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2010–2011 Minerals Yearbook

NEW MEXICO [ADVANCE RELEASE]

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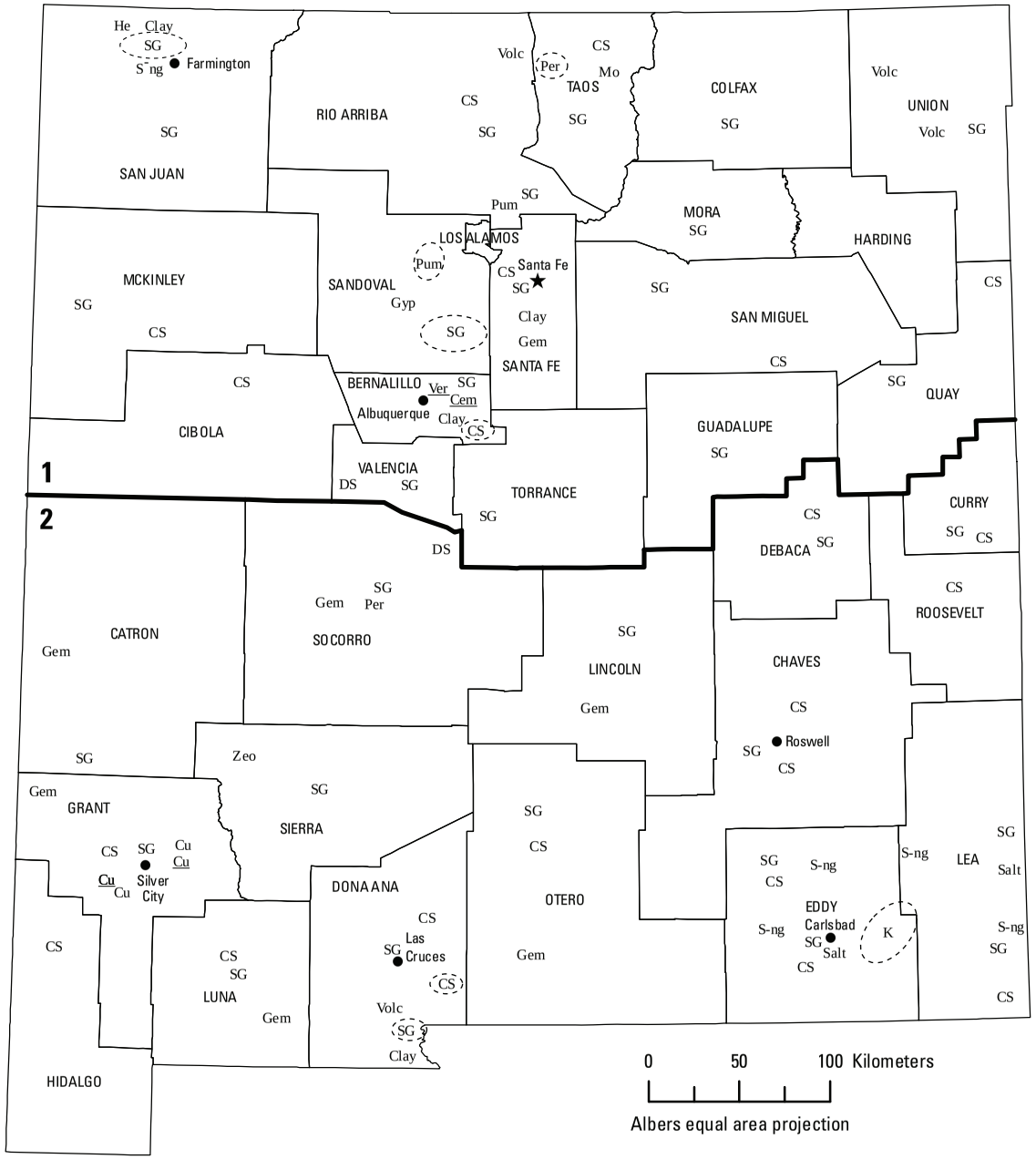

LEGEND

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

MINERAL SYMBOLS
(Principal producing areas)

Cem	Cement plant
Clay	Common clay
CS	Crushed stone
Cu	Copper
Cu	Copper plant
DS	Dimension stone
Gem	Gemstones
Gyp	Gypsum
He	Helium
K	Potash
Mo	Molybdenum
Per	Perlite
Pum	Pumice and pumicite
S-ng	Sulfur (natural gas)
Salt	Salt
SG	Construction sand and gravel
Ver	Vermiculite plant
Volc	Volcanic cinder
Zeo	Zeolites

Concentration of mineral operations

Source: New Mexico Bureau of Geology and Mineral Resources/U.S. Geological Survey (2010–11).

The Mineral Industry of New Mexico

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

In 2011, New Mexico's nonfuel mineral production[1] was valued at $1.25 billion, based upon annual U.S. Geological Survey (USGS) data. This was a $220 million (22%) increase from the State's total nonfuel mineral value of $1.03 billion in 2010, which had increased by nearly $148 million (17%), from a total of $879 million in 2009. In 2011, the State rose to 18th from 21st in 2010 in rank among the 50 States in total nonfuel mineral production value and accounted for 1.7% of the U.S. total in 2011. This was the State's highest ranking since it ranked 15th in 2008, when it accounted for 2.3% of the U.S. total. On a per capita basis, New Mexico was ninth in the Nation in nonfuel mineral production with a value of $601, about 2½ times the national average of $240.

The top nonfuel mineral commodities in 2011 and 2010 by production remained construction sand and gravel, crushed stone, potash, and portland cement. By value, these were copper, potash, construction sand and gravel, crushed stone, and salt. Copper increased in production value by $105 million (35%) in 2010 and by $186 million (46%) in 2011, and surpassed potash to become the State's leading mineral commodity in 2011. Copper had led the State's rankings for 38 of the past 43 years, from 1968 through 2011. Potash, reported as potassium salts prior to 1990, was the State's leading nonfuel mineral in the early 1950s through 1967, in 1982, during 2002–03, and during 2009–2010. Sand and gravel continued to rank third by value in 2011 and 2010 despite significant drops in production quantity—3.8 million metric tons (Mt) over the 2-year span, and production value, decreasing by almost 30% in 2010 and 10% in 2011. Crushed stone production increased by 559,000 metric tons (t) (11 %) and increased in value by $3.1 million (8%) in 2011 but had decreased by 723,000 t (12%) and $1.8 million (5%) in 2010; it remained fourth in rank in both years.

In 2011, salt was the fifth-leading commodity in production value, replacing portland cement, which was continuing a trend of recession-related significant decreases in production quantity and value that began after 2007. Salt decreased slightly in production value in 2011 despite an increase in production quantity; it had increased by 15% in quantity and 7% in value in 2010. Many of the mineral commodities decreased in production value to varying degrees in 2011, despite the overall increase in the State's mineral production value. Clay production and value decreased nearly 40% in 2011, though they had increased by almost 30% in 2010. Masonry cement had decreases of more than 40% in both years for production quantity and value. Perlite production quantity and value decreased by around 5% in 2011, but had increased by close to 10% in quantity and value in 2010. Zeolites decreased slightly (less than 3%) in production value and increased slightly in quantity in 2011, but were essentially unchanged in 2010 from 2009.

In 2011, the increase in production value of the commodities published as a combined total was led by potash, which increased 12% in value despite a drop in production quantity. Gypsum production quantity and value increased by about 7% each in 2011, though they had decreased by about 30% each in 2010. In 2011, both production quantities and values were at levels below that of 2009. Pumice and pumicite increased more than 20% in production quantity and value, though they too had experienced large decreases in 2010 and so were not up to 2009 levels. Molybdenum production quantity and value increased by almost 70% after relatively small decreases of 13% in 2010. Gold was also a factor in boosting 2011 values, as it had not been produced in 2010.

In 2011 and 2010, New Mexico continued to lead the Nation in the quantities of crude perlite, potash, and zeolites produced. New Mexico increased in rank in gypsum production to 8th in 2010 from 10th in 2009 among 19 and 16 producing States, respectively. The State rose in rank in salt production to 10th in 2011 and 2010 from 11th in 2009 among 16 producing States. New Mexico's copper production rose in rank to third in 2011 among eight producing States from fourth in 2009 and 2010 among seven producing States. In 2011, gypsum production fell in rank to 12th from 8th in 2010, among 16 producing States. Pumice and pumicite production fell in rank to sixth in 2010 and 2011 from third in 2009 among seven producing States. The State fell in rank of molybdenum concentrate production to seventh in 2011 and 2010 from sixth in 2009 among seven producing States. New Mexico's construction sand and gravel production fell in rank to 29th in 2011 and 25th in 2010 from 18th in 2009, out of 50 States. After not producing gold or silver in 2010, the State ranked 10th in silver and gold production in 2011, out of 10 and 11 producing States, respectively.

The following narrative information was provided by the New Mexico Bureau of Geology and Mineral Resources[2] (NMBGMR). Production data and information in the text that follows are those reported by the NMBGMR and are based on the agency's own surveys and estimates, data obtained from the New Mexico Energy, Minerals and Natural Resources Department (NMEMNRD), Mining and Minerals Division (MMD), personal mine visits by NMBGMR staff, company Web sites, and cited references. These may differ from some production figures published by the USGS.

[1]The 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.

[2]Virginia T. McLemore, Senior Economic Geologist, authored the State mineral industry information provided by the New Mexico Bureau of Geology and Mineral Resources.

Overview

The value of mineral production in 2010 from New Mexico exceeded $1.78 billion, down from the record-high production value in 2008 of $2.3 billion. These figures include coal production, which is not included in USGS total production values (New Mexico Energy, Minerals and Natural Resources Department, 2011a, b). Mining industry payroll exceeded $271 million, also down from 2008 values (New Mexico Energy, Minerals and Natural Resources Department, 2011a, b).

Active mining and processing operations in New Mexico in 2010 included 5 coal mines; 3 potash mines, 1 potash compaction plant, and 5 potash refineries; 2 molybdenum mines and 1 molybdenum mill; 2 copper mines and 2 solvent extraction/electrowinning (SX/EW) plants; 1 gold mine; about 25 industrial minerals mines and 16 industrial minerals mills; and 159 stone and aggregate operations (New Mexico Energy, Minerals and Natural Resources Department, 2011b).

By 2010 yearend, the cumulative number of exploration and mining permits on file in the State totaled more than 400, with an increase in the number of exploration permits filed. With the increase in most mineral commodity prices, exploration in New Mexico was expected to increase and some of these exploration projects were anticipated to result in new mining operations. However, the outlook for the aggregate industry remained depressed for the next few years until the housing and construction industries recovered from the economic recession.

Exploration and Development

In 2010, exploration permits from the New Mexico Mining and Minerals Department increased from previous years. Companies were exploring for mineral commodities, such as beryllium, copper, gold, potash, silver, turquoise, and rare-earth elements, throughout the State.

Industrial Minerals

Clay and Shale.—In 2010, Daleco Resources Corp. (West Chester, PA) continued to evaluate its Sierra Kaolin deposit after drilling 16 holes in 2005 (Daleco Resources Corp., 2014). The hydrothermal kaolin deposit in the Black Range in northwestern Sierra County had been estimated to contain 180 million metric tons (Mt) (200 million short tons) of kaolin (Iskender and others, 1994). The company's Mesa de Oro Property, approximately 35 kilometers (km) west of Las Lunas in Cibola County, was estimated by the company to contain a resource of 433 Mt (478 million short tons) of travertine. The company stated the deposit was a suitable source for cement production (Daleco Resources Corp., 2014).

Potash.—Intrepid Potash Inc. (Denver, CO) and The Mosaic Co. (Plymouth, MN) operated mines in the Carlsbad potash district, Eddy County, the largest potash-producing area in the United States. Potash was used as a fertilizer and chemical in specialty and industrial markets. Langbeinite and sylvite were the primary potash ore minerals found in Permian evaporites of the Permian Basin in New Mexico (Barker and Austin, 1996, p. 49–61). Intrepid continued the development and permitting of its HB Solar Solution Mine near Carlsbad. The company planned to use solar evaporative technologies to recover potash from salt-saturated brine. The HB Solar Solution Mine was estimated to have the capacity to produce 135,000 to 180,000 t (150,000 to 200,000 short tons) of potash annually for 28 years (Intrepid Potash Inc., 2010). In April 2010, the Bureau of Land Management (BLM) published the draft Environmental Impact Statement (EIS) and in July 2010 the New Mexico Environment Department (NMED) issued a groundwater discharge permit (Intrepid Potash Inc., 2010).

In November 2011, Intercontinental Potash Corp. (Toronto, Ontario, Canada) (formerly Trigon Uranium Corp.) concluded a prefeasibility study of the company's 100%-owned Ochoa Potash Project in Lea County (IC Potash Corp., 2011). The Ochoa deposit contained approximately 85% polyhalite, as well as halite and anhydrite in the Rustler Formation (Crowl and others, 2011). Potash is a leasable mineral; mining and exploration activities are administered by the BLM and excluded from the New Mexico 1993 Mining Act.

Garnet, Industrial.—B.O.W. Corp. continued to explore the Orogrande District, east of Las Cruces, for garnet resources. Garnet has not been produced in New Mexico for the past decade. Typically, garnet had been found in skarn deposits in southern and central New Mexico (Lueth, 1996).

Metals

Beryllium.—BE Resource Inc.'s (Toronto, Ontario, Canada) Warm Spring Project (also known as Sullivan Ranch deposit) consists of volcanogenic beryllium deposits in southern Socorro County. The company acquired the property in October 2007, received exploration drilling permits in 2010, and began drilling in September 2010 (BE Resources Inc., 2011, p. 1). In August 2011, the company placed the Warm Springs Project on care and maintenance (BE Resources Inc., 2011, p. 14 and 29). There was no beryllium production from the property.

Copper.—Copper One Inc. (Toronto, Ontario, Canada) entered into an Exploration and Purchase Option Agreement with LT Ranch Partnership LLC (Silver City, NM) for the LT Ranch property in December 2009. On June 3, 2010, the company was issued permits to drill 14 exploratory holes on the LT Ranch property after acquiring the surface rights in December 2009. The LT Ranch was a private property southeast of Silver City on the Lone Mountain copper prospect (Copper One Inc., 2010). During September 2011, the company was issued the final exploration permits to drill up to 528 holes at its 100%-owned Lone Mountain Project (Copper One Inc., 2011a). Exploratory drilling during 1975–89, and most recently during 2006–11, northwest of the carbonate-hosted silver deposits at the Lone Mountain property in Grant County, indicated at least three distinct zones of copper mineralization (U.S. Geological Survey, 2013, p. 33.2). The copper porphyry deposit had assays that ranged up to 1.0% copper. The company continued the technical evaluation of the Mimbres property in Grant County (Copper One Inc., 2011b, p. 12).

In 2007, Entrée Gold Inc. announced the discovery of a porphyry copper deposit in the Lordsburg district. Assays conducted during 2008–09 contained ore-grade material,

grading as much as 0.33% copper and 0.26 grams per metric ton (g/t) gold over 14 meters (m) from the deposit (Entrée Gold Inc., 2009). In 2010, the company continued project evaluations of the deposit; 12 exploratory holes confirmed near-surface mineralization over an area of 36 hectares. The assay from one hole graded 0.25% copper and 0.16 g/t gold. Permits for additional drill sites were pending (Entrée Gold Inc., 2010).

In 2011, Themac Resources Group, Ltd. (Vancouver, British Columbia, Canada) planned to resume operations at the Copper Flat porphyry deposit, approximately 6 km southwest of Hillsboro in the Hillsboro mining district, Sierra County. Themac's resource estimation in 2011 measured and indicated resources total 176 Mt (194,000 short tons) grading 0.26% copper, 0.008% molybdenum, 0.07 g/t (0.002 troy ounces per short ton) gold, and 2.0 g/t (0.05 troy ounces per short ton) silver and inferred resources of more than 7.4 Mt (8.2 million short tons) graded 0.23% copper, 0.004% molybdenum, and 0.003 g/t (0.01 troy ounces per short ton) silver (M3 Engineering and Technology Corporation, 2012, p. 97). The company filed the draft mining plan in 2010 and published a notice of intent with the U.S. Federal Register, which began the EIS process (Themac Resources Inc., 2012). The Hillsboro district included a copper porphyry deposit surrounded by polymetallic veins and carbonate-hosted Ag and Mn replacement deposits. Cumulative production from the Hillsboro district, 1877 through 1982, included almost 3,670 t of copper, 8,710 kg of gold, 4,170 kg of silver, and 70 t of lead (Geedipally and others, 2012).

Gold and Silver.—Santa Fe Gold Corp. (Lordsburg, NM) (formerly Azco Mining Inc.) obtained a permit to conduct dry mining activities at the Ortiz Project on August 19, 2011 (Santa Fe Gold Corp., 2011). The Carache and Lucas deposits in the Ortiz Mine Grant in Santa Fe County contained a combined estimated 26 Mt (29 million short tons) of gold graded 1.2 g/t (0.035 troy ounce per short ton) containing 32 kg (1.03 million troy ounces) of gold (Santa Fe Gold Corp., 2010, p. 25).

Molybdenum and Tungsten.—In 2008, Galway Resources Ltd. (Toronto, Ontario, Canada) put the Victorio Mountain Project on care and maintenance due to the low price of molybdenum and tungsten. The company explored strategic alternatives to advance the project in 2010 and 2011 as molybdenum and tungsten prices increased (Galway Resources Ltd., 2011). The Victorio Mountains deposit consisted of molybdenum, tungsten and beryllium skarns, and carbonate-hosted deposits associated with Tertiary intrusions (McLemore and others, 2000, p. 267).

Polymetallic Projects.—Southern Silver Exploration Corp. (Vancouver, British Columbia, Canada) continued exploration and development of the Oro Project (gold, silver, copper, lead, and zinc) in the Eureka mining district in Hidalgo County. Exploratory drilling began in January 2010 and focused on four separate gold-rich targets (Southern Silver Exploration Corp., 2010a). In August 2010, the company increased the Oro Project area to more than 1,100 ha by acquiring leases of two parcels of New Mexico State land (Southern Silver Exploration Corp., 2010b). In early 2011, Southern Silver Exploration staked 40 additional claims and completed the second phase of exploratory drilling by yearend (Southern Silver Exploration Corp., 2011a, b).

In 2010, Acclaim Exploration NL (West Perth, Western Australia, Australia) acquired three blocks of mining claims through the acquisition of Energy Company of America LLC. The Coyote, Aranda, and Los Pinos mining claims in the Nacimiento Region are located in Sandoval and Rio Arriba Counties, north-central New Mexico. The company completed a preliminary exploration program and budget for the first stage of exploration (Acclaim Exploration N.L., 2010). From 1881 to 1960, total production from the Nacimiento mining district included approximately 3,500 t of copper and 2,100 kg (75,000 troy ounces) of silver (McLemore and others, 1996). The deposits are stratabound, sedimentary-copper deposits in sandstones of the Agua Zarca Sandstone, Chinle Group (Triassic).

Rare-Earth Elements.—Geovic Mining Corp. (Denver, CO) staked claims for heavy rare-earth elements (REE) at its Cornudas Mountains exploration prospect in southern New Mexico. This was based on a USGS publication entitled "The Principal Rare Earth Elements Deposits of the United States" (Long and others, 2010). Concentrations of 700 ppm lanthanum, 270 ppm neodymium, and 242 ppm yttrium were reported for the Wind Mountain deposit. A full rare earth elements resource evaluation of the Wind Mountain uplift would require much more sampling than has been completed thus far (Long and others, 2010, p. 74). The alkaline dikes and sills reportedly also contain anomalous concentrations of beryllium, fluorine, lithium, nickel, niobium, tin, and zirconium (Geovic Mining Corp., 2011).

Strategic Resources Inc. (McLean, VA) began surface exploration for REE in the Gallinas Mountains (Lincoln County), Lemitar Mountains (Socorro County), and Jicarilla Mountains (Lincoln County) and planned to submit exploration permits to the State government.

Commodity Review

Industrial Minerals

Cement.—The Tijeras cement plant near Albuquerque continued to produce portland and masonry cement. The plant's estimated capacity was 800,000 metric tons per year (t/yr) of cement. The Tijeras cement plant was commissioned in 1959 and has been operated by Grupos Cementos de Chihuahua (GCC) since 1994. Limestone mined at Tijeras was used as the main ingredient, with additional varying quantities of gypsum, iron ore, and sandstone/shale (locally obtained from throughout New Mexico) and alumina from out of State.

Clays.—The State produced common clay and fire clay. Adobe bricks were manufactured in northern New Mexico at the Kinney Brick Co.'s (Albuquerque, NM) plant in Albuquerque and American Eagle Brick Co.'s (Sunland Park, NM) plant in Sunland Park, Dona Ana County.

Gypsum.—Eagle Materials (Dallas, TX) (formerly Centex Construction Products, Inc.) owned two wallboard plants in Albuquerque and Bernalillo Counties. Operations at the Bernalillo plant were halted due to the recession (Eagle Materials Inc., 2011, p. 2). Gypsum mines were operated in Dona Ana and Sandoval Counties. The Alley Gypsum

Mine, located in Dona Ana County, mined gypsum as an agricultural amendment (New Mexico Energy, Minerals and Natural Resources, 2011). Gypsum was primarily used in the manufacture of wallboard for commercial buildings, homes, and offices, as well as in the manufacture of portland and masonry cement and plasters; it was also used as a soil conditioner.

Perlite.—Perlite is found in high-silica rhyolite lava flows and lava domes that are typically 3.3 to 7.8 million years old (Chamberlin and Barker, 1996; Barker and Austin, 1996). Perlite was produced from three mines in New Mexico—Socorro, El Grande, and No Agua (Chamberlin and Barker, 1996). Perlite was used in building construction products, fillers, filter aid, horticultural aggregate, and other applications.

Pumice.—The main use for pumice was as an aggregate in lightweight building blocks and assorted building products. Other major applications included abrasives, absorbent, concrete aggregate and admixture, filter aid, horticulture (including landscaping), and the stonewashing of denim.

Pumice is found in the Jemez Mountains and in the Mogollon-Datil volcanic field (Hoffer, 1994, p. 12–15). Four operations were active in New Mexico in 2010—Copar Pumice's El Cajete Mine and the San Ysidro plant, CR Minerals Co.'s Rocky Mountain Mine and Santa Fe plant, Utility Block's U.S. Forest Service Mine and Unity Block mill, and Urban Trucking and Excavating's operation in Sandoval County.

Copar Pumice Company, Inc. (Espanola, NM) has mined pumice for more than 40 years and produces pumice from two quarries, the Guaje Canyon Mine, Los Alamos County, and El Cajete Mine, Sandoval County. The El Cajete pumice mine opened in 1997; reclamation was underway as mining was completed in specific areas. In Sandoval County, Urban Trucking and Excavating began mining pumice in April 2008 (New Mexico Energy, Minerals and Natural Resources Department, 2011).

Salt.—United Salt Corp. (Houston, TX) operated a solar evaporation salt plant near Carlsbad. United harvested the salt from a 1,050-ha salt lake. Salt was used for agricultural feed products, for chemical feed stocks, for swimming pool chlorine generation, for water conditioning, and for numerous other industrial applications. New Mexico Salt and Minerals Corp. also produced solar salt from a facility in the Carlsbad area.

Zeolites.—Zeolites minerals found were disseminated in altered volcanic ash. Clinoptilolite, the predominant mineral, was used in agriculture, environmental, and industrial applications due to its cation exchange, chemical, and physical properties.

St. Cloud Mining Co. (a subsidiary of Imagin Minerals, Inc., Wilton, CT) continued to operate Stone House Mine in Sierra County, the largest zeolite mine in the United States. The mining property consisted of approximately 610 ha (1,500 acres) and contained more than 16.6 Mt (18.3 million short tons) of reserves with a yearly capacity of almost 91,000 t (100,000 short tons). The modern facility had a crushing and sizing capacity of about 450 metric tons per day (500 short tons per day) (New Mexico Energy, Minerals and Natural Resources Department, 2003, p. 18).

Other Industrial Minerals

New Mexico had significant deposits of humate, predominantly in the Fruitland and Menefee Formations in the eastern San Juan Basin. Humates are weathered coal or highly organic mudstones found in the coal-bearing sequences. Humate was produced from 10 mines and mills in the State: Rammsco's Eagle Mesa Mine near Cuba, Morningstar Minerals Corp.'s San Juan mill in San Juan County, Horizon Ag-Products' San Luis Mine and mill south of Cuba, Mesa Verde Resources' Star Lake Mine, Pueblo Alto Mine and San Ysidro mill, Menefee Mining Corp.'s open pit Star Lake Mine and Menefee mill, and U-Mate International's U-Mate Mine. Approximately 11 billion metric tons of humate resources were reportedly contained within the San Juan Basin (Hoffman and others, 1996).

Freeport-McMoRan Copper & Gold Inc. (FCX) (Phoenix, AZ) continued to ship magnetite (for use in cement manufacture and other minor uses) from stockpiles at their Cobre Continental Mine, approximately 16 km northwest of Silver City.

Small flagstone dimension stone operations continued to produce sandstone, travertine, and other ornamental rock throughout the State. The largest was the New Mexico Travertine, Inc., a fully integrated stone processing plant located near Belen in Valencia County. New Mexico Travertine produced travertine for dimension stone from the Lucero quarry in Valencia County.

Metals

Copper.—Freeport continued to leach copper at the Chino Mine, near Santa Rita, and at the Tyrone Mine, near Silver City. The company was the only copper producer in New Mexico in 2010 and 2011. The Chino Mine, located 24 km east of Silver City, was the largest porphyry copper deposit in New Mexico and had operated since 1910. Copper sulfides (chalcocite, chalcopyrite), along with chrysocolla and azurite, were found in fractured granodiorite and adjacent mineralized skarns. The Chino operation included a 68,000-t/yr (150-million-pound-per-year) SX/EW plant that produced copper cathode from solution generated by run-of-mine (ROM) ore leaching and a 39,000-metric-ton-per-day (t/d) concentrator that produced copper and molybdenum concentrates; gold and silver were also recovered (Freeport-McMoRan Copper & Gold Inc., 2010, p. 11). In 2010, FCX produced 15,400 t (34 million pounds) of copper from the SX/EW plant (Freeport-McMoRan Copper & Gold Inc., 2010, p. 11, 23). In 2010, proven and probable run-of-mine (ROM)-leachable and millable reserves at Chino were estimated to be 181 Mt of ore grading 0.57% copper, 0.04 grams/metric ton (g/t) gold, 0.51 g/t silver, and 0.008% molybdenum (Freeport-McMoRan Copper & Gold Inc., 2010, p. 33).

The Tyrone porphyry copper deposit in the Burro Mountains, Grant County, occurs within a quartz monzonite laccolith and adjacent Proterozoic rocks. Several ore bodies, sometimes considered separate porphyry copper deposits, have been found and mined by open-pit methods. The Tyrone Mine is located 16 km south of Silver City. The Tyrone Mine consists of a SX/EW plant with a capacity to produce about 76,000 t/yr (168

million pounds per year) of copper cathode. In 2010, about 37,000 t (82 million pounds) of copper was produced (Freeport-McMoRan Copper & Gold Inc., 2010, p. 11). In 2010, proven and probable ROM-leachable reserves were estimated at 183 Mt of ore grading 0.28% copper (Freeport-McMoRan Copper & Gold Inc., 2010, p. 33). These reserves were expected to extend the mine life through 2018. The Tyrone Mine is among the lowest grade ore bodies operated by Freeport-McMoRan.

Freeport's Cobre Continental Mine (Santa Clara, Grant County) operation remained on care-and-maintenance status in 2010 (Freeport-McMoRan Copper & Gold Inc., 2010, p. 13). Estimated ROM-leachable reserves in 2010 were 73 Mt of ore grading 0.4% copper (Freeport-McMoRan Copper & Gold Inc., 2010, p. 32). Most of the copper reserves at the Cobre Mine, consisting of a porphyry copper deposit and adjacent skarn deposits, were in the Syrena and upper part of the Lake Valley limestones north of the Barringer fault.

Gold and Silver.—Santa Fe Gold's Summit Mine in the Steeple Rock mining district, Grant County, was expected to begin processing ore in 2010 and commercial production, in 2011 (Santa Fe Gold Corp., 2012, p. 3). Silver ore reserves were estimated at approximately 620,000 t (690,000 short tons) of ore grading approximately 4.8 g/t gold and 377 g/t of silver. The company had previously purchased the remaining components of the silver processing plant in Lordsburg, Hidalgo County, to process the Summit ore; the permitted Banner Mill began operations in April 2010 (Santa Fe Gold Corp., 2012, p. 15). Gold concentrate was first shipped from the mill in late 2010 (Santa Fe Gold Corp., 2012, p. 15). The Summit Mine was a volcanic-epithermal deposit similar to the Carlisle and Center Mines also in the Steeple Rock District, Grant County.

Molybdenum.—Molybdenum ore was produced by Chevron Mining Inc. (Englewood, CO) from the Questa Mine in Taos County. Chevron Mining (formerly Molycorp Inc., Greenwood Village, CO) mined approximately 73 Mt of ore from the open pit mine grading 0.19% molybdenum between 1965 until 1983. The mine was placed on standby in 1992 and resumed operations in 1995. Mining operations were scaled back in 2009 due to the low price of molybdenum, but continued through 2010 (Chevron Corp., 2010, p. 61). Underground block caving of ore continued throughout 2011. In 2010, its sales were 90 t, down from 230 t in 2009 (Chevron Corp., 2010, p. 61). Chevron continued with a reclamation program to cover overburden rock piles at the inactive open pit site.

Legislation and Governmental Affairs

The State continued to be an active participant in the STATEMAP program. STATEMAP is a component of the congressionally mandated National Cooperative Geologic Mapping Program (NCGMP) through which the USGS distributes Federal funds to support geologic mapping efforts through a competitive funding process. The NCGMP has three primary components: (1) FEDMAP, which funds Federal geologic mapping projects; (2) STATEMAP, which is a matching-funds grants program with State geological surveys; and (3) EDMAP, a matching-funds grant program with universities that has a goal to train the next generation of geologic mappers. In 2010, the New Mexico STATEMAP program completed 14 quadrangles, including quadrangles in the Nogales and Capitan mining districts. Mapping of the Grants uranium district had also begun. Completed geologic maps are listed at http://geoinfo.nmt.edu/publications/maps/geologic/home.html.

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TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN NEW MEXICO[1, 2]

(Thousand metric tons and thousand dollars)

Mineral	2009		2010		2011	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, common	10	90	13	116	8	70
Copper[3]	56	300,000	53	405,000	66	591,000
Gemstones, natural	NA	21	NA	15	NA	23
Sand and gravel, construction	14,100 r	111,000 r	11,600	84,400	10,300	76,200
Stone:						
Crushed	6,000 r	40,300 r	5,280	38,400	5,840	41,400
Dimension	32	986	W	W	W	W
Combined values of cement, clays [bentonite (2010)], gold (2009, 2011), gypsum (crude), helium [Grade-A (2009)], lime (2010), molybdenum concentrates, perlite (crude), potash, pumice and pumicite, salt, silver (2009, 2011), zeolites, and values indicated by symbol W	XX	426,000 r	XX	499,000	XX	544,000
Total	XX	879,000 r	XX	1,030,000	XX	1,250,000

rRevised. NA Not available. W Withheld to avoid disclosing company proprietary data. Withheld values included in “Combined values” data. XX Not applicable.
[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.

TABLE 2
NEW MEXICO: CRUSHED STONE SOLD OR USED IN THE UNITED STATES, BY TYPE[1]

	2009				2010				2011			
Type	Number of quarries	Quantity[r] (thousand metric tons)	Value[r] (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]	19	3,630 [r]	$20,600 [r]	$5.66	19	3,280	$21,800	$6.64	18	3,510	$24,400	$6.94
Sandstone and quartzite[3]	3	165 [r]	1,540 [r]	9.30	--	--	--	--	2	178	1,260	7.10
Volcanic cinder and scoria	6	285 [r]	2,600 [r]	9.12	5	226	1,520	6.72	4	265	1,590	6.00
Miscellaneous stone	19 [r]	1,920 [r]	14,700 [r]	7.66	26	1,780	15,100	8.49	22	1,880	14,100	7.51
Total or average	XX	6,000 [r]	40,300 [r]	6.57	XX	5,280	38,400	7.26	XX	5,840	41,400	7.09

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

TABLE 3
NEW MEXICO: CRUSHED STONE SOLD OR USED BY PRODUCERS
IN 2010, BY USE[1]

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	44	798
Filter stone	W	W
Coarse aggregate, graded:		
Concrete aggregate, coarse	136	1,910
Bituminous aggregate, coarse	73	607
Bituminous surface-treatment aggregate	9	166
Fine aggregate (-⅜ inch):		
Stone sand, concrete	115	1,350
Stone sand, bituminous mix or seal	70	576
Screening, undesignated	53	427
Coarse and fine aggregates:		
Graded road base or subbase	221	1,390
Unpaved road surface	W	W
Crusher run or fill or waste	88	437
Other construction materials	W	W
Other miscellaneous uses and specified uses not listed	79	292
Unspecified:[2]		
Reported	25	104
Estimated	3,330	25,700
Total	5,280	38,400

W Withheld to avoid disclosing company proprietary data; included in "Total."
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Reported and estimated production without a breakdown by end use.

TABLE 4
NEW MEXICO: CRUSHED STONE SOLD OR USED BY PRODUCERS
IN 2011, BY USE[1]

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	37	642
Filter stone	W	W
Coarse aggregate, graded:		
Concrete aggregate, coarse	61	922
Bituminous aggregate, coarse	66	632
Bituminous surface-treatment aggregate	W	W
Railroad ballast	W	W
Unspecified graded coarse aggregate	W	W
Fine aggregate (-⅜ inch):		
Stone sand, concrete	77	870
Stone sand, bituminous mix or seal	80	905
Screening, undesignated	W	W
Coarse and fine aggregates:		
Graded road base or subbase	28	240
Unpaved road surface	19	252
Terrazzo and exposed aggregate	2	18
Crusher run or fill or waste	9	55
Unspecified and other construction materials	46	346
Chemical and metallurgical, cement manufacture	328	1,930
Other miscellaneous uses and specified uses not listed	6	56
Unspecified:[2]		
Reported	32	370
Estimated	4,030	28,300
Total	5,840	41,400

W Withheld to avoid disclosing company proprietary data; included in "Total."
[1]Data are rounded to no more than three significant digits.
[2]Reported and estimated production without a breakdown by end use.

TABLE 5
NEW MEXICO: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2010, BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

	District 1		District 2		District 3	
Use	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1½ inch)[2]	W	W	23	378	14	51
Coarse aggregate, graded[3]	77	940	142	1,740	--	--
Fine aggregate (-⅜ inch)[4]	73	645	164	1,710	--	--
Coarse and fine aggregates[5]	W	W	202	1,340	--	--
Other construction materials	W	W	W	W	--	--
Other miscellaneous uses and specified uses not listed[6]	W	W	W	W	--	--
Unspecified:[7]						
Reported	4	27	10	64	11	12
Estimated	1,600	11,000	1,730	14,700	--	--
Total[8]	1,960	13,900	2,300	20,200	25	63

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes macadam, riprap and jetty stone, filter stone, and other coarse aggregates.
[3]Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, railroad ballast, and other graded coarse aggregates.
[4]Includes stone sand (concrete), stone sand (bituminous mix or seal), screening (undesignated), and other fine aggregates.
[5]Includes graded road base or subbase, unpaved road surface, terrazzo and exposed aggregate, crusher run, roofing granules, and other coarse and fine aggregates.
[6]Includes drain fields, waste material, lightweight aggregate (slate), pipe bedding, refractory stone (including ganister), and other miscellaneous uses.
[7]Reported and estimated production without a breakdown by end use.
[8]District 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
NEW MEXICO: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2011, BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		Unspecified	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1½ inch)[2]	W	W	34	606	--	--
Coarse aggregate, graded[3]	W	W	99	1,350	--	--
Fine aggregate (-⅜ inch)[4]	W	W	147	1,670	--	--
Coarse and fine aggregates[5]	W	W	57	564	(6)	1
Other construction materials	--	--	46	346	--	--
Chemical and metallurgical[7]	328	1,930	--	--	--	--
Other miscellaneous uses and specified uses not listed[8]	W	W	--	--	--	--
Unspecified:[9]						
Reported	W	W	W	W	17	17
Estimated	1,740	12,000	2,290	16,300	--	--
Total	3,150	20,600	2,670	20,800	17	18

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes macadam, riprap and jetty stone, filter stone, and other coarse aggregates.
[3]Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, railroad ballast, and other graded coarse aggregates.
[4]Includes stone sand (concrete), stone sand (bituminous mix or seal), screening (undesignated), and other fine aggregates.
[5]Includes graded road base or subbase, unpaved road surface, terrazzo and exposed aggregate, crusher run, roofing granules, and other coarse and fine aggregates.
[6]Less than ½ unit.
[7]Includes cement manufacture, lime manufacture, dead-burned dolomite manufacture, flux stone, chemical stone, glass manufacture, and sulfur oxide removal.
[8]Includes drain fields, waste material, lightweight aggregate (slate), pipe bedding, refractory stone (including ganister), and other miscellaneous uses.
[9]Reported and estimated production without a breakdown by end use.

TABLE 7
NEW MEXICO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2010,
BY MAJOR USE CATEGORY[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	1,460	9,850	6.75
Plaster and gunite sands	288	2,700	9.38
Concrete products (blocks, bricks, pipe, decorative, etc.)	26	330	12.69
Asphaltic concrete aggregates and other bituminous mixtures	2,090	18,700	8.95
Road base and coverings[2]	1,790	12,400	6.93
Fill	512	2,770	5.41
Other miscellaneous uses[3]	147	2,960	20.14
Unspecified:[4]			
Reported	1,440	7,250	5.03
Estimated	3,810	27,500	7.22
Total or average	11,600	84,400	7.28

[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.
[2]Includes road and other stabilization (lime).
[3]Includes railroad ballast, and snow and ice control.
[4]Reported and estimated production without a breakdown by end use.

TABLE 8
NEW MEXICO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2011,
BY MAJOR USE CATEGORY[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	1,400	11600	8.29
Plaster and gunite sands	44	296	6.73
Concrete products (blocks, bricks, pipe, decorative, etc.)	81	1,280	15.80
Asphaltic concrete aggregates and other bituminous mixtures	1,190	11,700	9.83
Road base and coverings	1,310	10,000	7.63
Fill	403	1,860	4.62
Other miscellaneous uses[2]	231	3,590	15.54
Unspecified:[3]			
Reported	2,180	10,300	4.72
Estimated	3,450	25,600	7.42
Total or average	10,300	76,200	7.40

[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.
[2]Includes railroad ballast, and snow and ice control.
[3]Reported and estimated production without a breakdown by end use.

TABLE 9
NEW MEXICO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2010, BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

	District 1		District 2		Unspecified districts	
Use	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregates and concrete products[2]	1,020	6,510	508	4,190	252	2,180
Asphaltic concrete aggregates and other bituminous mixtures	W	W	W	W	271	3,000
Road base and coverings[3]	1,060	7,760	729	4,610	--	--
Fill	220	2,070	292	704	--	--
Other miscellaneous uses[4]	132	2,910	15	56	--	--
Unspecified:[5]						
Reported	703	5,420	74	441	661	1,390
Estimated	2,180	15,700	1,630	11,800	--	--
Total[6]	6,720	51,100	3,650	26,800	1,180	6,560

W Withheld to avoid disclosing company proprietary data; included in “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]Includes road and other stabilization (lime).
[4]Includes railroad ballast, and snow and ice control.
[5]Reported and estimated production without a breakdown by end use.
[6]District 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 withh

TABLE 10

NEW MEXICO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2011, 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]	W	W	W	W	--	--
Asphaltic concrete aggregates and other bituminous mixtures	W	W	W	W	--	--
Road base and coverings	850	6,690	463	3,340	--	--
Fill	217	1,250	186	611	--	--
Other miscellaneous uses[3]	212	3,330	18	265	--	--
Unspecified:[4]						
Reported	685	5,710	344	2,150	1,150	2,400
Estimated	2,210	16,300	1,240	2,400	--	--
Total	6,210	50,700	2,930	23,100	1,150	2,400

W Withheld to avoid disclosing company proprietary data; included in "Total." -- 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]Includes railroad ballast, and snow and ice control.

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