2009 Minerals Yearbook

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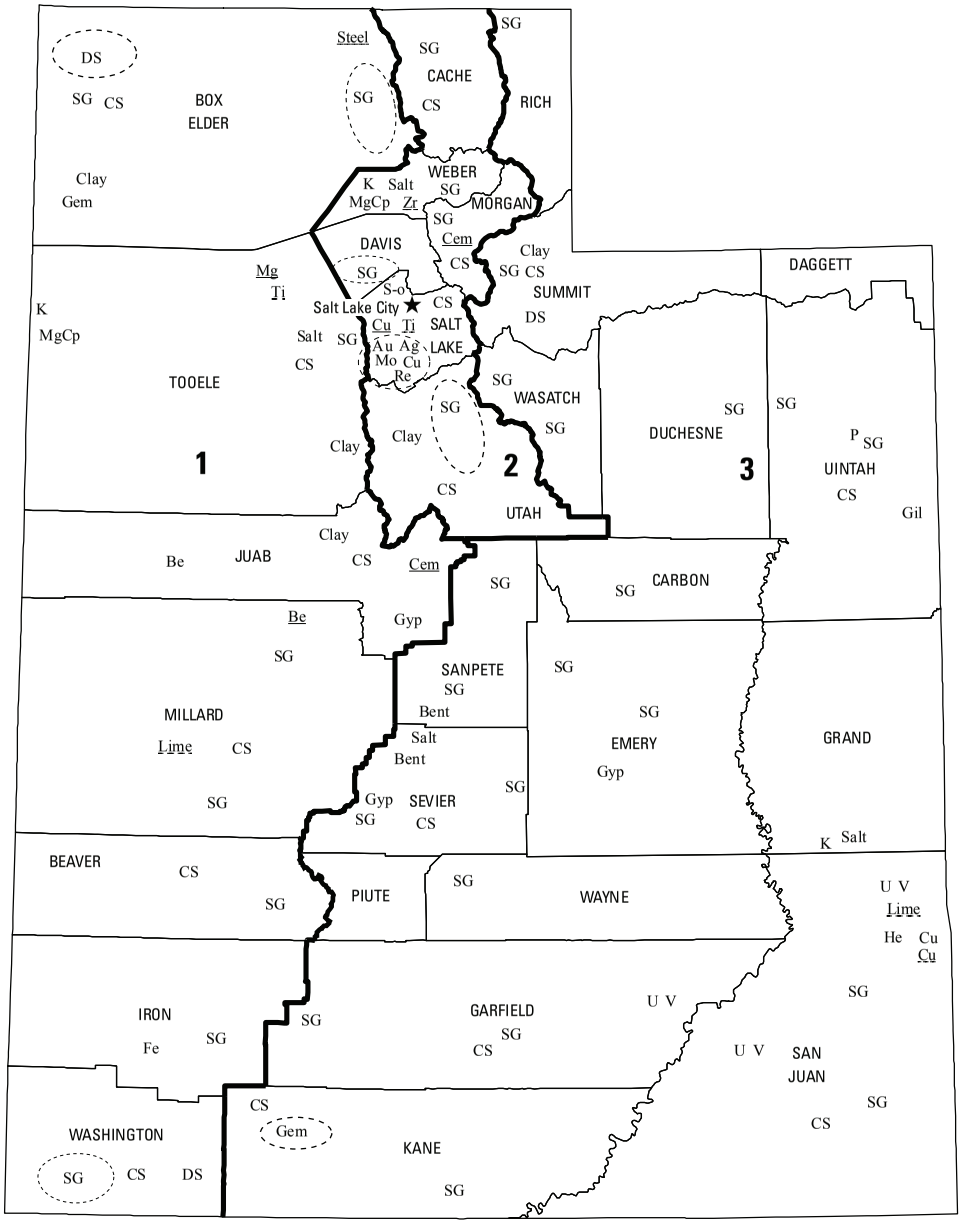

LEGEND

County boundary

Capital

City

1 Crushed stone/sand and gravel district boundary

MINERAL SYMBOLS (Principal producing areas)

Ag	Silver
Au	Gold
Be	Beryllium
Be	Beryllium plant
Bent	Bentonite
Cem	Cement plant
Clay	Common clay
CS	Crushed stone
Cu	Copper
Cu	Copper plant
DS	Dimension stone
Fe	Iron
Gem	Gemstones
Gil	Gilsonite
Gyp	Gypsum
He	Helium
K	Potash
Lime	Lime plant
Mg	Magnesium metal plant
MgCp	Magnesium compounds
Mo	Molybdenum
P	Phosphate rock
Re	Rhenium
Salt	Salt
SG	Construction sand and gravel
S-o	Sulfur (oil)
Steel	Steel plant
Ti	Titanium metal plant
U	Uranium
V	Vanadium
Zr	Zirconium metal plant

Concentration of mineral operations

0 50 100 Kilometers

Albers equal area projection

Source: Utah Geological Survey/U.S. Geological Survey (2009).

The Mineral Industry of Utah

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

In 2009, Utah's nonfuel raw mineral production was valued[1] at $3.9 billion, based upon annual U.S. Geological Survey (USGS) data. This was a $270 million, or 6.4%, decrease from the State's total nonfuel mineral production value of almost $4.2 billion in 2008, which followed an approximately $290 million, or 7.4%, increase from a total production value of almost $3.9 billion in 2007. The State remained fourth in rank among the 50 States in total nonfuel mineral production value for the fourth consecutive year and accounted for 6.6% of the U.S. total value.

Metallic minerals (beryllium, copper, gold, magnesium, molybdenum concentrates, and silver) accounted for 80% of Utah's nonfuel mineral production value. The State's total nonfuel mineral production value declined owing to the decrease in the production values (in descending order of decrease) of magnesium metal, potash, copper, phosphate rock, and molybdenum concentrates, for a combined decrease of $410 million (actual data withheld—company proprietary data).

Gold was the leading mineral commodity produced in the State in production value, up by 74%, and up by 56% in production quantity (actual data withheld—company proprietary data). Significant increases also took place in the production value of silver, up by 40% (actual data withheld—company proprietary data), and salt up by $13 million, or 9%, despite a 7% decrease in production quantity (table 1).

The largest decrease in production value occurred in magnesium metal whose production decreased slightly, with a significant decrease in unit value. A 46% decrease in the quantity of crushed stone produced, from almost 9 million metric tons (Mt) to almost 5 Mt, resulted in a $33 million, or a 46%, decrease in the commodity's production value. Moderate decreases (in descending order of value) in the production of portland cement, construction sand and gravel, down by 15%, and lime, resulted in a combined value decrease of $88 million (actual data withheld—company proprietary data). The quantity of beryllium concentrates produced decreased by 31%.

In 2009, Utah continued to be the only State to produce beryllium concentrates and magnesium metal. The State remained ranked second in the production quantity of copper, magnesium compounds, and potash. Utah remained third in gold and fourth in silver among 11 gold- and silver-producing States. Utah rose in rank in the production quantity of construction sand and gravel, to fifth from sixth, and in the production quantity of salt, to sixth from seventh. The State rose in rank to third from fourth in gemstones (based on production value). The State decreased in rank to 3d from 2d in the production quantity of bentonite clay and molybdenum and to 12th from 10th in the production quantity of lime.

The Utah Geological Survey[2] (UGS) provided the following narrative information. UGS production data were based upon its surveys, estimates, and information gathered from company annual reports and may differ from some USGS annual production figures, which were based upon USGS company surveys and estimates.

Overview

In 2009, there was considerable uranium exploration, and several uranium mines and a uranium mill reopened; all of this activity was tempered by continued low uranium prices. One new uranium mine commenced production in late 2009. The startup of Allegheny Technologies, Inc.'s (Pittsburgh, PA) titanium sponge plant in December, adjacent to US Magnesium, LLC's (Salt Lake City, UT) magnesium facility on the west shore of the Great Salt Lake, was expected to increase demand for magnesium and begin a new era in metal processing in the State (Allegheny Technologies, Inc., 2010, p. 19). Utah's lone iron ore mine remained idle and no announcement was made as to when operations might resume. One new copper mine began production in 2009, but encountered problems with its mill that resulted in only a small amount of concentrates being produced.

Exploration and Development Activities

During 2009, the Utah Division of Oil, Gas, and Mining (DOGM) received 4 new large mine permit applications (2 hectares (ha) or larger of disturbance) and 15 new small mine permit applications (less than 2 ha of disturbance). This is an increase of one large mine permit application and a decrease of 18 small mine permit applications compared with those of 2008. In 2009, the DOGM listed 114 active large mines, an increase of 2 mines since 2008, and l95 active small mines, excluding construction sand and gravel operations, a decrease of 11 mines since 2008.

All of the new large mine applications were for industrial-mineral operations. New small mine applications included eight for industrial minerals, five for precious metals, one for base metals, and one for energy minerals. In 2009, 17 notices of intent to explore on public lands were filed with DOGM, compared with 64 in 2008 and 53 in 2007. The notices of intent included eight for energy minerals (all uranium), six for combinations of base and precious metals, one for base metals, one for precious metals, and one for gemstones, fossils, and other.

[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 2009 USGS mineral production data published in this chapter are those available as of September 2011. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at URL http://minerals.usgs.gov/minerals.

[2]Kenneth Krahulec, Geologist, and Roger Bon, Industry Outreach Specialist, of the Utah Geological Survey authored the text of the State mineral industry information provided by that State agency.

Slightly more than 1,400 (down from 6,000 in 2008) new Federal unpatented mining claims were recorded by the Bureau of Land Management (BLM), and the Utah School and Institutional Trust Lands Administration reported signing mineral lease contracts on 61 tracts of land in 2009 as compared with 196 tracts in 2008. The leases and tracts were divided among the following commodities: 32 metalliferous minerals, 2 gemstone/fossil, 15 potash, 5 sand and gravel, 2 volcanic material, 2 geothermal, 1 humic shale, 1 limestone, and 1 unclassified. The number of new unpatented mining claims filed in Utah rose dramatically from a low of 508 in 2001 to over 7,900 in 2007. Just over 1,400 new claims were staked in Utah during 2009 in Uintah County for phosphate, Beaver County for copper, Tooele County for copper and gold, and San Juan County for uranium. At the end of 2009, the BLM had over 21,000 unpatented mining claims filed in Utah. Mineral exploration and development work continued at a somewhat slower pace in 2009 than in 2008. Most of the exploration efforts were focused on copper, gold, molybdenum, potash, and uranium.

Industrial Minerals

In 2009, industrial minerals exploration activity increased in Utah. Simplot Phosphates LLC staked over 200 new claims in Uintah County for phosphate. Several companies had acquired parcels totaling over 50,000 ha (500 square kilometers) of ground and were exploring for potash brines in the Paradox Basin of southeastern Utah. Mesa Exploration Corp. (formerly Mesa Uranium Corp.; Vancouver, British Columbia, Canada) announced that it acquired approximately 2,400 ha of property at their Green Energy lithium brine project, which is also in the Paradox Basin (Mesa Exploration Corp., 2009).

Metals

In 2009, the Bingham Canyon Mine continued to produce near-record profits, and a sediment-hosted copper solvent extraction/electrowinning (SX-EW) operation in Lisbon Valley began to operate at full capacity. Base-metal exploration in 2009 was dominated by major companies doing brownfield exploration in the Bingham and Tintic mining districts for polymetallic projects.

Despite strong precious-metal prices, exploration activity in Utah for gold and silver slowed, largely due to the inability of small exploration companies to raise funds during the economic recession in 2008 and 2009. Precious-metal exploration was largely focused in the eastern Basin and Range Province of western Utah. In 2009, Kennecott Utah Copper Co.'s (South Jordan, UT) Bingham Canyon Mine was the leading producer of copper and the second-leading producer of molybdenum in the United States. Kennecott Utah Copper Co. continued an aggressive development program with efforts concentrated on extending the mine life past 2020, potentially to 2032 (Rio Tinto plc, 2010, p. 40).

Brownfield exploration by Kennecott Utah Copper Co. in the Oquirrh Mountains in 2009 included the addition of 140 magnetotelluric and 192 gravity stations to the existing grids. In addition, six deep core holes were drilled, totaling almost 10,000 meters (m), principally east and west of the Bingham pit. Exploration in the Oquirrh Mountains outside of the Bingham area included geologic mapping, geochemical sampling, and collecting magnetotelluric data from an additional 245 stations (Russell Franklin, Exploration Manager, Kennecott Exploration Company, written commun., March 2010). The program resulted in the discovery of a new copper-molybdenum-gold porphyry system within 3 kilometers (km) of the Bingham Canyon Mine (Rio Tinto plc, 2010, p.40).

Following bankruptcy, Lisbon Valley Mining Co. LLC (Moab, UT) successfully restarted mining in 2009 (Lisbon Valley Mining Co., 2013). Andover Mining Corp. (formerly Andover Ventures, Inc., Vancouver, British Columbia, Canada) and Genco Resources Ltd. (Vancouver, British Columbia, Canada) drilled the Burgin Extension deposit to complete a Canadian National Instrument (NI) 43–101 report on the historical resource of 1 Mt containing 565 ppm gold, 21% lead, and 6.7% zinc (Andover Mining Corp., 2011, p. 4). In 2009, Freeport-McMoRan Copper and Gold, Inc. (Phoenix, AZ) began an integrated program of geologic mapping, geochemical sampling, and geophysical surveying with Quaterra Resources Inc. (Vancouver, British Columbia, Canada) that identified targets to be drill tested in 2010 covering 1,300 ha of patented and unpatented mining claims covering the Southwest Tintic porphyry copper system in Juab County (Quaterra Resources Inc., 2009).

CML Metals Corp. (St. George, UT; formerly Palladon Iron Corporation, formerly a wholly owned subsidiary of Palladon Ventures Ltd.) owned the Iron Mountain property (formerly Comstock-Mountain Lion open pit). The ore occurs as a massive magnetite replacement/skarn deposit adjacent to Miocene laccoliths west of Cedar City. In 2009, CML Metals Corp. completed a Canadian N 43–101-compliant resource estimate on the Comstock-Mountain Lion deposit showing a resource of 28.5 Mt averaging 49% iron (Palladon Ventures, 2009). Stockpiled ore remained at the newly completed rail loadout near the mine, while the company reevaluated its production plans.

Cordex Exploration Co. (Reno, NV) acquired the 2,020-ha Silver Dome property in the southern Fish Springs district for Columbus Exploration Corp. (Vancouver, British Columbia, Canada; formerly Columbus Silver Corp). Silver mineralization at Silver Dome is hosted in flat-lying Ordovician sandstones. The target at Silver Dome was bulk-minable silver mineralization amenable to open-pit development. Columbus Exploration Corp. completed 13 reverse-circulation holes totaling 1,640 m in a Phase I drilling program. Weak gold mineralization was intersected, but no ore-grade intervals were cut (Columbus Exploration Corp., 2009).

Commodity Review

Industrial Minerals

Industrial mineral values have increased substantially over the past 10 years. Commodities or commodity groups that have realized the majority of these gains include construction sand and gravel, and crushed stone; portland cement; lime;

salines including salt, magnesium chloride, and potash [potassium chloride and sulfate of potash (SOP)]; and phosphate rock. These commodities account for about 90% of the total value of Utah's industrial-minerals production. Other commodities produced in Utah, in descending order of value, include gilsonite; bentonite, common clay, and kaolin; expanded shale; and gypsum. The overall value of industrial minerals decreased owing to lower demand; however, several producers had near-record prices for their products, especially brine-derived products.

Cement.—Portland cement and lime were the third-largest contributors to the value of industrial minerals produced in 2009. Two operators produced portland cement in Utah: Holcim, Inc. (Bethlehem, PA) and Ash Grove Cement Co. (Overland Park, KS). Holcim's Devils Slide plant and mine were located east of Morgan in Morgan County, and Ash Grove's Leamington plant and mine were east of Lynndyl in Juab County. The companies had a combined capacity of more than 1.4 Mt of cement annually. Both plants operated below capacity in 2009. In addition to limestone, Ash Grove Cement mined a modest amount of shale and sandstone that were used in the manufacture of cement.

Clays.—Five companies produced approximately 200,000 metric tons (t) of common clay, bentonite, and high-alumina clay in 2009, approximately 64,000 t (24%) less than in 2008. Statewide, there were 18 active mine permits held by common clay, bentonite, and high-alumina clay operators in 2009. Many of these mines operated intermittently. The two leading producers of common clay in 2009 were Western Clay Co. (Aurora, UT) (bentonite) and Interstate Brick Co. (West Jordan, UT) (common clay). In addition, Interpace Industries, Inc. (Harrisville, UT) produced common clay, Redmond Minerals, Inc. produced bentonite, and an individually owned company mined lesser amounts of high-alumina clay. More than 75% of all common clay was used in the manufacture of brick. Bentonite was used as a sealant in many civil engineering applications, as a pet-waste absorbent (litter-box filler), as a component of oil and gas drilling fluids, and as a binder in foundry molds. High-alumina clays were used only in the manufacture of portland cement.

Gilsonite.—Gilsonite production for 2009 was estimated to be about 58,000 t, a decrease of about 11,000 t from that of 2008. Gilsonite is an unusual solid hydrocarbon that has been mined in Utah for more than 100 years. Gilsonite was marketed worldwide for use in over 150 products ranging from printing inks to explosives. All of the gilsonite mines are located in southeastern Uintah County. The three companies that produced gilsonite were, in descending order of production, American Gilsonite Co. (Bonaza, UT); Lexco, Inc. (the mine was purchased in mid-2009 by American Gilsonite); and Ziegler Chemical and Minerals Co. (Piscataway, NJ). Although lower in 2009, gilsonite production had been increasing modestly during the past several years prior to 2009.

Gypsum.—Three operators (down from seven in 2008) reported production of 140,000 t of gypsum in 2009, about 132,000 t, or 49%, less than in 2008. In descending order of production, the three producers were U.S. Gypsum Corp., Sunroc Corp. (St. George, UT; a subsidiary of Clyde Co., Inc.), and Diamond K Gypsum, Inc. (Richfield, UT). Georgia-Pacific Gypsum LLC (Atlanta, GA) and U.S. Gypsum operated the two wallboard plants in Utah; both plants are near the town of Sigurd in Sevier County. The Georgia Pacific plant remained closed during 2009. Most gypsum produced in Utah is used for making wallboard, but several operators supply raw gypsum to regional cement companies where it is used as an additive to retard the setting time of cement and to the agricultural industry for use as a soil conditioner. The decreased production of gypsum is directly related to the downturn of the housing industry in the Rocky Mountain region. Statewide, nine operations were active and eight were inactive.

Lime.—Lime production was about 33% lower in 2009 than in 2008. Graymont Western U.S., Inc. (Richmond, British Columbia, Canada), which produced dolomitic quicklime and high-calcium quicklime, was the only active producer in the State. Graymont Western's plant is in the Cricket Mountains, approximately 56 km southwest of Delta in Millard County, and is one of the 10 largest lime plants in the United States. Lhoist North America's (Fort Worth, TX; formerly Chemical Lime) plant near Grantsville in Tooele County was idle during 2009. Statewide, the DOGM listed 36 active limestone operations, including 15 large mine and 21 small mine permits. Total limestone production reported in 2009 was 4 Mt. Most limestone was used in the manufacture of cement and lime products. Other uses of limestone included construction as well as flue-gas desulfurization in coal-fired power plants. A small amount of limestone was also pulverized and marketed as "rock dust" to the coal mining industry.

Phosphate Rock.—Simplot Phosphates, LLC is Utah's only phosphate producer. The company's phosphate operation was 18 km north of Vernal in Uintah County. The mine produces roughly 2.7 to 3.6 Mt of ore annually, which is processed into 0.9 to 1.8 Mt of phosphate concentrate. The concentrate is transported in slurry form to the company's fertilizer plant in Rock Springs, WY, by a 145- km underground pipeline. During 2009, the mine produced about 3.4 Mt of ore, nearly the same as in 2008.

Salt, Magnesium Chloride, Potash (Potassium Chloride), and Sulfate of Potash.—Brine-derived products, including salt, were the largest contributors to the value of industrial-mineral production in Utah in 2009, with a combined value of $445 million, about $69 million (18%) more than in 2008. In addition to salt, brine-derived products include magnesium chloride and potash (potassium chloride and potassium sulfate). One company (North Shore Limited Partnership) produced a small amount of concentrated magnesium brine that was used as an ingredient in mineral food supplements. The statewide production of salt and other brine-derived products, excluding magnesium metal, was estimated to be 3.95 Mt in 2009, about 0.27 Mt more than in 2008. Potash production (including SOP) was estimated to be about 0.33 Mt in 2009, approximately 0.06 Mt less than in 2008. Salt production was estimated to be 3.0 Mt in 2009, about 0.18 Mt more than in 2008, with most of the production coming from three operators processing brine from the Great Salt Lake. The three largest operators were, in descending order of production, Great Salt Lake Minerals Corp. (a subsidiary of Compass Minerals International, Inc.),

Cargill Salt Co. (Minneapolis, MN), and Morton International. In addition, three other companies produced salt and/or potash from operations not located on the Great Salt Lake: Intrepid Potash-Wendover, LLC near Wendover in Tooele County produced salt and potash; Intrepid Potash-Moab, LLC near Moab in Grand County produced salt and potash; and Redmond Minerals, Inc. near Redmond in Sanpete County produced rock salt.

Sand and Gravel, Construction, and Stone, Crushed.—Construction sand and gravel and crushed stone were the second-largest contributors to the value of industrial minerals produced in Utah during 2009, with an estimated value of $214 million, about $26 million (11%) lower than in 2008. These materials were produced in nearly every county in Utah by commercial operators as well as county, State, and Federal agencies. Owing to the large number of operations (approximately 140 active pits and quarries), the UGS does not send production questionnaires to this group.

Shale, Expanded.—Expanded or "bloated" shale (a lightweight aggregate used mainly in the construction industry) is manufactured by roasting high-purity shale at temperatures near 1,100 °C. The intense heat causes the shale to expand and vitrify, creating a lightweight aggregate that is durable, uniform in size, and inert. Utelite Corp. is the sole producer of this type of aggregate in the State. The mine and plant are located east of Wanship in Summit County.

Metals

Beryllium.—Utah continued to be the Nation's sole producer of beryllium concentrates. Brush Resources operated a beryllium (bertrandite) mine in Juab County, and domestic ore and imported beryl can be processed through parallel circuits at the company's plant a few miles north of Delta in Millard County. After processing, beryllium hydroxide was then sent to the company-owned refinery and finishing plant in Elmore, OH, where it is converted into beryllium metal, alloys, and oxide. In 2005, Brush Resource's parent company, Brush Engineered Materials, Inc., was awarded a contract under the Department of Defense's Defense Production Act, Title III Program for the engineering and design of a new facility for the production of primary beryllium, the feedstock material used to produce beryllium metal products. Construction of the new facility began in 2008 and was expected to be finished in 2010. The new facility is located at the existing plant site in Ohio.

Copper.—Copper was the largest contributor to the value of nonfuel minerals in Utah with an estimated value of $1.7 billion. Although the price decreased sharply in 2009, a substantial increase in production raised the value of copper produced to near the alltime high, and the value of base-metal production statewide to $2.13 billion. The Bingham Canyon Mine produced about 304,000 t of copper in 2009, compared with the 238,000 t produced in 2008 (Rio Tinto plc, 2010, p. 65).

Gold and Silver.—The Barney's Canyon Mine exhausted its reserves in late 2001 and ceased mining, but continued to produce gold from its heap-leach pads at a reduced rate in 2009, down from less than 160,000 kg (5 million troy ounces) to about 62,000 kg (2 million troy ounces) (Rio Tinto plc, 2010, p. 65). The leach pads were anticipated to be depleted in 2010. Silver was also a byproduct metal from the Bingham Canyon Mine. Silver production was approximately 152,000 kg (4.9 million troy ounces) in 2009, about 46,700 kg (1.5 million troy ounces), or 44%, more than a 106,000 kg (3.41 million troy ounces) in 2008 (Rio Tinto plc, 2010, p. 66). Several other small mines in the State likely produced minor amounts of gold and silver, but production was not reported nor included in the above totals.

Magnesium.—Magnesium metal was the third-largest contributor to the value of base metals in 2009. Magnesium metal was produced from Great Salt Lake brines by US Magnesium, LLC (Salt Lake City, UT) at its electrolytic plant at Rowley in Tooele County. The plant's annual capacity is 52,000 t of magnesium metal at 99.8% purity (Kramer, 2011, p. 45.1). It remained the only active primary magnesium processing facility in the Nation. Magnesium production in 2009 was moderately higher than in 2008.

Molybdenum.—Molybdenum was the second-largest contributor to the value of Utah's base-metal production in 2009. Kennecott's Bingham Canyon Mine produced about 11,300 t of byproduct molybdenum in 2009, compared to 10,700 t produced in 2008 (Rio Tinto plc, 2010, p. 66). The USGS reports that the Bingham Canyon Mine was one of five domestic copper mines to recover molybdenum as a byproduct (Polyak, 2011, p. 50.13).

Vanadium.—Vanadium is produced as a coproduct with uranium in several uranium mines in Utah and is recovered in the form of vanadium pentoxide (V_2O_5) during the milling of uranium ore. Three mines operated by Denison Mines produced vanadium-bearing ore in 2009, which was processed at the White Mesa Mill.

Mineral Fuels and Related Materials

Uranium.—Utah has historically been a significant uranium-producing State, with the majority of its production from the Colorado Plateau in the southeastern portion of the State. Uranium exploration and development activity in Utah has fluctuated along with the spot prices.

Denison Mines Corp. (Toronto, Ontario, Canada) owns five permitted uranium mines in Utah as well as the 1,800-metric-ton-per-day (t/d), dual-circuit (uranium-vanadium) White Mesa Mill near Blanding, San Juan County. The mill processes both uranium ore and an alternate feed waste material. The mill began operating on stockpiled ore from Denison-owned mines in 2008, and began accepting ore from other mining companies for toll milling in 2009. Uranium recoveries were averaging over 90%. The mill had the capacity to produce about 1,360 t of U_3O_8 and 2,000 t of V_2O_5 annually.

Denison's Pandora Mine in the eastern La Sal district of San Juan County, shipped about 270 t/d 110 km south to the White Mesa Mill. Reserves at the Pandora Mine were estimated to be 263,000 t at 0.22% U_3O_8 and 1.1% V_2O_5. In 2009, Denison reopened the Beaver Mine, 3 km west of the Pandora Mine. Beaver was producing about 200 t/d from a resource estimated at 680,000 t at 0.2% U_3O_8 and 1.25% V_2O_5. The La Sal district uranium ores are hosted in the Upper Jurassic Salt Wash Member of the Morrison Formation.

Denison's Henry Mountains Complex (Tony M Mine and Bullfrog properties), in the Shootaring Canyon district of Garfield County, hosts the largest known uranium resource in Utah, estimated to be about 1.5 Mt averaging 0.24% U_3O_8. Declining uranium prices and lower than anticipated head grades forced its closure in November 2008, and approximately 18,000 t of ore remained stockpiled at the Henry Mountains Complex. The mine had a 200-km haul route to the White Mesa mill.

Denison's Rim Mine in the Dry Valley (East Canyon) district of San Juan County began operating at 45 t/d, with reserves estimated at 136,000 t at 0.22% U_3O_8 and 2% V_2O_5. Rim's status was changed to standby in March 2009. Both the Shootaring and Dry Valley district uranium ore bodies are hosted in the Upper Jurassic Salt Wash Member of the Morrison Formation.

White Canyon Uranium Ltd. (Vancouver, British Columbia, Canada) obtained the necessary permits for the Daneros Mine in the White Canyon district in San Juan County in May 2009, development began in July, and mining began in December 2009. The Daneros ore body had an estimated resource of 190,000 t at 0.3% U_3O_8. Ore was shipped 100 km to the White Mesa mill for toll milling. The White Canyon district ores are hosted by the basal Shinarump Conglomerate Member of the Upper Triassic Chinle Formation and typically contain about 1% copper.

Energy Fuels, Inc. (Toronto, Ontario, Canada) explored and rehabilitated its historical uranium mines. The Whirlwind Mine on Beaver Mesa straddles the Utah-Colorado border about 45 km northeast of Moab in Grand County. The property began limited production in 2009. The Whirlwind resource is about 149,000 t averaging 0.20% U_3O_8 and 0.66% V_2O_5. Energy Fuels began rehabilitation of their 284-ha Hecla Shaft Mine near La Sal, San Juan County. The mine, renamed the Energy Queen, had an estimated resource of 234,000 t averaging 0.24% U_3O_8 and 0.96% V_2O_5, with access via an existing 229-m-deep lined shaft. Both the Whirlwind and Energy Queen uranium ores are hosted in the Upper Jurassic Salt Wash Member of the Morrison Formation.

Environmental Issues and Other Activities

The U.S. Department of Energy (DOE) and the State of Utah have agreed to move the 10.8 Mt of uranium mill tailings located along the Colorado River near Moab. The tailings, sitting on a 52-ha site, formerly owned by Atlas Minerals Corp., are estimated to average about 100 ppm uranium and 400 ppm vanadium [Don Metzler, Federal Project Director for Moab UMTRA (Uranium Mill Tailings Remedial Action) program, U.S. Department of Energy, oral commun., March 2007.] The tailings were to be moved 48 km north to a site near Crescent Junction. DOE will transport the tailings by rail to a 100-ha disposal cell developed in the Cretaceous Mancos Shale. The $1 billion reclamation project began shipping tailings in April 2009, and over $100 million was spent on the effort in 2009. The completion of the reclamation project was expected in 2028.

New minerals-related publications by the UGS include: Utah Renewable Energy Zones Task Force Phase I Report titled Renewable Energy Zone Resource Identification (Berry and others, 2009); Annotated Bibliography of Utah Tar Sands and Related Information—2009 (Gwynn and Hanson, 2009); and Strategies for In Situ Recovery of Utah's Heavy Oil and Bitumen Resources (Schamel, 2009).

A new CD published in 2009 by the Utah Geological Association contains papers on mineral resources, water resources, geology, stratigraphy, and geophysics. The CD also includes papers on Bingham Canyon Mine expansion, geology of the Crypto zinc skarn, Iron Mountain iron resources, Kings Canyon gold mineralization, Keg Mountain exploration, Gold Mountain mining district, saline resources, and three historical mineral resource papers (Utah Geological Association, 2009).

Additional information can be obtained on the UGS Web site at http://geology.utah.gov/ and the UGS Map and Bookstore at http://mapstore.utah.gov/. Additional geographic information system (GIS) data on Utah is available for free download at http://agrc.its.state.ut.us/ and http://geology.utah.gov/databases/index.htm.

The UGS has been 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 grant 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. Under the FEDMAP, the State had three mapping projects in progress. Utah completed 11 mapping projects under the STATEMAP and completed one mapping project under the EDMAP in 2009.

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TABLE 1

NONFUEL RAW MINERAL PRODUCTION IN UTAH[1, 2]

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral		2007 Quantity	2007 Value	2008 Quantity	2008 Value	2009 Quantity	2009 Value
Beryllium concentrates	metric tons	3,810	NA	4,410	NA	3,030	NA
Clays, Common		531	10,400	479	10,200	342	7,230
Gemstones, natural		NA	240	NA	781	NA	783
Salt		2,470	135,000	2,150	139,000	2,000	152,000
Sand and gravel, construction		45,700 r	265,000 r	38,900 r	222,000 r	32,400	190,000
Stone:							
Crushed		13,200	97,800	8,950 r	72,700 r	4,830	39,400
Dimension		8	619	9	707	9	844
Combined values of cement (portland), clays (bentonite), copper, gold, gypsum (crude), helium (Grade–A), lime, magnesium compounds, magnesium metal, molybdenum concentrates, phosphate rock, potash, silver		XX	3,370,000	XX	3,730,000	XX	3,510,000
Total		XX	3,880,000	XX	4,170,000 r	XX	3,900,000

[r]Revised. NA Not available. 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.

TABLE 2

UTAH: CRUSHED STONE SOLD OR USED, BY TYPE[1]

Type	2008 Number of quarries	2008 Quantity (thousand metric tons)	2008 Value (thousands)	2009 Number of quarries	2009 Quantity (thousand metric tons)	2009 Value (thousands)
Limestone[2]	15 r	7,100 r	$57,200 r	18	3,430	$29,700
Dolomite	-- r	-- r	-- r	--	--	--
Sandstone and quartzite	4 r	236	2,790 r	5	239	2,940
Volcanic cinder and scoria	-- r	-- r	-- r	--	--	--
Miscellaneous stone	12 r	1,620 r	12,700 r	12	1,160	6,770
Total	XX	8,950 r	72,700 r	XX	4,830	39,400

[r]Revised. XX Not applicable. -- Zero.

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

[2]Includes limestone-dolomite reported with no distinction between the two.

TABLE 3

UTAH: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2009, BY USE[1]

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	W	W
Other coarse aggregate	W	W
Coarse aggregate, graded, railroad ballast	W	W
Coarse and fine aggregates, crusher run or fill or waste	W	W
Other construction materials	4	17
Agricultural, poultry grit and mineral food	W	W
Chemical and metallurgical:		
Cement manufacture	W	W
Lime manufacture	W	W
Flux stone	W	W
Unspecified:[2]		
Reported	2,020	14,100
Estimated	420	3,740
Total	4,830	39,400

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

UTAH: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2009, BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

	District 1		District 2		District 3		Unspecified districts	
Use	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction:								
Coarse aggregate (+1½ inch)[2]	--	--	W	W	--	--	--	--
Coarse aggregate, graded[3]	W	W	--	--	--	--	--	--
Coarse and fine aggregate[4]	--	--	W	W	--	--	--	--
Other construction materials	--	--	4	17	--	--	--	--
Agricultural[5]	--	--	W	W	--	0	--	--
Chemical and metallurgical[6]	W	W	W	W	--	--	--	--
Unspecified:[7]								
Reported	568	5,270	907	7,560	118	945	430	286
Estimated	44	355	281	2,610	96	776	--	--
Total	1,870	17,400	2,310	20,000	214	1,720	430	286

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 riprap and jetty stone and other coarse aggregate.

[3]Includes railroad ballast.

[4]Includes crusher run or fill or waste.

[5]Includes poultry grit and mineral food.

[6]Includes cement and lime manufacture, and flux stone.

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

TABLE 5
UTAH: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2009,
BY MAJOR USE CATEGORY[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products[2]	1,140	$8,650	$7.61
Asphaltic concrete aggregates and road base materials	3,940	22,700	5.77
Fill	2,410	12,100	5.03
Other miscellaneous uses[3]	100	762	7.62
Unspecified:[4]			
Reported	6,090	33,700	5.53
Estimated	18,700	112,000	5.99
Total or average	32,400	190,000	5.86

[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 snow and ice control, and railroad ballast.
[4]Reported and estimated production without a breakdown by end use.

TABLE 6
UTAH: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2009, BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products[2]	W	W	665	4,330	W	W
Asphaltic concrete aggregates and road base materials	1100	6770	1,050	5,450	873	5,850
Fill	891	5,820	1,420	5,930	77	311
Other miscellaneous uses[3]	314	2,670	41	277	217	2,140
Unspecified:[4]						
Reported	1,610	9,070	3,190	18,600	952	5,260
Estimated	3,350	19,200	12,000	74,700	3,340	18,100
Total	7,260	43,500	18,400	109,000	5,460	31,700

	Unspecified districts	
	Quantity	Value
Concrete aggregate (including concrete sand)[2]	--	--
Asphaltic concrete aggregates and road base materials	924	4,660
Fill	22	43
Other miscellaneous uses[3]	--	--
Unspecified:[4]		
Reported	345	723
Estimated	--	--
Total	1,290	5,430

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 snow and ice control and railroad ballast.
[4]Reported and estimated production without a breakdown by end use.