive annual declines. According to the Nevada Department of Taxation, the gross proceeds reported for gypsum in 2011 were \$12.7 million, an increase of 8% from that in 2010.

The leading Nevada producer of gypsum in 2011 and 2010 was PABCO Gypsum in Clark County northeast of Las Vegas. Production increased 4% to 644,000 t in 2011 relative to 2010, the first annual increase since 2005, though production was still 58% below the 2005 peak. In 2010, production fell 5% to about 618,000 t of crude gypsum from that in 2009. Gypsum was processed into wallboard at a PABCO Gypsum plant adjacent to their mining operation; processing of the ore yields about 70% by weight of gypsum. The ore occurs in a nearly flat-lying, late Miocene gypsite blanket atop a 1,295-ha (5-square-mile) mesa. Drilling indicated that the gypsum is at least 36.5 m thick in the area of current mining.

The Nation's leading wallboard producer, USG, was the second-ranked Nevada producer of gypsum in 2010. Production decreased 19% to 147,500 t in 2010 from that in 2009. The company mined gypsum in western Pershing County and processed it into wallboard and plaster at a plant at Empire in Washoe County. The gypsum is Triassic or Jurassic and forms several masses in a 518-ha (2-square-mile) area. The largest mass, the Selenite orebody, contains 85 to 95% gypsum. In December 2010, USG announced that because of the collapse in construction, the Empire operations would be shut down and placed on "indefinite idle status" on January 30, 2011. The operation could be restarted if the economy improved and construction picked up (USG Corp., 2010).

Lime, Limestone, and Dolomite.—Nevada has two large lime producers and several small producers. Because of the price increase, the overall gross proceeds reported to the Nevada Department of Taxation increased 3% in 2010. Nevada's largest producer, the Pilot Peak high-calcium lime operation of Graymont Western US, Inc. (formerly Continental Lime, Inc.) is in the Proctor mining district in the Toano Range about 16 km northwest of Wendover in Elko County. The plant has three kilns with a combined capacity of more than 604,000 t/yr of quicklime and a hydrated lime plant capable of producing 288 t/d (318 short tons per day). Pilot Peak mainly markets lime to gold-mining operations for use in cyanide-solution pH control. Production is mainly from the Middle to Late Devonian Devils Gate Limestone, which generally consists of interbedded limestone and dolomite. Nevada's other large producer, Chemical Lime Co., produces lime at Apex in the Apex mining district about 32 km northeast of Las Vegas. The operation makes high-calcium quicklime used in metallurgical processing, paper manufacturing, and environmental markets. The company also produces dolomitic lime and hydrated high-calcium lime at Apex, mainly for construction uses. The company's Henderson plant processes Type S hydrated dolomitic lime for building and home construction. In addition to lime, Chemical Lime also shipped crushed limestone. Because of the decline in demand from the drop in the housing market, Chemical Lime idled their plant in Grantsville, UT, in 2010, but the production capacity at their Apex and Henderson operations was expected to cover that closing. Production is from the Middle to Late Devonian Sultan Limestone.

Of Nevada's small lime producers, the Nutritional Additives Corp. produces agricultural and nutritional dolomite products along the northwest edge of the Sonoma Range about 8 km (five miles) south of Winnemucca. Production is from the Late Triassic Dun Glen Formation, which consists mainly of massive black dolomite with minor limestone and shale in its lower section. Min-Ad, Inc., a subsidiary of Inter-Rock Minerals Inc. of Toronto, Ontario, Canada, also produced dolomite from the Dun Glen Formation about 5 km (3 miles) south of the Nutritional Additives Corp. operation. Their dolomite is mostly sold in the midwestern United States and as far as New York State and Alberta, Canada, for use in beef and dairy feed. Along with gypsum and anhydrite, the Art Wilson Company of Carson City also produced some pure calcitic limestone from the Adams Mine. The limestone is used for soil pH control and reportedly contains no detectable magnesium.

Lithium.—Nevada is the only State with domestic production of lithium raw materials, and because this production is from one company, actual production and consumption data are kept confidential to protect company proprietary data. The Nevada Department of Taxation reported the gross proceeds from lithium decreased 30% to \$10.2 million in 2011 from 2010 and increased 94% to \$14.5 million in 2010 from 2009.

Chemetall Foote Co., a subsidiary of Chemetall GmbH (Frankfurt am Main, Germany) and its parent company, Rockwood Holdings, Inc., owns and operates the only Nevada lithium production facility, which is at Silver Peak. The company produces lithium carbonate, lithium hydroxide monohydrate, and lithium hydroxide anhydrite. The lithium chemicals are produced by solar evaporation, preconcentration, and subsequent refining techniques from brine that is pumped from beneath the Clayton Valley playa. The brine varies between 100 and 300 ppm lithium. Production figures are proprietary.

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

Production is confidential, but the plant capacity is rated at 136,000 t/yr. The Nevada Department of Taxation reported the 2011 gross proceeds at \$58 million, an increase of 3% from 2010. The magnesite and brucite occur as complex replacement bodies in Triassic dolomite in an area of about 526 ha (1,300 acres) in the Paradise Range, just east of the town of Gabbs.

Perlite.—Nevada has large perlite resources; several deposits of perlite in central Pershing, northern Lincoln, and southern Clark Counties have been mined extensively in the past. However, the State now produces only minor amounts of perlite. Current perlite production in Nevada is restricted to relatively small-scale mining of two deposits for niche markets, and the State produced less than 2% of the domestic total in 2011 and 2010. Nevada's actual production is confidential, but according to the Nevada Department of Taxation, the gross proceeds reported for 2011 were \$1.3 million, a decrease of 10% from \$1.4 million in 2010.

Wilkin Mining and Trucking Inc. has been mining perlite from the Tenacity Perlite Mine for more than 25 years in the South Pahroc Range mining district about 40 km west of Caliente in Lincoln County. The company has a small popping plant in Caliente, and present sales are almost exclusively of expanded perlite that is used for horticultural purposes. In most years, the company ships between 1,300 and 1,800 t. The deposit consists of a large, flat-lying, 6-m-thick perlite flow with obsidian pellets in Tertiary rhyolitic volcanic rocks.

In 2011 and 2010, EP Minerals processed and shipped a small amount of expanded perlite from its Colado diatomite

plant in Pershing County, which is marketed as a filter aid. Plant capacity is reportedly about 7,260 t/yr. The crude perlite comes from the Popcorn Mine about 24 km (15 miles) south of Fallon in Churchill County, which is usually mined 1 or 2 weeks per year.

Potash.—The Rulco Potassium Sulfate Project was temporarily shut down throughout 2009, but claims were kept current through 2010. In 2009 and 2010, the BLM resurveyed some of the subdivisional lines of the public lands involving the project for “potassium use” and to meet “certain administrative needs” of Rulco and the BLM (BLM Nevada, 2009; U.S. Department of the Interior, Bureau of Land Management, 2009).

Pozzolan.—Although the Mustache Pozzolan Quarry was permitted for the Nevada Cement Co. in 2010, there was no production of pozzolan in 2011 and 2010.

Salt.—According to data from the NDOM, Nevada's only producer, the Huck Salt Co., produced 19,000 t of salt in 2011, a decrease of 17% from 2010, and 23,000 t in 2010, an increase of 3% from 2009. Between 1995 and 2010, production has ranged between 8,200 t and 27,600 t and averaged 15,600 t. According to the Nevada Department of Taxation, the gross proceeds reported for 2011 were \$728,000, a decrease of 6% from that in 2010. The salt is mainly used for deicing roads, and production levels are dependent on weather. The salt is also used for water softeners. The salt is mined from a playa on Fourmile Flat about 40 km southeast of Fallon in Churchill County, where it has been harvested almost continuously since the 1860s, when it was hauled to the mills that processed silver and gold ore from the Comstock Lode.

Sand and Gravel, Construction, and Stone, Crushed.—In 2011, production from sand and gravel deposits accounted for about 67% of statewide aggregate production with crushed stone and lightweight aggregate making up the balance. With a total production value of almost \$180.4 million, construction aggregate was the fourth most valuable commodity produced in the State. Production from sand and gravel deposits accounted for about 71% of aggregate production statewide in 2010. The total production value of almost \$191 million made construction aggregate the third most valuable commodity produced in the State—well below the value of Nevada's gold production and about 44% of the value of second-ranked copper production, but nearly 1.3 times that of fourth-ranked silver.

Zeolites.—Nevada contains large identified resources of zeolite; however, no zeolite is currently mined in Nevada. In 2011 and 2010, Saint Cloud Mining Co. of Winston, NM, operated the Ash Meadows plant, which shipped 900 to 4,500 t annually of clinoptilolite used in water filtration, odor control, and nuclear cleanup from their plant in Armargosa Valley in Nye County. The clinoptilolite is mined from a small open pit just over the State line in Inyo County, CA, in a large area of zeolite deposits that extends into Nevada. The plant, which has a 40,000-ton annual capacity, also produces zeolite-based cement for building materials and oil and gas projects.

KMI Zeolite, Inc. owns a plant in Sandy Valley about 51 km southwest of Las Vegas, and a deposit reportedly containing about 54 Mt of largely clinoptilolite in California about 137 km northwest of the mill. The mill is capable of producing 50,000 t/yr and was in operation in 2011.

Metals

Copper and Molybdenum.—Nevada produced 56,100 t of copper in 2011, a decrease of 3.0% from 2010 and 58,000 t of copper in 2010, which itself was a decline of 12.1% from 2009. The Robinson Mine (KGHM International, formerly Quadra, FNX) produced 81% of the total copper in 2011 and 85% of the total in 2010. Newmont's Phoenix Mine made up the balance of the copper production in both years. Newmont is in the process of permitting a copper-leach circuit at Phoenix, which should increase production from the site starting in 2014. Nevada also produced 866 t of molybdenum in 2011, a 441% increase over 2010, and 160 t in 2010, an increase of 16.7% over 2009. The Robinson Mine produced 572 t of molybdenum in 2011 and 103 t in 2010. Win-Eldrich Mines Ltd. reported 294 t of molybdenum production in 2011 and 57.8 t in 2010 from its underground Ashdown Mine, near Denio in Humboldt County.

Gold.—Gold continues to be the leading commodity produced in Nevada. The Carlin trend in the northeastern portion of the State alone accounts for 1.5% of all the gold ever mined in the world. By the end of 2011, cumulative production from the Carlin trend had reached 2,435 t of gold, assuring its place as one of the most productive gold-mining districts in the world.

Nevada produced 172 t of gold in 2011 and 166 t of gold in 2010, an increase that ended a 9-year decline in production. Based on the number of projects that are planned to be brought into production, gold production is anticipated to continue to increase in the next few years. Production of gold in 2011 and 2010 came from 20 major mining operations. The Carlin trend accounted for 36% of the total production in 2011 and 41% of the total production in 2010, down from about 50% in recent previous years. The decreasing share of production from the Carlin trend is mainly due to the resurgence of the Cortez area mines (primarily due to initiation of full-scale open-pit mining) as well as a decrease in production along the Carlin trend—78.6 t in 2009, 67.6 t in 2010, and 62.4 t in 2011.

Combined, Barrick and Newmont accounted for 85% of Nevada's gold production in 2011 and 81% in 2010, a decrease from 89% in 2009. The 2010 decrease in Barrick and Newmont's share of the ounces produced was mainly due to increased production from the mid-tier companies Allied Nevada Gold Corp. at the Hycroft Mine and Great Basin Gold Ltd. at the Hollister Mine, as well as Yukon-Nevada Gold Corp's resumption of production at Jerritt Canyon. Nevertheless, Barrick remained the leading producer of gold in both 2011 and 2010, with production coming from its fully owned Goldstrike, Bald Mountain, and Ruby Hill Mines, and Cortez area mines; 75% share of Turquoise Ridge Mine, plus its 50% share of the Round Mountain Mine's production; and 33% share of the production from the Marigold Mine. In fact, Barrick's production increased 23% in 2011 to 96.2 t and 3.2% in 2010 to 78.4 t of gold. The increases were the result of a major upsurge in production at its Cortez area mines to 44.2 t in 2011—one-quarter of Nevada's output.

Newmont produced 55.7 t of gold in 2011 and 55.2 t of gold in 2010, a 10.8% decrease from 2009. The company reported

production from its Carlin trend mines and from the Twin Creeks, Phoenix, and Midas Mines, plus its 25% share of the Turquoise Ridge Mine. The decrease in 2010 production was due mainly to a pit wall failure at Gold Quarry in December of 2009. The slight increase in production during 2011 was due to commencement of production at the Exodus and Pete-Bajo underground mines and the Pay Raise and Widge open pit mines; increases in production at the Lantern, Twin Creeks, and Turquoise Ridge Mines; and re-leaching of ore at the Lone Tree Mine. Production also resumed at Gold Quarry after remediation of the pit wall failure. Production ended at the Deep Star underground mine in 2011 and is due to end at Widge in 2012, and at East Carlin in 2013. However, the company expects to more than make up for it with the projected opening of the Emigrant open pit mine in 2012. Production, which was halted at the Chukar underground mine due to the pit wall failure at Gold Quarry, was to resume in 2012. The BLM approved the Newmont's Genesis project which will involve the resumption of mining at the Silver Star (formerly Genesis) open pit.

In 2011, Jipangu, Inc., shut down the Florida Canyon Mine, and moved production to the nearby Standard Mine, both on the west edge of the Humboldt Range. Gryphon Gold's Borealis Mine, Mineral County, and Scorpio Gold's Mineral Ridge Mine, Esmeralda County, began preproduction in 2011, with possible full production to start in 2012. Klondex Mines Ltd. began exploration sampling at its underground Fire Creek Mine, Lander County, with production set for the middle of 2012. At Jerritt Canyon, mining of the Starvation Canyon, Murray, Burns Basin, and Wright Window deposits is scheduled to commence production in 2013. Other gold mines that are in the permitting or development stages and should begin production in 2012 or 2013 include the Gold Hill deposit near Round Mountain (50% Kinross Gold Corp., 50% Barrick), Comstock Mining's Lucerne deposit in Storey County, Atna Resources Ltd.'s Reward deposit near Beatty in Nye County and its Pinson deposit in Humboldt County, and Imperial Metals Corp.'s underground Sterling deposit near Beatty.

Iron Ore.—In 2011 and 2010, the Saga Exploration Company shipped iron ore from stockpiles at the old Nevada Barth Mine in Eureka County. The iron ore consists mostly of hematite and some magnetite, and is used in the manufacture of cement by the Nevada Cement Company in Fernley. The Nevada Department of Taxation reported gross proceeds of \$768,000 in 2011, a decline of 6% from 2010.

In 2011, Standard Industrial Minerals, Inc., of Bishop, California, sold several hundred tons of iron oxide from stockpiles at the Wabuska Iron Mine (the old Minnesota Mine), Douglas County. The material was sold to a company for use as an additive in agricultural products. The iron oxide is magnetite that replaced dolomitized limestone of the Triassic Oreana Peak Formation.

Silver.—Much of Nevada's silver production, which totaled 222 t in 2011 (a 3.2% decrease from 2010) and 229 t in 2010 (a 0.7% increase from 2009), was a coproduct or byproduct of gold mining. With a ratio of value (average price of gold to average price of silver) of 45:1 in 2011 and 61:1 in 2010, only those deposits with significantly more silver than gold can

be considered primary silver deposits. Only one such deposit operated in Nevada in 2011 and 2010—the Coeur Rochester Mine in Pershing County (with silver-to-gold production ratios of 222:1 in 2011 and 210:1 in 2010). Coeur d’Alene Mines Corp. recovered 43.3 t of silver in 2011 and 62.9 t in 2010 from the leach pads at its Rochester Mine, where mining stopped in 2007 but recommenced in February 2011. It produced 19% of Nevada’s silver in 2011 and 27% in 2010. Overall, Newmont was the leading silver producer in 2011 and 2010, producing 94.3 t and 93.5 t, respectively, primarily from its Midas and Phoenix Mines.

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TABLE 1
NONFUEL MINERAL PRODUCTION IN NEVADA^{1,2}

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	2009			2010			2011		
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
Barite	389 ^r	30,400 ^r	656	49,700	704	59,900			
Clays, Kaolin	W	W	19	W	18	247			
Gold ³	161,000	5,040,000	166,000	6,560,000	172,000	8,690,000			
Sand and gravel, construction	19,800 ^r	124,000 ^r	15,100	87,500	17,300	89,200			
Silver ³	203,000	95,900	224,000	145,000	209,000	237,000			
Stone, crushed	7,380 ^r	81,300 ^r	7,210	83,400	7,320	78,500			
Combined values of cement (portland), clays [bentonite (2009, 2011), fuller's earth (2009–10)], copper, diatomite, gemstones (natural), gypsum (crude), lime, lithium carbonate, magnesite, molybdenum concentrates, perlite (crude), pumice and pumicite, salt, sand and gravel (industrial), stone (dimension), zeolites (2009–10), and values indicated by symbol W	XX	639,000	XX	791,000	XX	876,000			
Total	XX	6,010,000 ^r	XX	7,720,000	XX	10,000,000			

¹Revised. W Withheld to avoid disclosing company proprietary data. Withheld values included in "Combined values" data. XX Not applicable.²Production as measured by mine shipments, sales, or marketable production (including consumption by producers).³Data are rounded to no more than three significant digits; may not add to totals shown.³Recoverable content of ores.TABLE 2
NEVADA: CRUSHED STONE SOLD OR USED IN THE UNITED STATES, BY TYPE¹

Type	2009				2010				2011			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone ²	7	1,990 ^r	\$27,000 ^r	\$13.57	6	2,250	\$28,600	\$12.75	6	2,460	\$23,300	\$9.49
Granite	6	189	1,430	7.53	4	107	1,120	10.45	4	80	881	11.03
Traprock	--	--	--	--	3	619	7,960	12.85	3	709	8,460	11.93
Sandstone and quartzite ³	--	--	--	--	2	680	7,430	10.92	2	805	8,870	11.02
Volcanic cinder and scoria	2	149	1,440	--	2	162	1,700	10.49	--	--	--	--
Miscellaneous stone	15 ^r	5,060 ^r	51,400 ^r	10.16	10	3,400	36,600	10.75	10	3,260	37,000	11.33
Total or average	XX	7,380 ^r	81,300 ^r	11.02	XX	7,210	83,400	11.56	XX	7,320	78,500	10.73

¹Revised. XX Not applicable. -- Zero.²Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.³Includes limestone-dolomite reported with no distinction between the two kinds of stone.³Includes sandstone-quartzite reported with no distinction between the two kinds of stone.

TABLE 3
NEVADA: CRUSHED STONE SOLD OR USED BY PRODUCERS
IN 2010, BY USE¹

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Macadam	W	W
Riprap and jetty stone	W	W
Coarse aggregate, graded:		
Concrete aggregate, coarse	104	1,330
Bituminous aggregate, coarse	W	W
Bituminous surface-treatment aggregate	136	1,500
Railroad ballast	W	W
Fine aggregate (-¾ inch):		
Stone sand, concrete	W	W
Stone sand, bituminous mix or seal	45	436
Screening, undesignated	91	288
Coarse and fine aggregates:		
Graded road base or subbase	286	2,200
Crusher run or fill or waste	181	674
Other coarse and fine aggregates	W	W
Other construction materials	W	W
Agricultural, other agricultural uses	W	W
Chemical and metallurgical:		
Cement manufacture	W	W
Lime manufacture	W	W
Other miscellaneous uses and specified uses not listed	W	W
Unspecified:²		
Reported	2,080	22,500
Estimated	975	10,600
Total	7,210	83,400

W Withheld to avoid disclosing company proprietary data; included in "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 2011, BY USE¹

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	W	W
Unspecified coarse aggregate	W	W
Coarse aggregate, graded:		
Concrete aggregate, coarse	190	2,330
Bituminous aggregate, coarse	W	W
Railroad ballast	W	W
Fine aggregate (-¾ inch):		
Stone sand, concrete	53	769
Unspecified fine aggregate	W	W
Coarse and fine aggregates:		
Graded road base or subbase	W	W
Unspecified and other construction materials	W	W
Agricultural, unspecified and other agricultural uses	W	W
Chemical and metallurgical:		
Cement manufacture	W	W
Lime manufacture	W	W
Other miscellaneous uses and specified uses not listed	168	1,930
Unspecified: ²		
Reported	2,310	25,100
Estimated	1,830	20,100
Total	7,320	78,500

W Withheld to avoid disclosing company proprietary data; included in "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 5
NEVADA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2010, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2	
	Quantity	Value	Quantity	Value
Construction:				
Coarse aggregate (+1½ inch) ²	W	W	W	W
Coarse aggregate, graded ³	W	W	518	6,840
Fine aggregate (-¾ inch) ⁴	--	--	W	W
Coarse and fine aggregates ⁵	W	W	514	4,180
Other construction materials	--	--	W	W
Agricultural ⁶	W	W	--	--
Chemical and metallurgical ⁷	W	W	W	W
Other miscellaneous uses and specified uses not listed ⁸	W	W	--	--
Unspecified: ⁹				
Reported	461	4,700	1,620	17,800
Estimated	44	481	931	10,100
Total ¹⁰	1,490	26,900	5,490	53,900

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 macadam, riprap and jetty stone, filter stone, and other coarse aggregates.

³Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, railroad ballast, and other graded coarse aggregates.

⁴Includes stone sand (concrete), stone sand (bituminous mix or seal), screening (undesignated), and other fine aggregates.

⁵Includes graded road base or subbase, unpaved road surface, terrazzo and exposed aggregate, crusher run, roofing granules, and other coarse and fine aggregates.

⁶Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.

⁷Includes cement manufacture, lime manufacture, dead-burned dolomite manufacture, flux stone, chemical stone, glass manufacture, and sulfur oxide removal.

⁸Includes drain fields, waste material, lightweight aggregate (slate), pipe bedding, refractory stone (including ganister), and other miscellaneous uses.

⁹Reported and estimated production without a breakdown by end use.

¹⁰District totals may not add up to the published State total, owing to revisions made after the production of the table and (or) proprietary data being withheld.

TABLE 6
NEVADA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2011, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2	
	Quantity	Value	Quantity	Value
Construction:				
Coarse aggregate (+1½ inch) ²	W	W	W	W
Coarse aggregate, graded ³	W	W	W	W
Fine aggregate (-¾ inch) ⁴	W	W	W	W
Coarse and fine aggregates ⁵	W	W	W	W
Other construction materials	W	W	--	--
Agricultural ⁶	W	W	--	--
Chemical and metallurgical ⁷	W	W	W	W
Other miscellaneous uses and specified uses not listed ⁸	--	--	W	W
Unspecified: ⁹				
Reported	W	W	1,850	20,800
Estimated	--	--	1,830	20,100
Total	1,630	25,100	5,690	53,400

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 macadam, riprap and jetty stone, filter stone, and other coarse aggregates.

³Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, railroad ballast, and other graded coarse aggregates.

⁴Includes stone sand (concrete), stone sand (bituminous mix or seal), screening (undesigned), and other fine aggregates.

⁵Includes graded road base or subbase, unpaved road surface, terrazzo and exposed aggregate, crusher run, roofing granules, and other coarse and fine aggregates.

⁶Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.

⁷Includes cement manufacture, lime manufacture, dead-burned dolomite manufacture, flux stone, chemical stone, glass manufacture, and sulfur oxide removal.

⁸Includes drain fields, waste material, lightweight aggregate (slate), pipe bedding, refractory stone (including ganister), and other miscellaneous uses.

⁹Reported and estimated production without a breakdown by end use.

TABLE 7
NEVADA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2010,
BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregates and concrete products	1,610	\$16,500	\$10.23
Plaster and gunite sands	44	476	10.82
Asphaltic concrete aggregates and other bituminous mixtures	787	7,820	9.94
Road base and coverings ²	3,170	16,800	5.29
Fill	354	1,370	3.88
Snow and ice control	70	479	6.84
Other miscellaneous uses ³	359	3,780	10.52
Unspecified: ⁴			
Reported	5,080	17,600	3.47
Estimated	3,670	22,700	6.19
Total or average	15,100	87,500	5.78

¹Data are rounded to no more than three significant digits, except unit value; 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 8
NEVADA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2011,
BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregates and concrete products ²	1,100	\$11,000	\$9.98
Asphaltic concrete aggregates and other bituminous mixtures	951	8,260	8.69
Road base and coverings ³	2,100	16,000	7.62
Fill	99	560	5.66
Snow and ice control	80	507	6.34
Other miscellaneous uses ⁴	174	1,980	11.38
Unspecified: ⁵			
Reported	7,910	25,000	3.16
Estimated	4,930	25,900	5.25
Total or average	17,300	89,200	5.16

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

²Includes plaster and gunite sands.

³Includes road and other stabilization (lime).

⁴Includes filtration and railroad ballast.

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

TABLE 9
NEVADA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2010, 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	457	6,020	1,200	10,900	--	--
Asphaltic concrete aggregates and road base materials ³	419	2,410	3,540	22,200	--	--
Fill	309	1,180	46	192	--	--
Other miscellaneous uses ⁴	240	2,080	189	2,180	--	--
Unspecified: ⁵						
Reported	650	5,280	766	4,680	3,660	7,670
Estimated	1,010	7,030	2,660	15,700	--	--
Total ⁶	3,090	24,000	8,400	55,800	3,660	7,670

-- 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.

⁶District totals may not add up to the published State total, owing to revisions made after the production of the table and (or) proprietary data being withheld.

TABLE 10
NEVADA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2011, 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	525	5,740	580	5,280	--	--
Asphaltic concrete aggregates and road base materials ³	815	6,180	2,230	18,100	--	--
Fill	81	443	18	117	--	--
Other miscellaneous uses ⁴	95	967	157	1,520	--	--
Unspecified: ⁵						
Reported	853	7,320	621	4,240	6,440	13,500
Estimated	1,340	7,200	3,580	18,600	10	48
Total	3,710	27,800	7,190	47,800	6,450	13,500

-- 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.