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2000 Summary of Mineral Activity in Utah

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SUMMARY

The value of Utah's mineral production (including coal) in 2000 is estimated to be \$1.92 billion, \$102 million more than in 1999. Contributions from each of the major industry segments are: base metals, \$749 million (39 percent of total); industrial minerals, \$500 million (26 percent of total); coal, \$464 million (24 percent of total); and precious metals, \$212 million (11 percent of total).

The changes in Utah's mineral valuation by industry segment for the years 1996 through 2000 are shown in figure 1. Compared to 1999, the 2000 values of: (1) base metals increased \$123 million, (2) industrial minerals decreased \$83 million, (3) coal increased \$4 million, and (4) precious metals increased \$59 million.

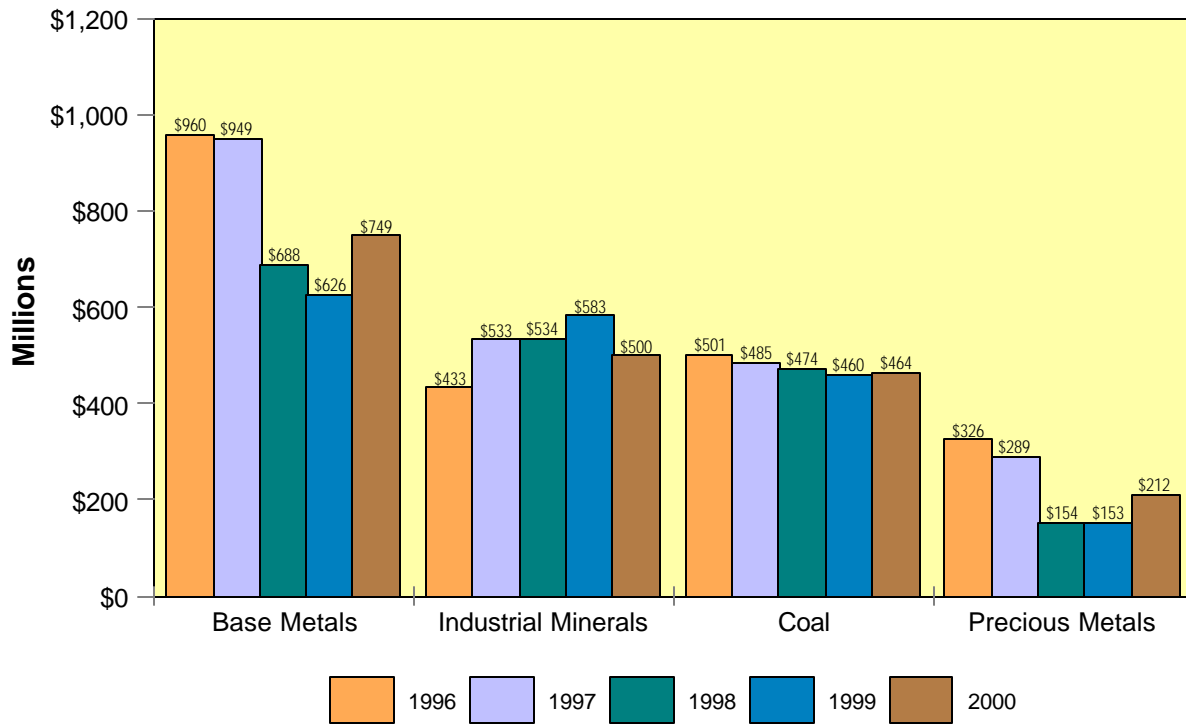


Figure 1. Value of Utah mineral and coal production, 1996 through 2000.

The value of mineral production is expected to remain relatively high in 2001 primarily due to increased production, but the increased volume will be offset by flat to declining base- and precious-metal prices due to the economic slowdown that began in the second half of 2000.

During the year 2000, the Utah Division of Oil, Gas and Mining received 11 Large Mine permit applications (5 acres [2 hectares] and larger disturbance) and 56 new Small Mine permit applications (less than 5 acres [2 hectares] disturbance). All of the Large Mine permit applications were made to change from Small to Large Mine classification.

Mineral exploration statewide decreased significantly compared to 1999. Fifteen Notices of Intent to explore on public lands were filed with the Utah Division of Oil, Gas and Mining in 2000, compared to 26 in 1999, 22 in 1998, and 50 to 60 per year received during the early 1990s.

The U.S. Geological Survey ranked Utah 11th in the nation (down from 9th) in the value of nonfuel minerals produced in 1999 (latest year that production figures are available). Utah accounted for slightly more than 3 percent of the U.S. total nonfuel mineral production value.

OUTLOOK

The value of mineral production is expected to remain relatively high in 2001 primarily due to increased production, but the increased volume will be offset by flat to declining base- and precious-metal prices due to the economic slowdown that began in the second half of 2000. Operator surveys indicate that in 2001: base-metal production will be mixed with an increase in copper and a decrease in magnesium and molybdenum; industrial-minerals production should remain relatively high, although a reduced demand for sand and gravel and cement may result in an overall lower total value; coal production is expected to increase as are average coal prices; and precious-metal production will be mixed with a decrease in gold partially offset by an increase in silver. The anticipated re-opening of two small mines may add to the overall level of both precious- and base-metals production. Exploration for both base and precious metals is expected to remain relatively low.

MINE PERMIT SUMMARY AND STATUS

During the year 2000, the Utah Division of Oil, Gas and Mining (DOGGM) received 11 Large Mine permit applications (5 acres [2 hectares] and larger disturbance) and 56 new Small Mine permit applications (less than 5 acres [2 hectares] disturbance). All of the Large Mine permit applications were made to change from Small to Large Mine status. These numbers represent an increase of six Large Mine permit applications and a decrease of one Small Mine permit application compared to 1999. New Large Mine permits include seven dimension stone quarries, two limestone quarries (aggregate), one gypsum quarry, and one dimension stone mill site. New Small Mine permits are grouped as follows: industrial minerals - 42, precious metals - 5, gemstones and fossils - 5, and mill sites - 4.

The state has 85 active Large Mines (excluding sand and gravel) that are grouped by industry segment as follows: base metals - 4, precious metals - 1, coal - 12, and industrial minerals (including gemstones, geodes, and fossils) - 68. One hundred four Small Mines reported production in 2000, 24 more than in 1999. Small Mines are grouped as follows: base metals - 1, precious metals - 13,

industrial minerals - 90 (including building, decorative and dimension stone, gemstones, fossils, and geodes).

In December 2000, DOGM sent 427 annual report questionnaires to all Large and Small Mine permit holders. By March 13, 2001, 331 reports had been received. Sixty-four Large Mines and 111 Small Mines reported production. Several reporting mines produced more than one commodity.

EXPLORATION PERMITS

Mineral exploration statewide decreased significantly compared to 1999. Fifteen Notices of Intent (NOIs) to explore on public lands were filed with DOGM in 2000, compared to 26 in 1999, and 22 in 1998. The number of new NOIs listed by county included: Beaver - 7, Box Elder - 1, Kane - 2, Millard - 1, Tooele - 2, Uintah - 1, and Washington -1. Ten permits were issued for industrial minerals exploration and five for precious metals.

NATIONAL RANKINGS

The U.S. Geological Survey (USGS) ranked Utah 11th in the nation (down from 9th) in the value of nonfuel minerals produced in 1999 (latest year that production figures are available). Utah accounted for slightly more than 3 percent of the U.S. total nonfuel mineral production value. Based on USGS estimates of quantities produced in the 50 states during 1999, Utah remained the only state to produce beryllium concentrates and was the first of two magnesium-metal-producing states. The state remained second in copper and potash; fourth in gold, molybdenum, phosphate rock, and Grade-A helium; and fifth in silver, bentonite, and perlite. Utah rose to third from fourth in magnesium compounds, to fifth from sixth in salt, to sixth from seventh in gemstones, but dropped from sixth to ninth in construction sand and gravel. Additionally, the state was a significant producer of lime (Tanner, 2001).

USGS data show that between 1990 and 1999 the value of nonfuel mineral production in Utah ranged from a low of \$1.18 billion in 1991 to a high of \$1.84 billion in 1995 (figure 2). The value of nonfuel mineral production for 1999 is estimated to be \$1.26 billion. The Utah Geological Survey's (UGS) estimate for the value of nonfuel mineral production for 2000 is \$1.46 billion, \$98 million more than the UGS's 1999 estimate.

BASE- AND PRECIOUS-METAL PRODUCTION

Base-metal production, with an estimated value of \$749 million, was the largest contributor to the value of minerals produced in 2000 (figure 1). In descending order of value, those metals are: copper, magnesium metal, molybdenum, and beryllium. Precious-metal production, valued at \$212 million, included gold (90 percent of total value) and silver (10 percent of total value). Kennecott Utah Copper Corporation's Bingham Canyon mine, located in Salt Lake County, a few miles west of Salt Lake City,

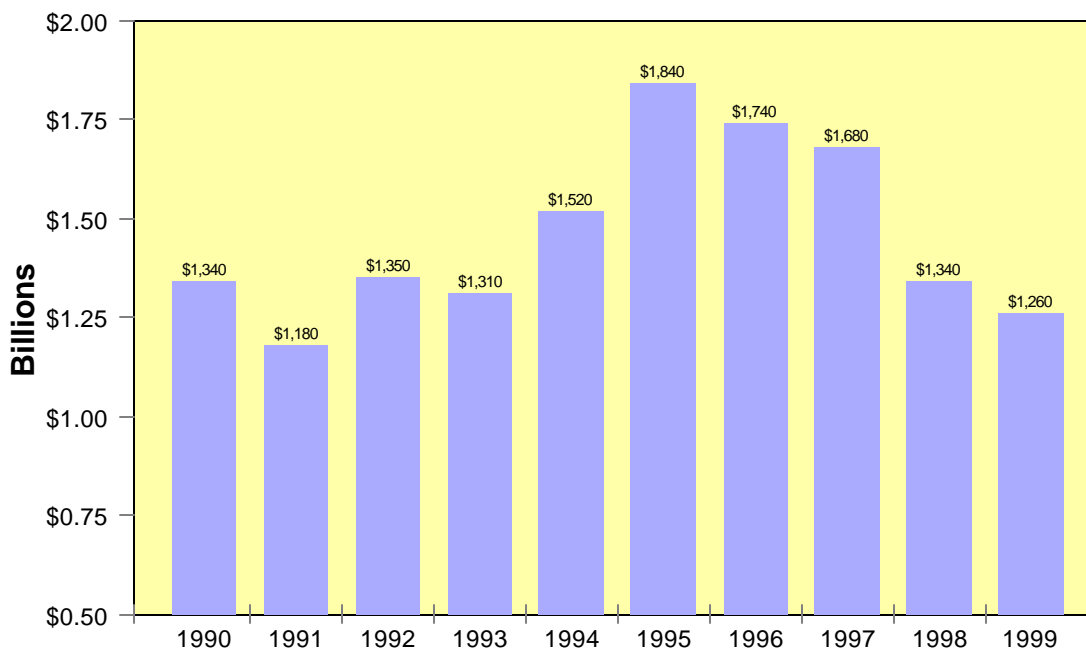


Figure 2. Value of Utah nonfuel mineral production, 1990 through 1999.

is the state's sole producer of copper, silver, and molybdenum, and a major producer of gold. The combined value of minerals produced from the Bingham Canyon mine is more than one-third of the total value of all minerals produced statewide.

Copper

Copper is the largest contributor to the value of nonfuel minerals in the state. Significant price increases in 1994 and 1995 pushed the value of copper to historical highs and the value of base-metal production statewide to over \$1 billion for the first time in 1995. Since 1995, the price of copper has fallen significantly (\$1.38/lb [\$3.04/kg] in 1995 vs \$0.76/lb [\$1.68/kg] in 1999). Copper prices increased somewhat in 2000, averaging \$0.89/lb [\$1.96/kg]. Copper production from Kennecott's Bingham Canyon mine increased slightly in 2000 to approximately 330,000 short tons (st), (300,000 metric tons [mt]) from 1999 production of approximately 310,000 st (282,000 mt) of copper metal. Kennecott's annual copper production has stabilized at slightly more than 300,000 st (272,000 mt).

Magnesium Metal

Magnesium metal was the second-largest contributor to the value of base metals in 2000. Magnesium metal is produced from Great Salt Lake brines by Magnesium Corporation of America at its electrolytic plant at Rowley in Tooele County. The plant has a capacity to produce 47,000 st (43,000 mt) of magnesium metal (99.9 percent purity) annually and is one of only two active primary

processing facilities in the U.S. Magnesium production was less than capacity in 2000, due to construction of a new process circuit and increased control of flue-gas emissions. Demand for magnesium metal has decreased worldwide and domestic producer prices were at their lowest level since 1994.

Molybdenum

The sole molybdenum producer in Utah is Kennecott's Bingham Canyon mine, which produced more than 15,000 st (14,000 mt) of molybdenum concentrate (MoS_2) in 2000, a substantial increase from 1999 production. The Bingham Canyon mine was one of six (down from eight) molybdenum-producing mines in the U.S. in 2000. Molybdenum is recovered as a by-product from the copper milling operation.

Beryllium

Utah continued to be the nation's leading producer of beryllium metal. Beryllium ore (bertrandite) is mined at Brush Wellman, Inc.'s Topaz and Hogs Back mines in Juab County and processed with imported beryl at the company's plant a few miles north of Delta in Millard County. The Hogs Back mine began producing in 1998. In 2000, more than 100,000 st (91,000 mt) of ore was mined and trucked to the company's Delta plant for processing. The product (beryllium hydroxide) is then sent to the company-owned refinery and finishing plant in Ohio, where it is converted into beryllium metal, alloys, and oxide. The demand for beryllium alloys and beryllium oxide has increased modestly over the past several years because alloys are increasingly used in the automobile and electronics industries. Slightly more beryllium ore was mined in 2000 than in 1999.

Vanadium

No vanadium ore was mined in Utah in 2000, as vanadium prices remained near a five-year low (Reese, 2001).

Gold and Silver

Gold production in 2000 is estimated to be nearly 700,000 Troy ounces (oz) (21,800 kg), a substantial increase from the 470,000 oz (14,600 kg) produced in 1999. Gold is produced from two surface mines owned by Kennecott Corporation: one primary producer (Barneys Canyon mine) and one by-product operation (Bingham Canyon mine), both located in Salt Lake County. Several small mines in the state are known to produce minor amounts of precious metals, but metal-specific production is not reported, and not included in the above totals. Barneys Canyon mine will exhaust its ore reserve in late 2001, but will continue to produce gold for several years at a reduced rate until its leach pads are depleted.

Silver production statewide was estimated to be approximately 4.0 million oz (0.124 million kg), nearly 300,000 oz (9,300 kg) more than 1999. Silver was produced as a by-product metal from the Bingham Canyon mine.

INDUSTRIAL MINERAL PRODUCTION

The industrial minerals segment, with an estimated value of \$500 million, was the second-largest contributor to the value of minerals produced in 2000 (figure 1). Major commodities produced by group or individual commodity in descending order of value included: (1) sand and gravel and crushed stone; (2) Portland cement, lime, limestone, and dolomite; (3) salines, including sulfate of potash, salt, potash (potassium chloride), and magnesium chloride; (4) phosphate; (5) gilsonite; (6) expanded shale; (7) gypsum; and (8) common clay and bentonite.

Sand and Gravel and Crushed Stone

Sand and gravel, and crushed stone (including limestone and dolomite) are the highest contributors to the value of industrial minerals produced in 2000. These materials are produced in every county in Utah by commercial operators, and by state, federal, and county agencies. Due to the large number and diversity of producers, operators are not sent UGS production questionnaires. However, data are compiled by the USGS. The data show that in 2000, 43.7 million st (39.7 million mt) of sand and gravel, and 8.9 million st (8.1 million mt) of crushed stone were produced, with a combined value of \$168.4 million. This compares to 43.4 million st (39.5 million mt) of sand and gravel and 9.7 million st (8.8 million mt) of crushed stone produced in 1999, with a combined value of \$170.3 million (Tepordei, 2001).

Portland Cement, Lime, Limestone, and Dolomite

Portland cement, lime, limestone, and dolomite were the second-highest value industrial minerals produced in 2000, with a combined value of \$137.1 million. Two operators produce Portland cement in Utah: Holnam, Inc. and Ash Grove Cement Company. Holnam's Devil's Slide plant is east of Morgan in Morgan County, and Ash Grove's Leamington plant is east of Lynndyl in Juab County. Both companies have expanded production capacity and the two plants have a combined capacity of more than 1.5 million st (1.4 million mt) of cement annually. Both plants operated at, or near, capacity in 2000. In addition to limestone, both Holnam and Ash Grove Cement mine modest amounts of shale that is also used in the manufacture of cement.

Lime production was slightly lower in 2000 than 1999. Graymont Western U.S., Inc. (formerly Continental Lime Company), which produces high-calcium lime, and Chemical Lime of Arizona, Inc., which produces dolomitic lime, are the two suppliers of calcined limestone (quick lime) and hydrated lime in Utah, with a combined capacity of more than 1.0 million st (0.9 million mt) per year. Both operations serve markets in Utah and surrounding states. Continental Lime's plant is in the Cricket Mountains, approximately 35 miles (56 km) southwest of Delta in Millard County, and is rated as one

of the 10 largest lime plants in the United States. Chemical Lime of Arizona's plant is about 8 miles (13 km) northwest of Grantsville in Tooele County.

In addition, 19 companies quarried 2.4 million st (2.2 million mt) of limestone and dolomite in 2000, which was used mainly in construction, steel-making, and flue-gas desulfurization in power plants. The three largest suppliers of crushed limestone used in construction are: Valley Asphalt Company, from two quarries in Utah County; Pelican Point Rock Products Company (formerly Larsen Limestone Company), from one quarry in Utah County; and Harper Construction Company, from one quarry in Salt Lake County. A small amount of limestone and dolomite was also crushed to a fine powder and marketed as "rock dust" to the coal mining industry.

Salt, Magnesium Chloride, Potash (Potassium Chloride), and Sulfate of Potash

Brine-derived products, including salt, are the third-largest contributors to the value of industrial mineral production in Utah, with a combined value of about \$100 million. In addition to salt, other brine-derived products include magnesium chloride and potash (potassium chloride and sulphate of potash [SOP]). One company (North Shore Limited Partnership) produces a small amount of concentrated brine which is used as an ingredient in mineral food supplements. The location of operators around Great Salt Lake is shown in figure 3. The statewide production of salt and other brine-derived products, excluding magnesium metal, is estimated to be 3.4 million st (3.1 million mt) in 2000, essentially the same as 1999. Potash production (including SOP) is estimated to be about 230,000 st (210,000 mt) in 2000, approximately 175,000 st (160,000 mt) less than 1999.

Salt production alone is estimated to be 3.0 million st (2.7 million mt) in 2000, about 600,000 st (545,000 mt) more than 1999, with most of the production coming from three operators using brine from Great Salt Lake. These operators are, in descending order of production: (1) IMC Kalium Ogden Corporation (formerly GSL Minerals), (2) Cargill Salt Company, and (3) Morton International, Inc. In addition, three other companies produce salt and/or potash from operations not located on Great Salt Lake: (1) Reilly Chemical Company at Wendover in Tooele County (potash), (2) Moab Salt Company near Moab in Grand County (salt and potash), and (3) Redmond Minerals, Inc. near Redmond in Sanpete County (salt).

Phosphate

Utah's only phosphate producer, SF Phosphates Ltd.'s Vernal phosphate operation, is 11 miles (18 km) north of Vernal in Uintah County. SF Phosphates is a partnership of Farmland Industries, Inc. (Missouri) and J.R. Simplot, Inc. (Idaho). The company mines roughly 3.0 million st (2.7 million mt) of ore annually, which is processed into about 1.0 million st (0.9 million mt) of concentrate and transported in slurry form to the company's Rock Springs, Wyoming fertilizer plant via a 90-mile-long

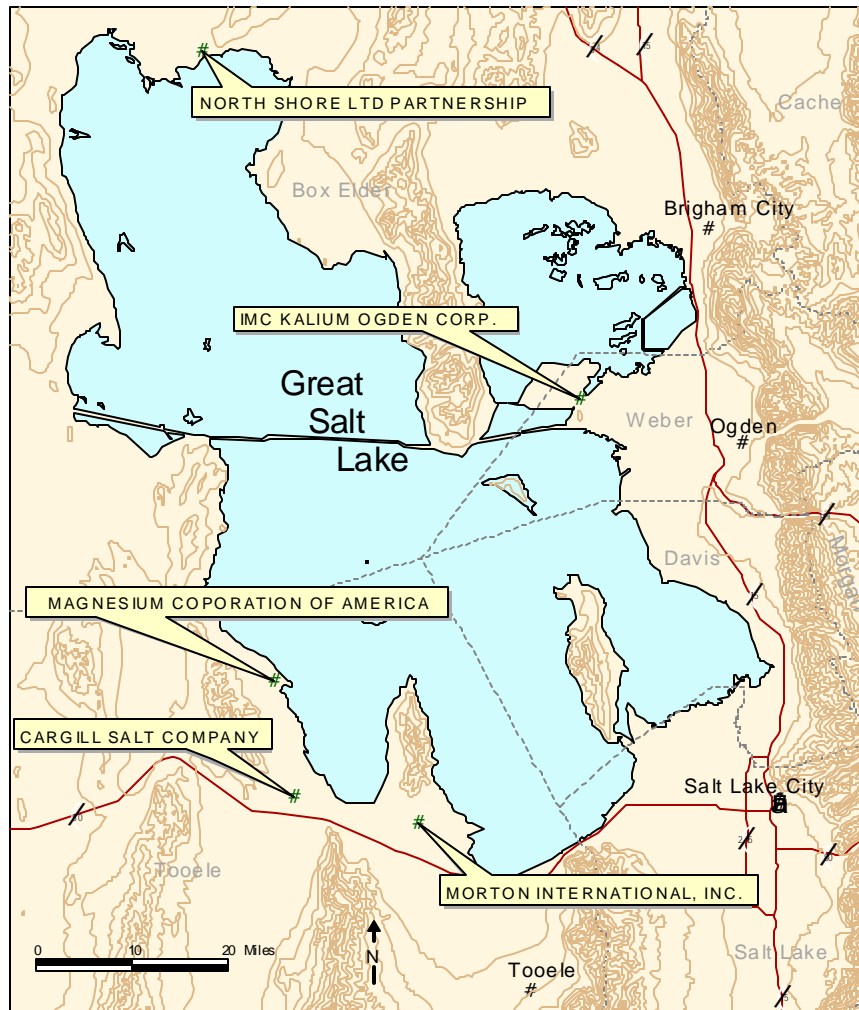


Figure 3. Location of brine industries around Great Salt Lake, Utah.

(144 km) underground pipeline. During 2000, the mine produced more than 3.5 million st (3.2 million mt) of ore, the highest production level in the past nine years.

Gilsonite

Gilsonite production for 2000 is estimated to be more than 60,000 st (55,000 mt), approximately 10,000 st (9,000 mt) more than 1999. Gilsonite is an unusual solid hydrocarbon that has been mined in Utah for more than 100 years. The three operations producing gilsonite are all near the town of Bonanza in eastern Uintah County. In descending order of production they are: (1) American Gilsonite Company's Bonanza mine, (2) Zeigler Chemical and Minerals Company's Zeigler and Tom Taylor mines, and (3) Lexco, Inc.'s Cottonwood mine. Gilsonite is marketed worldwide for use in over 150 products ranging from printing inks to explosives. Gilsonite production has been relatively stable for the past several years.

Expanded Shale

One company, Utelite, Inc., mined more than 200,000 st (181,000 mt) of shale in 2000 to manufacture "expanded shale" for use as a lightweight aggregate for the construction industry. The mine is located near the town of Wanship in Summit County. Production of "expanded shale" increased slightly over the past year.

Gypsum

More than 500,000 st (455,000 mt) of gypsum was produced by seven companies in 2000, 20,000 st (18,000 mt) more than in 1999. In descending order of production, the companies are: (1) U.S. Gypsum Company, (2) Georgia Pacific Corporation, (3) Nephi Gypsum, Inc., (4) Nephi Sandstone Company, (5) H.E. Davis and Sons, (6) D.K. Gypsum Industries, and (7) Western Clay Company. Both U.S. Gypsum and Georgia Pacific operate wall board plants near Sigurd in Sevier County. The majority of gypsum produced in Utah is used for making wall board, 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 agriculture industry for use as a soil conditioner.

Common Clay and Bentonite

More than 325,000 st (295,000 mt) of common clay and approximately 60,000 st (55,000 mt) of bentonite were produced by six companies in 2000, an 11 percent increase in common clay and a 30 percent decrease in bentonite compared to 1999. In descending order of production the companies are: (1) Interstate Brick Company (common clay), (2) ECDC Environmental, LLC (common clay), (3) Interpace Industries (common clay), (4) Western Clay Company (bentonite), (5) Redmond Minerals, Inc. (bentonite), and (6) Paradise Management Company (common clay). More than 75 percent of all clay is used in the manufacture of brick. Bentonite is used as a sealant in many civil engineering

applications, as a pet waste absorbent (litter box filler), as an additive in oil and gas drilling fluids, and as a binder in foundry molds.

ENERGY MINERALS PRODUCTION

Coal

Utah's operators mined 26.9 million st (24.4 million mt) of coal from 12 underground mines in 2000, which was valued at \$464 million, approximately 400,000 st (364,000 mt) more than 1999 (figures 1 and 4). Utah's only coal waste reprocessing plant was idle during the year. Production in 2000 was the second-highest in Utah history. The mines are located in Carbon (6), Emery (5), and Sevier (1) Counties in east-central Utah. The coal reprocessing facility is located near the town of Wellington in Carbon County. The largest coal producer was the SUFCO mine, operated by Canyon Fuel Company, LLC (Sevier County) which produced nearly 6.0 million st (5.5 million mt) of raw coal. In addition, the following four mines each produced in excess of 3.0 million st (2.7 million mt) of coal: (1) Deer Creek mine, operated by Energy West Mining Company (PacifiCorp, Inc.) (Emery County); (2) Skyline #1 and #3 mines, operated by Canyon Fuel Company, LLC (Carbon and Emery Counties); (3) Crandall Canyon mine, operated by Genwal Coal Company (Emery County); and (4) Trail Mountain mine, operated by Energy West Mining Company (Emery County).

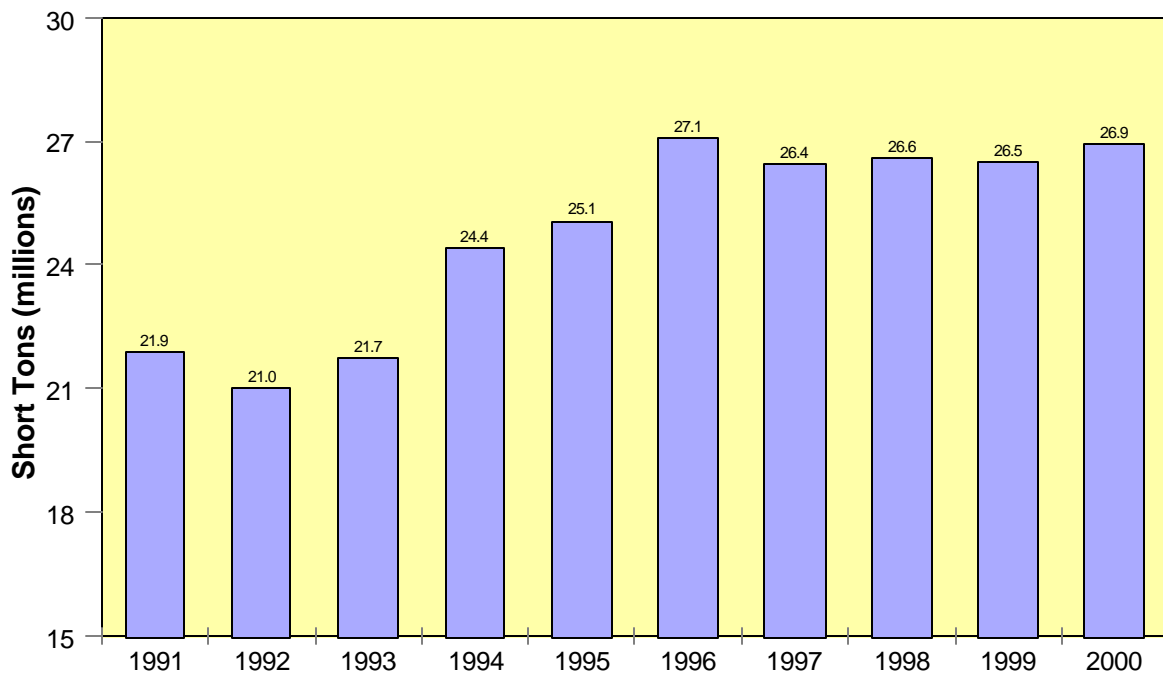


Figure 4. Utah coal production, 1991 through 2000.

Slightly more than 50 percent of Utah's coal was consumed by electric utilities within the state. Coal is utilized for industrial purposes within the state, shipped to electric utilities and industrial users in other states, and exported to Pacific Rim countries for both power generation and industrial use. One new mine located in Carbon County (West Ridge) began producing coal in early 2000. The Willow Creek mine (RAG International, Inc.) was closed following a mine explosion and fire in July 2000, and will remain closed indefinitely. The Trial Mountain mine and White Oak Mining and Construction Company's White Oak #2 mine will be closed in April 2001, because of economic reserve depletion. In spite of these mine closings, coal production is expected to increase to a record level in 2001.

Uranium

Because of the continued weak market for uranium, there was no uranium ore mined in Utah in 2000, and International Uranium Corporation's White Mesa mill was idle the entire year. U.S. Energy Company's Shootaring Canyon mill in Garfield County was also idle during the year and no milling is planned until there is a significant increase in the price of both uranium and vanadium.

BASE- AND PRECIOUS-METAL EXPLORATION

Base- and precious-metal exploration remained at a low level during 2000. DOGM received 15 Notices of Intent (NOIs) to explore; eleven less than in 1999 and significantly lower than the 50 to 60 per year received during the early 1990s. Five of the NOIs were for precious metals and 10 were for industrial minerals. Most drilling was around existing mines, or as follow-up on previous drilling. Most exploration was for precious metals, but several projects were for copper, or lead and zinc. Figure 5 shows the location of mining districts, exploration areas, and properties discussed below.

Tintic Area

Chief Consolidated Mining, through its subsidiaries Tintic Utah Metals (owned 75 percent by Chief) and Chief Gold Mines, Inc. (owned 100 percent by Chief), continued exploration and rehabilitation work on its East Tintic properties in Juab County.

At the Trixie mine (Chief Gold Mines, Inc.), surface drilling of 29 holes led to the discovery of a high-grade ore body at depths of 600 to 700 ft (180-215 m) approximately 1,200 ft (365 m) south of the Trixie shaft. The discovery hole intersected 30 ft (9 m) of ore that averaged 3.2 oz per short ton (oz/t) (100 grams per metric ton [g/t]) gold and 7.1 oz/t (220 g/t) silver. Follow-up drilling blocked out ore reserves of 70,500 st (64,000 mt) averaging 0.75 oz/t (23.3 g/t) gold and 5 oz/t (156 g/t) silver after cutting all gold assay values to 1 oz/t (31 g/t). In several drill holes, gold assays ranged from 2.1 to 17.1 oz/t (65-530 g/t) gold. The new ore body represents an upper extension of the 75-85 oreshoot along the 757 fissure. The 75-85 oreshoot had been previously mined by Kennecott and Sunshine. The ore is similar to that previously mined, consisting of quartzite breccia with ore and gangue filling the voids between breccia clasts and locally replacing gouge and fine grained fault breccia. The ore

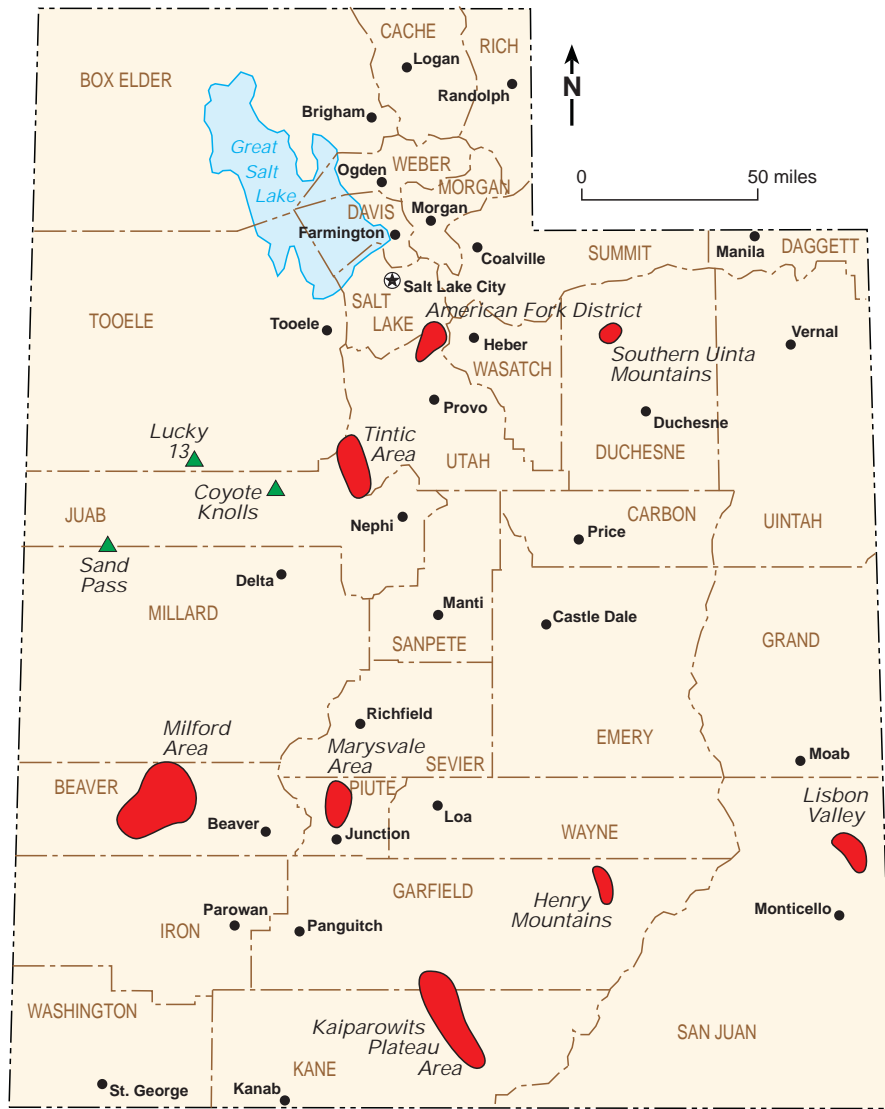


Figure 5. Major base- and precious-metals exploration areas in Utah during 2000.

consists of copper, lead, zinc, and silver sulfides and sulfosalts (enargite, tetrahedrite-tennantite, polybasite, pyrrargyrite, and other minerals), pyrite, and native gold in a gangue of quartz, barite, chalcedony, and sericite.

In November 2000, a station was completed at the 600 level of the Trixie shaft and a drift was begun to access the ore body. By the end of February 2001, the drift was approximately 600 ft (180 m) from the shaft. Production from the new ore body is expected to begin in mid- to late 2001. The ore will be processed at the rehabilitated Burgin mill (420 st per day [stpd]) (380 mt per day [mtpd]) owned by Tintic Utah Metals, LLC. The mill was test operated from June to August using low-grade, stockpiled Trixie ore and then placed on standby in September, awaiting production from the high-grade zone.

Additional underground exploration drilling was done in the Trixie mine to explore for continuations of known ore shoots. The drilling included three underground diamond drill holes and over 8,000 ft (2,400 m) of long-hole drilling. Drilling was done from the 750, 1050, and 1250 levels. Although this program discovered additional ore, most development work for 2001 will concentrate on the newly discovered ore body on the 600 and 750 levels. In addition, detailed surface work and structural re-interpretation indicated a covered "Trixie-like" target approximately 1,800 ft (550 m) south of the Trixie mine. A geophysical survey is planned and the target will be drilled in either 2001 or 2002.

No drilling was done on the Burgin, Eureka Standard, or Apex properties in 2000. No decision has been made by the Utah Division of Water Rights on dewatering the Burgin mine and no further work is expected on the property until a dewatering permit is granted.

American Fork District

Unico Incorporated acquired the Silver Bell mine east of Alpine in Utah County. The mine has over 1,000 ft (300 m) of developed drifts, but only a limited amount of ore has been mined. The ore is in a 5- to 6-ft-wide (1.5-1.8 m) vein with silver, copper, lead, zinc, and gold values. The upper part of the deposit is oxidized, but sulfides are present in the lower levels of the workings. Plans for 2001 call for rehabilitation of the workings with mining to begin as early as mid-2001. The ore will be shipped to the company's mill at the Deer Trail mine near Marysvale in Piute County.

Milford Area

The Milford area in Beaver County was the most active exploration area in the state. Exploration and drilling were done by several companies and individuals including Breccia Development Company and Nevada Star Resources. Exploration was concentrated in the Beaver Lake Mountains, Star, and San Francisco districts, and in the Blue Mountain area. Targeted minerals include gold, silver, copper, lead, and zinc. The following targets are all located within the Milford area (figure 5).

Beaver Lake Mountains District

Nevada Star Resources drilled eight wide-spaced holes on their Beaver Lake-Rocky Range copper property northwest of Milford in Beaver County. The holes were drilled in the pediment west of the

Copper Ranch mine and south of the OK mine. Holes were drilled to an average depth of 600 ft (180 m) and spaced approximately 1,000 ft (300 m) apart. Six of the eight holes penetrated significant copper intercepts and follow-up drilling on closer spacing is planned for 2001.

Nevada Star is currently attempting to secure financing to bring the property into production. A full feasibility study was completed in 1998 for an open-pit, heap-leach, oxide copper operation capable of producing 5,000 st (4,500 mt) copper metal per year. Previously announced drill-indicated reserves for the property are 6.4 million st (5.8 million mt) of 0.74 percent copper.

San Francisco District

In September 2000, Horn Silver Mines leased their patented claims surrounding the Horn Silver and King David mines in Beaver County to Franconia Minerals Corporation. Franconia plans to conduct underground mapping and sampling of the accessible workings, followed by surface drilling, which could begin as early as June 2001. The main target is lead-zinc-silver sulfide replacement deposits in limestone in the footwall of the Horn Silver fault. As many as four manto runs are known between the 850 and 1000 levels, in the area between the Horn Silver and King David shafts. In the past, ore mined from these runs had grades of 10 to 12 percent zinc, 10 percent lead, and 10 oz/t (340 g/t) silver. A portion of the property having zinc oxide potential was previously leased by World Hydrocarbons.

Star District

Breccia Development Company drilled nine holes on their Star project, located in Beaver County east of the Harrington-Hickory mine in the northern part of the district. Holes were drilled from 600 to 1,000 ft (180-300 m) deep and the target was lead-silver, manto-style mineralization similar to that at the Harrington-Hickory mine. The drilling intersected anomalous lead, zinc, and silver values, but assays have not been released. Additional drilling is planned for 2001.

Breccia Development drilled an additional nine holes on their Goldstar project, located three miles southwest of the Star project. These holes also were 600 to 1,000 ft (180-300 m) deep. Most of the drilling was west of the old workings in the area (Vicksburg mine, Estelle mine, etc.). Exploration targets included distal disseminated gold in altered and silicified Mesozoic sandstones and shales, lead-zinc replacements in Permian limestones, copper- or zinc-bearing skarns in limestone roof pendants and at the contact of the granodiorite intrusive, and possible porphyry copper mineralization within the intrusive stock. Additional drilling is planned for 2001. No work was done during 2000 on the SH molybdenum prospect on the west side of the Star Range.

Blue Mountain Area

Breccia Development drilled 10 holes north of Jockey Road on their AB prospect in the central Blue Mountain area of Beaver County. Four holes were drilled to a depth of 1,500 ft (460 m) and the remaining six were drilled to depths between 600 and 800 ft (180-240 m). The target was disseminated gold in Oligocene volcanic tuffs and flows and underlying Cambrian carbonate units. The

drilling intersected anomalous gold and pathfinder elements in decalcified dolomite. Farther east, 1998 drilling had intersected ore-grade mineralization associated with jasperoids in limestone. Additional drilling is planned for 2001. No work was done in 2000 on the 2-D copper-molybdenum prospect on the east side of Blue Mountain, or the Red Hills gold-silver prospect south of Jockey Road. However, both prospects are still active and drilling is planned in 2001.

Marysvale Area

Unico, Inc. continued exploration and development operations at the Deer Trail mine in the Mt. Baldy district southwest of Marysvale, Piute County. During 2000, the company began construction of a 400 stpd (360 mtpd) mill that is scheduled to become operational in early March 2001. The current mill is a gravity-flotation mill, but a heavy medium separation circuit is scheduled to be installed in mid-2001. Little ore was mined or milled during 2000, and most of the development work concentrated on rehabilitation of the PTH level (Lower or New Deer Trail mine). Plans for 2001 call for mining the high-grade manto zones of the 3400 orebody above the PTH level, exploring the Wet Fissure below the PTH level, establishing secondary surface access (probably through the Old Deer Trail mine), rehabilitating the PTH workings from the 3400 to 8600 areas to MSHA standards, and draining the flooded levels of the 8600 ore zone. In addition, the company plans to investigate the feasibility of driving a lower adit at least 500 ft (150 m) below the PTH level to access lower ore zones.

Kaiparowits Plateau Area

In July 1999, 3-R Minerals submitted a Notice to Amend for its titanium-zirconium prospect in southern Garfield County. The company also requested approval to construct an on-site concentrating facility, consisting of up to 34 spiral concentrators, at their Coal Bed Canyon mine site south of Escalante in Garfield County. The draft EIS was issued in November 2000, and the BLM recommended authorization, noting it was a grandfathered School and Institutional Trust Lands' lease. The public comment period ended in January 2001, and the final EIS is being prepared. Once approval is obtained, mining of Recent unconsolidated, heavy-mineral fluvial sands could begin at the permitted mine site in Alvey Wash. The planned capacity of the concentrating facility would be 50 st (45 mt) per hour resulting in an estimated annual production of 5,000 st (4,500 mt) zircon and 1,250 st (1,125 mt) titanium minerals. No significant mining was done during 2000, but an estimated 50 st (45 mt) of ore was transported off site for classification and spiral testing.

The status of 3-R Mineral's Calf Canyon-Dave Canyon federal claims remains unresolved. The case is currently before the U.S. Federal Court of Claims in Washington, D.C.

Southern Uinta Mountains

Dal Quinn Exploration and Mining Company continued exploration on its copper-silver property in the southern Uinta Mountains 30 miles (50 km) north of Duchesne, Duchesne County. The main target is altered fault and breccia zones along the Hoyt Canyon and South Flank faults. Surface samples of

clay gouge along both faults in the eastern part of the property returned assays of 9.5, 21, and 58 oz/t (300, 650, and 1,800 g/t) silver along with anomalous to possibly ore-grade tungsten values. To date, seven holes ranging in depth from 30 to 120 ft (9-36 m) have been drilled on the property; four in 1999 and three in 2000. None of the holes reached their planned target depth because of lost circulation or lack of water for drilling. Three holes were drilled along the South Flank fault, three along the Hoyt Canyon fault, and one in an area of strong limonite staining in quartzite. Partial assay results are available for two of the holes drilled along the Hoyt Canyon fault. The eastern hole was drilled to a depth of 70 ft (21 m) and contained 2.5 oz/t (78 g/t) silver from 10 to 20 ft (3-6 m) and 9.8 oz/t (305 g/t) silver, 0.3 percent copper, 0.5 percent zinc, and 0.7 percent tungsten. The western hole was drilled to a depth of 80 ft (24 m) and contained 21 oz/t (650 g/t) silver and 0.1 percent copper between 70 and 80 ft (21-24 m). The company is waiting for assay results from other drill intervals. Drilling plans for 2001 include deepening two holes and drilling four or more additional holes to the west along the Hoyt Canyon fault. Planned drill depths are 350 to 700 ft (100-215 m). In addition to the fault/breccia mineralization, the property contains wide zones of specular hematite and several 5- to 15-ft-wide (1.5-4.5 m) zones assaying up to 40 percent manganese, with anomalous cobalt, molybdenum, and vanadium.

Lisbon Valley

In early 2000, Summo Minerals Corporation expanded its San Juan County deposit by initially drilling 15 holes southwest of the Centennial orebody on a 200 by 400 ft (61 by 122 m) grid pattern; 14 of the 15 holes intersected the ore zone with an average thickness of 44 ft (13 m) and an average grade of 0.504 percent copper. Follow-up drilling of 47 in-fill and extension holes (62 holes total) further delineated the new Centennial Southeast Extension orebody. The new orebody is 300 to 800 ft (90-240 m) wide and extends over 2,200 ft (670 m) southwest of the designed southern high wall of the Centennial pit. The orebody consists of sooty chalcocite and bornite in the basal Dakota Sandstone beneath 130 to 325 ft (40-100 m) of overburden. Forty of the 62 holes intersected the ore body and averaged 45 ft (14 m) of 0.68 percent copper. The ore body is still open to the southeast. In addition, Summo drilled a water well north of the Centennial pit that intersected 65 ft (20 m) of greater than 0.10 percent copper. Although no additional exploration is planned for 2001, the northwest and southeast areas will be tested sometime in the future. The Winters Company calculated the following proven and probable reserves using a \$0.90 per lb copper price as part of a Feasibility Study Update 2000. The new reserves include the Centennial South East Extension, but also reclassified some low-grade material from ore to waste.

Pit	Reserves	Cu (%)	Strip ratio
Centennial	27,986,000 st (25,389,000 mt)	0.534	2.3:1
Sentinel	6,156,000 st (5,585,000 mt)	0.325	0.5:1
GTO	2,601,000 st (2,360,000 mt)	0.744	5.7:1

The Final Feasibility Study indicated a cash operating cost of \$0.45 per pound copper and a total projected production cost of \$0.73 per pound copper over a mine life of 8½ years. The project is fully permitted and a decision has been made to go forward with development. Construction could begin as soon as financing is secured. Once construction has begun, cathode copper production is expected within 14 months, with estimated production of 40 million lbs (18 million kg) per year.

Henry Mountains

Both Kaibab Industries and Martinque Mining did exploration work in the Bromide Basin area east of Mount Ellen in northern Garfield County. In 2000, Kaibab Industries drilled 12 holes with an aggregate footage of nearly 10,000 ft (3,000 m). The holes were drilled to test the high-grade Bromide and Crescent Creek veins and the Kimble-Turner shear zone. Assay results have not been released, but a wide zone of disseminated copper mineralization was intersected in the Kimble-Turner shear zone. Work continued on mining and rehabilitation of the Bromide and Crescent Creek mines. The Crescent Creek adit was re-opened with more than 300 ft (90 m) of drifting done on the Crescent Creek vein, and slightly more than 450 ft (140 m) of drifting was done on the Bromide vein to the east. Approximately 900 st (800 mt) of ore was milled at the Martinque mill.

During 2000, Martinque Mining built an access road and portal to the Martinque mine near the top of Bartons Peak, and drove an adit approximately 30 ft (10 m) along the vein. The vein trends approximately N 70° W, is 6 to 8 ft (2-2.4 m) wide, and assays up to 3.0 oz/t (100 g/t) gold. Martinque also completed a geochemical soil survey on the Butler Wash property north of Crescent Creek. Assay results have not yet been received.

Martinque also completed a surface sampling program over the alluvial placers along and adjacent to Crescent Creek east of the Bromide Basin. Results indicated an average cyanide-recovered grade of 0.05 oz/t (2 g/t) gold for alluvial placers. The alluvial placers cover an area of 2,800 acres (1,100 ha).

Other Areas

Echo Bay drilled eight holes on the Lucky 13 property in southern Tooele County before returning the property to the vendors. Individual holes were 300 to 500 ft (90 to 150 m) deep, with total drill footage of approximately 3,000 ft (900 m). The drilling intersected only minor, low-grade copper (300-400 ppm) and gold (150 ppb) values. The target was disseminated gold adjacent to feeder structures in Lower Cambrian limestone and shale, a similar stratigraphic sequence to that at the Detroit district. The prospect had previously been held by Phelps Dodge.

Lennox Ventures, Inc. recently leased the Sand Pass property in southern Juab and northern Millard Counties, with exploration planned for 2001. The target is disseminated gold associated with extensive jasperoids in Lower Cambrian sedimentary units. The area was previously drilled for gold by Exxon, Texaco, Freeport, and Amselco between 1982 and 1987. Previous drilling intersected scattered, low-grade gold (generally less than 0.5 ppm).

Lawrence Fawn leased the Coyote Knolls property in western Juab County and plans to begin mining in 2001 at a rate of approximately 100 st (90 mt) per day. The ore zone is a 5- to 15-ft- wide (1.5-5 m), gold- and silver-bearing silicified breccia and quartz vein. The product will be sold to McFarland and Hullinger, Inc. to be added to silica flux going to the Kennecott smelter at Magma, with credits given for the contained gold and silver. Previous drilling and sampling indicated that the ore zone averaged 0.12 oz/t (4.11 g/t) gold and 22 oz/t (754 g/t) silver.

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