

2002 Summary of Mineral Activity in Utah

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SUMMARY

The value of Utah's mineral production (including coal) in 2002 is estimated to be \$1.77 billion, about \$182 million (9.4 percent) less than in 2001. Contributions from each of the major industry segments are: base metals, \$612 million (34.6 percent of total); industrial minerals, \$565 million (31.9 percent of total); coal, \$420 million (23.7 percent of total); and precious metals, \$172 million (9.8 percent of total). Industrial minerals was the only segment that gained in value in 2002.

The changes in Utah's mineral valuation by industry segment for the years 1998 through 2002 are shown in figure 1. Compared to 2001, the 2002 values of (1) base metals decreased \$81 million (11.7 percent), (2) industrial minerals increased \$27 million (5.1 percent), (3) coal decreased \$60 million (12.5 percent), and (4) precious metals decreased \$68 million (28.3 percent).

The value of mineral production is expected to decrease moderately again in 2003 primarily due to decreased production of several base- and precious-metal commodities, and because of flat to declining base- and precious-metal prices. Coal prices should remain at the same level as in 2002; production will be less.

During 2002, the Utah Division of Oil, Gas and Mining (DOG M) received five Large Mine permit applications (5 acres [2 ha] and larger disturbance) and 20 new Small Mine permit applications (less than 5 acres [2 ha] disturbance). The five Large Mine permit applications include three new mine applications and two applications to change from a Small Mine permit to a Large Mine permit.

Mineral exploration statewide remained low for the third year in a row. Eleven Notices of Intent to explore on public lands were filed with DOGM in 2002, compared to 14 in 2001, 15 in 2000, 26 in 1999, and the 50 to 60 per year received during the early 1990s. Nationally, Utah ranked 9th in the value of nonfuel minerals produced in 2001 (latest year that production figures are available) and accounted for about 3.5 percent of the total U.S. nonfuel mineral production value. Utah also ranked 12th in coal production in 2001. The state should retain similar rankings in 2003.

OUTLOOK

The value of mineral production in Utah is expected to decrease again in 2003. Operator surveys indicate that in 2003, overall base-metal values will be slightly higher while precious-metal values will be substantially lower. A modest increase in metal prices is forecast for the year, but decreased production of several metals will reduce overall values. The opening of one or two small base-metal mines in the next two to three years will add incrementally to the state's base-metal values. Precious-metal production will be substantially lower in 2003 due to decreased production from Kennecott's Bingham Canyon and Barney's Canyon mines. Industrial-mineral values will also be lower with lower regional demand for sand and gravel and

crushed stone. The production of cement and lime products is expected to remain nearly the same as the current year. Coal prices are expected to remain flat while coal production will decline at several mines in 2003. Low base- and precious-metal prices will continue to depress exploration for these metals for the foreseeable future.

MINE PERMIT SUMMARY

During 2002, DOGM received five Large Mine permit applications (5 acres [2 ha] and larger disturbance) and 20 new Small Mine permit applications (less than 5 acres [2 ha] disturbance). The Large Mine permit applications include four industrial mineral mines and one base- and precious-metal mine. Two of the Large Mine permit applications were made to change from a Small Mine permit to a Large Mine permit, and three applications were for new mines. The 20 Small Mine permit applications include 16 industrial mineral mines, two base- and precious-metal mines, one oil recovery site (oil shale), and one gemstone and fossil site. These numbers represent a decrease of 12 Small Mine permit applications and no change in the number of Large Mine permit applications compared to 2001.

In 2001, DOGM recorded production from 80 Large Mines (excluding sand and gravel). The Large Mines include four base-metal mines, two precious-metal mines, 13 coal mines, and 61 industrial-mineral mines (including gemstones, geodes, fossils, and others). One hundred ten Small Mines reported production in 2001, 13 fewer than in 2000. These Small Mines included one base-metal, 10 precious-metal, and 99 industrial-mineral operations.

EXPLORATION PERMITS

Mineral exploration statewide remained at the same low level as 2001. Eleven Notices of Intent (NOIs) to explore on public lands were filed in 2002 with DOGM; nine notices were approved. This compares to 14 NOIs being filed in 2001, 15 in 2000, and 26 in 1999. The nine approved NOIs by county include: Beaver - 2, Iron - 2, Millard - 1, Utah - 2, and Washington - 2. Six NOIs were approved for base- and precious-metal exploration and three for industrial-minerals exploration. This is the lowest number of exploration permits approved in the past 11 years.

NATIONAL RANKINGS

The U.S. Geological Survey (USGS) ranked Utah 9th in the nation in the value of nonfuel mineral production in 2001 (latest year that production figures are available), which is the same as 2000. USGS data show that Utah accounted for 3.5 percent of the total U.S. nonfuel mineral production value. The 2001 data also show that Utah remained the only state that produced beryllium concentrates. Additionally, Utah was second in the production of copper and gold; second of two magnesium-metal-producing states and three potash-producing states; fourth in the production of perlite and magnesium compounds and fourth of four states that produced phosphate rock; fifth in silver, gemstones, and bentonite; and sixth in salt. While Utah rose to second from third in the production of magnesium compounds, it dropped to third from second in

the production of molybdenum concentrates. Additionally, Utah was a significant producer of Portland type cement, construction sand and gravel, and lime (Tanner, 2003). All USGS mineral production data for 2001 cited in this report are preliminary estimates as of August 2002 and are expected to change; related rankings may also change.

USGS data show that between 1991 and 2001 the value of nonfuel mineral production in Utah ranged from a low of \$1.18 billion in 1991 to a high of \$1.85 billion in 1995 (figure 2). The value of nonfuel mineral production for 2001 is estimated to be \$1.35 billion, about \$80 million less than 2000. The Utah Geological Survey's (UGS) estimate for the value of nonfuel mineral production for 2002 is \$1.35 billion.

BASE- AND PRECIOUS-METAL PRODUCTION

Base-metal production, with an estimated value of \$612 million, was the largest contributor to the value of minerals produced in 2002 (figure 1). In descending order of value, those metals were: copper, magnesium metal, molybdenum, and beryllium. The 2002 base-metal values were about \$81 million (11.7 percent) less than in 2001. Precious-metal production, valued at \$172 million, included gold (91 percent of total value) and silver (9 percent of total value). Precious-metal values in 2002 were \$68 million (28.3 percent) less than in 2001. Kennecott Utah Copper Corporation's Bingham Canyon mine is located about 32 km (20 mi.) southwest of Salt Lake City in Salt Lake County and is the state's sole producer of copper and molybdenum, and the major producer of gold and silver. 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 Utah. 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 from \$3.04/kg (\$1.38/lb) in 1995 to \$1.67/kg (\$0.76/lb) in 2002. Annual average copper prices have fluctuated between \$1.68/kg and \$1.96/kg (\$0.76 - \$0.89 per lb) since 1998. Copper production from Kennecott's Bingham Canyon mine decreased modestly in 2002 to approximately 260,000 metric tons (mt) (290,000 short tons [st]) from 2001 production of approximately 316,000 mt (350,000 st) of copper metal. Kennecott announced that economic open-pit reserves will be exhausted in the next 10 to 12 years, and that no decision has been made to extend a portion of the mine underground, although a rigorous economic evaluation is being conducted. Kennecott reports that the Bingham Canyon mine produces more than 10 percent of the annual refined copper requirements in the U.S. (Rio Tinto, 2003)

Magnesium Metal

Magnesium metal was the second-largest contributor to the value of base metals in 2002. Magnesium metal is produced from Great Salt Lake brines by U.S. Magnesium LLC (formerly Magnesium Corporation of America [Magcorp]) at its electrolytic plant at Rowley in Tooele County. U.S. Magnesium purchased the assets of Magcorp in June 2002 from the U.S. Bankruptcy Court. The plant's annual capacity is 43,000 mt (47,000 st) of magnesium metal

(99.9 percent purity). It is the only active primary magnesium processing facility in the U.S. Magnesium production was less than capacity in 2002, due to depressed magnesium prices and ongoing modernization of the processing plant. U.S. Magnesium plans to complete the modernization work in 2003 and will evaluate the possibility of expanding operations as the market improves. Magnesium metal prices reached a 10-year low in 2002.

Molybdenum

The sole molybdenum producer in Utah is Kennecott's Bingham Canyon mine, which produced slightly more than 10,000 mt (11,000 st) of by-product molybdenum concentrate (MoS_2) in 2002, a significant decrease (more than 25 percent) from 2001. Production was lower due to a combination of lower amounts of molybdenum in the copper ore and lower smelter throughput. The Bingham Canyon mine was one of six molybdenum-producing mines in the U.S. in 2002. The USGS reports that in the U.S., mine output of molybdenum decreased 13 percent in 2002 (Magyar, 2003). Over the past two years U.S. molybdenum production has dropped by 20 percent.

Beryllium

Utah continues to be the nation's sole producer of beryllium concentrates. Beryllium ore (bertrandite) is mined at Brush Resource's Topaz and Hogs Back mines in Juab County and processed along with imported beryl at the company's plant a few miles north of Delta in Millard County. 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. In 2002, about 13,000 mt (15,000 st) of ore was mined and trucked to the processing plant. Mine production was substantially less than previous years due to reduced demand, increased processing of stockpiled ore, and the use of imported beryl. The use of beryllium in electronic and electrical components, and aerospace and defense applications accounted for an estimated 80 percent of total consumption in 2002 (Cunningham, 2003). Although the demand for beryllium alloys and beryllium oxide has increased modestly over the past several years, the current economic downturn and increased imports of beryl and finished beryllium (beryllium-copper master alloy) has reduced the demand for beryllium ore.

Gold and Silver

Gold production in 2002 is estimated to be nearly 15,600 kg (500,000 Troy ounces [oz]), a 35 percent decrease from the nearly 24,100 kg (775,000 oz) produced in 2001. 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. Gold is also produced by one small underground mine (Trixie) operated by Chief Gold Mines. The Trixie mine is near the town of Eureka in Utah County. Several other small mines in the state are known to produce minor amounts of gold and silver, but metal-specific production is not reported, and not included in the above totals. The Barneys Canyon mine exhausted its economic ore reserves in late 2001 and ceased mining, but will continue to produce gold from its heap-leach pads at a much reduced rate into 2004, when those pads will be

depleted. A combination of lower gold-content copper ore and lower smelter throughput reduced gold production from the Bingham Canyon mine in 2002.

Silver production is estimated to be approximately 0.12 million kg (3.7 million oz) in 2002, nearly 25,000 kg (800,000 oz) less than in 2001. Silver is produced as a by-product metal from the Bingham Canyon mine, and from polymetallic ore from the Trixie mine. The lower production of silver is due to the same factors that caused a similar reduction in gold. Development work at the Trixie mine was suspended in March 2002 due to unstable mining conditions and no announcement has been made about a resumption in activity.

INDUSTRIAL-MINERALS PRODUCTION

Industrial-minerals production, with an estimated value of \$565 million, was the second-largest contributor to the value of minerals produced in 2002 (figure 1) and the second-highest value achieved to date. Since 1993 (first year of data recording by the UGS), the value of industrial minerals has varied from a low of \$428 million in 1995 to a high of \$583 million in 1999. Within the past five years, those commodities or commodity groups that have realized substantial gains include sand and gravel and crushed stone; Portland cement and lime; and salines, including salt, magnesium chloride, potash (potassium chloride), and sulfate of potash. Other major commodities produced in Utah, in descending order of value, include phosphate, gilsonite, expanded shale, common clay and bentonite, and gypsum.

Sand and Gravel and Crushed Stone

Sand and gravel, and crushed stone (including limestone and dolomite) were the largest contributors to the value of industrial minerals produced in Utah during 2002 (up from second-largest in 2001), with an estimated value of \$160 million. These materials are produced in every county in Utah by commercial operators, and by federal, state, and county agencies. Due to the large number and intermittent operation of producers, operators are not sent UGS production questionnaires. However, production data are compiled by the USGS. Their preliminary 2002 data show production of 30.6 million mt (33.9 million st) of sand and gravel with an estimated value of \$119 million, and 8.45 million mt (9.37 million st) of crushed stone with an estimated value of \$41.5 million. This compares to 25.3 million mt (27.9 million st) of sand and gravel and 10.5 million mt (11.6 million st) of crushed stone produced in 2001, with a combined value of \$150 million (Tepordei and Bolen, 2003).

Portland Cement and Lime

Portland cement and lime were the second-highest-value (up from third in 2001) industrial minerals produced in 2002, with a combined value of \$159 million. Two operators produce Portland cement in Utah: Holcim, Inc. (formerly Holnam, Inc.) and Ash Grove Cement Company. Holcim's Devils Slide mine and plant is east of Morgan in Morgan County, and Ash Grove's Leamington mine and plant is east of Lynndyl in Juab County. The companies have a combined capacity of more than 1.4 million mt (1.5 million st) of cement annually. Both plants operated near capacity in 2002, with total production slightly exceeding that of 2001. In addition

to limestone, both Holcim and Ash Grove Cement mine modest amounts of shale and sandstone that are used in the manufacture of cement.

Lime production was about 3 percent higher in 2002 than 2001. There are two suppliers of lime in Utah, with a combined capacity of more than 0.9 million mt (1.0 million st) per year: Graymont Western U.S., Inc. (formerly Continental Lime Company), which produces dolomitic quick lime and high-calcium quick lime; and Chemical Lime of Arizona, Inc., which produces dolomitic quick lime and hydrated lime. Both operations serve markets in Utah and surrounding states. Graymont Western's plant is in the Cricket Mountains, approximately 56 km (35 miles) southwest of Delta in Millard County, and is one of the 10 largest lime plants in the United States. Chemical Lime of Arizona's plant is about 13 km (8 miles) northwest of Grantsville in Tooele County.

An additional 10 to 12 operators quarried about 2.1 million mt (2.3 million st) of limestone and dolomite in 2002 that was used mainly for construction and flue-gas desulfurization in coal-fired power plants. A small amount of limestone and dolomite is also crushed to a fine powder and marketed as "rock dust" to the coal mining industry. The three largest suppliers of crushed limestone used for construction are: Harper Construction Company, from one quarry in Salt Lake County; Valley Asphalt Company, from two quarries in Utah County; and Pelican Point Rock Products Company (formerly Larsen Limestone Company), from one quarry in Utah County.

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

Brine-derived products, including salt, are the third-highest contributors (down from first in 2001) to the value of industrial-minerals production in Utah during 2002, with a combined value of about \$148 million. In addition to salt, 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 that 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 3.32 million mt (3.68 million st) in 2002, about 160,000 mt (180,000 st) higher than 2001. Potash production (including SOP) is estimated to be about 316,000 mt (350,000 st) in 2002, approximately 18,000 mt (20,000 st) more than 2001.

Salt production alone is estimated to be 2.7 million mt (3.0 million st) in 2002, about 180,000 mt (200,000 st) more than 2001, 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 LLC near Moab in Grand County (salt and potash), and (3) Redmond Minerals, Inc. near Redmond in Sanpete County (salt).

Phosphate

SF Phosphates, Ltd. is Utah's only phosphate producer. The company's phosphate operation is 18 km (11 miles) north of Vernal in Uintah County. SF Phosphates is a partnership of Farmland Industries, Inc. (with headquarters in Missouri) and J.R. Simplot, Inc. (with

headquarters in Idaho). The company mines roughly 2.7 to 3.6 million mt (3 - 4 million st) of ore annually, which is processed into 0.9 to 1.8 million mt (1 - 2 million st) of phosphate concentrate. The concentrate is transported in slurry form to the company's Rock Springs, Wyoming fertilizer plant via a 144-km- (90-mile-) long underground pipeline. During 2002, the mine produced about 3.6 million mt (4.0 million st) of ore, its highest production in the past 11 years.

Gilsonite

Gilsonite production for 2002 is estimated to be about 59,000 mt (65,000 st), about 4,500 mt (5,000 st) more than in 2001. Gilsonite is an unusual solid hydrocarbon that has been mined in Utah for more than 100 years. All of the gilsonite mines are located near the town of Bonanza in eastern Uintah County. The three companies that produce gilsonite, in descending order of production, are: (1) American Gilsonite Company, (2) Zeigler Chemical and Minerals Company, and (3) Lexco, Inc. 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 180,000 mt (200,000 st) of shale in 2002 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" was approximately 10 percent higher in 2002 than in 2001.

Common Clay and Bentonite

Nearly 243,000 mt (270,000 st) of common clay and approximately 32,000 mt (35,000 st) of bentonite were produced by five companies in 2002, a 14 percent decrease in common clay and a 22 percent decrease in bentonite compared to 2001. Statewide, there were 12 active Large Mine and 11 active Small Mine permits held by clay operators in 2002. Many of these mines, both Large and Small, are operated intermittently. In descending order of production, the three largest producers of common clay in 2002 were: (1) Interstate Brick Company, (2) Interpace Industries, and (3) Paradise Management Company. Two companies (Western Clay Company and Redmond Minerals, Inc.) produce bentonite from pits located in central Utah. More than 75 percent of all common 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. ECDC Environmental LLC intermittently produces clay for use at their waste disposal facility near the town of East Carbon in Carbon County. Sufficient stockpiled ore will preclude mining any additional clay for the foreseeable future.

Gypsum

Six companies produced about 307,000 mt (350,000 st) of gypsum in 2002, nearly 45,000 mt (50,000 st) less than in 2001. In descending order of production, the companies are: (1) U.S.

Gypsum Company, (2) Georgia Pacific Corporation, (3) Nephi Gypsum, Inc., (4) H.E. Davis and Sons, (5) D.K. Gypsum Industries, and (6) Western Clay Company. Both U.S. Gypsum and Georgia Pacific operate wallboard plants near Sigurd in Sevier County. The Georgia Pacific plant closed in 2002 and the company's mines in Utah are inactive. Wallboard manufacturing was shifted to the company's Las Vegas, Nevada facility.

The majority of 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 agriculture industry for use as a soil conditioner.

ENERGY MINERALS PRODUCTION

Coal

Utah's coal operators produced 22.3 million mt (24.7 million st) of coal valued at \$420 million from 12 underground mines and one surface mine in 2002 (figures 1 and 4). This production is approximately 2.1 million mt (2.3 million st) less than in 2001. All of the mines and facilities are located in central Utah. Utah's only coal-waste recovery plant, located near the town of Wellington in Carbon County, remained idle for the third year, although the company's synfuel facility located at the Castle Valley railroad spur continued to operate on resources purchased from other coal operators. The largest coal producer was the SUFCO mine, operated by Canyon Fuel Company, LLC (Sevier County), which produced a record-high of slightly more than 6.9 million mt (7.6 million st) of raw coal. In addition, the following four mines each produced in excess of 1.8 million mt (2.0 million st) of coal: (1) Deer Creek, operated by Energy West Mining Company (Pacifcorp, Inc.) (Emery County); (2) Skyline #3, operated by Canyon Fuel Company, LLC (Emery and Sanpete Counties); (3) Crandall Canyon, operated by Genwal Coal Company (Emery County); and (4) West Ridge, operated by West Ridge Resources (Carbon County).

Just over half of Utah's coal was consumed by electric utilities within the state in 2002. Coal was also used for industrial purposes within the state, shipped to electric utilities and industrial users in other states, and exported overseas. The export market to Pacific Rim countries, which had accounted for up to 5.0 million mt (5.5 million st) of production in recent years, dwindled to less than 0.45 million mt (0.5 million st) in 2002 due to lower overall demand and foreign competition. No improvement in overseas exports is anticipated in the next several years.

One new surface operation located in Carbon County, White Oak Mining and Construction Company's (Lodestar, Inc.) Whisky Creek mine, began producing coal in late 2001. The Whisky Creek mine was opened to salvage the remaining near-surface coal from the company's White Oak #1 underground mine, which was mined out in 2001. The company's Horizon mine produced a small amount of coal in 2002 before being idled in late January. The Willow Creek mine (RAG International, Inc.), which was closed following a mine explosion and fire in July 2000, remained closed. Consolidation Coal Company's Emery Deep mine in Emery County is in the early stage of redevelopment and produced a small amount of coal (about 22,500 mt [25,000 st]) in 2002. One new mine (UtahAmerican Energy Company's Lila Canyon mine) in Emery County is in the permitting stage and could begin producing within a year or so, depending on successful marketing efforts.

Uranium

Because of the continued weak market for uranium, no uranium ore was mined in Utah in 2002. U.S. Energy Company's Shootaring Canyon mill (Garfield County) remained idle the entire year while International Uranium Corporation's White Mesa mill (San Juan County) processed an "alternate feed." No ore processing is planned at either facility until there is a significant increase in the price of uranium or vanadium.

EXPLORATION AND DEVELOPMENT

Exploration for base and precious metals remained at a low level in 2002. DOGM received only 11 new NOIs, the lowest level in the past 10 years. Six were for precious metals (one unspecified but likely precious metals), two for base metals, and three for industrial minerals. Four of the base- and precious-metal NOIs were from individuals and four were from small- to medium-sized companies. New mine development was also depressed and several planned operations were on hold awaiting financing. Work at most developing operations was confined to clearing and rehabilitating existing workings and/or limited sampling and test mining.

Exploration and development is not expected to improve in 2003. The U.S. Bureau of Land Management's new (BLM) regulations, effective in January 2003, require bonding for disturbance of even less than the previous limit of 2 ha (5 acres), which will further discourage exploration, particularly by individuals or small companies. Continuing low base metal prices and tight money will limit funding opportunities for new or expanded operations. Figure 5 shows the location of the major exploration areas, prospects, and mines discussed below.

Milford Area

Western Utah Copper Company (WUCC) was active during 2002 in the San Francisco, Beaver Lake, and Rocky mining districts in west-central Beaver County. WUCC assembled a large property position including the patented and unpatented claims held by Nevada Star Resources Corporation, the patented Cactus claim block held by Horn Silver Mines, Inc., and other claims and leases. During the year WUCC did planning and permitting work in contemplation of resumption of mining at the Maria deposit in the Rocky district and the Cactus deposit in the San Francisco district.

Elsewhere in the San Francisco district, Franconia Minerals Corporation continued their exploration in the Horn Silver-King David area targeting the potential for manto and structurally controlled sulfide and zinc-rich oxide ores at depth, along strike, and west of the known resource. Work completed in 2002 consisted of data compilation from old maps and reports, underground mapping and sampling of accessible workings, a modified Mise-a-la-Masse geophysical survey, and drilling three diamond core holes of a proposed four-hole program.

Drill hole SF-1 was a vertical hole designed to intersect an extension of zinc ore exposed on the 650 and 800 depth levels of the Horn Silver mine. The hole was abandoned at 298 m (949 ft), short of its target depth, due to poor drilling conditions. The drill hole intersected brecciated, altered, and silicified limestone with oxidized iron-zinc mineralization. The alteration and brecciation could represent proximity to mineralized breccia.

Drill hole SF-2 was an angle hole (-81°) designed to test for mineralization west of the

workings on the 600, 800, 900, and 1000 levels of the Horn Silver mine in the southern (caved) area of the mine. The hole was drilled to a depth of 383 m (1,257 ft) and intersected nearly 17 m (56 ft) of oxide mineralization assaying 14.01 percent zinc including two high-grade intercepts of 4.8 m (15.7 ft) of 25.5 percent zinc and 1.6 m (5.2 ft) of 24.0 percent zinc. The mineralized zones are thought to occur in and along high-angle structures. The intersections represent a previously unknown area of zinc mineralization.

Drill hole SF-3 was another angle hole (-75°) that was drilled to intersect the target zones 46 to 61 m (150 - 200 ft) south of hole SF-2. The hole was drilled to a depth of 403 m (1,322 ft) and intersected two zones of oxide zinc mineralization: an upper intercept of 3.5 m (11.4 ft) assaying 18.0 percent zinc starting at a depth of 358.9 m (1,177.6 ft) and a lower intercept of 15.1 m (49.5 ft) assaying 16.6 percent zinc starting at a depth of 374.4 m (1,228.5 ft). The lower intercept includes a 7.9-m- (26.0-ft-) thick zone assaying nearly 25 percent zinc. Preliminary evaluation suggests that the ore is largely conformable to bedding and may grade into sulfide manto-style mineralization. The mineralized zone(s) in SF-2 and SF-3 remain open to the east, south, and west. The work plan for 2003 includes drilling three to five diamond core holes to offset the ore intercepts in drill holes SF-2 and SF-3, and down-hole geophysics (Kathy Tureck, Franconia Minerals Corporation, written communication, 2003).

Lisbon Valley

After several delays due to legal challenges, U.S. Department of Interior review, and corporate restructuring, Constellation Copper Corporation plans to proceed with construction of a mine and mill complex on its Lisbon Valley copper property, subject to arranging appropriate financing. The property is permitted, and a revised and updated feasibility study has been completed using copper sales prices ranging from \$1.65 to \$1.98/kg (\$0.75 - \$ 0.90 per lb). Announced reserves are 32.8 million mt (36.7 million st) at an average grade of 0.514 percent copper in three separate open-pit areas. Construction of facilities for an open-pit, heap-leach, solvent extraction-electrowinning operation is expected to begin in mid-2003 with copper production beginning 12 to 14 months later. The mine is scheduled to produce over 18 million kg (40 million lb) of copper per year.

Gold Hill-Clifton District

Several companies are active in the Gold Hill-Clifton district. In early 2002, Clifton Mining Company announced an agreement with New Centennial Mining to drill and explore its Cane Springs property prior to entering into a joint venture. Apparently, the exploration agreement was subsequently terminated because in mid-December 2002 Clifton Mining Company announced it had signed an option agreement with Dumont Nickel, Inc. for a multi-year program to explore the Cane Springs and other properties in the district held by Clifton Mining and Woodman Mining Company (over 50 percent owned by Clifton Mining). Dumont Mining Company, a wholly owned subsidiary of Dumont Nickel Inc., was formed to conduct the exploration. Initial exploration will concentrate on the high-grade Cane Springs mine with an initial 610 m (2,000 ft) drilling program scheduled to begin in early 2003. The Cane Spring mine is a gold-copper skarn deposit in garnet-wollastonite marble. The deposit was previously mined to the 45-m (149-ft) level and ore continues at least to the 80-m (240-ft) level. Historical ore grades at the Cane Springs mine were 17.1 to 34.3 g/t (0.5 -1.0 oz/st) gold. The mine is

currently flooded to the 30-m (100-ft) level.

Dumont is also planning to evaluate the “Clifton shears” (Herat mine), and anticipates up to 1,525 m (5,000 ft) of drilling to test the downdip continuation of the ore zone. The “Clifton shears” is a series of multiple gold-, silver-, lead- and copper-bearing fissure veins and shear zones in quartz monzonite. The veins/shears are 0.3 to 3.1 m (1 to 10 ft) wide and are traceable for up to 1,830 m (6,000 ft) along strike. Previous surface and underground sampling indicated an average grade of 1.3 g/t gold (0.038 oz/st) gold, 285 g/t (8.3 oz/st) silver, and 5.6 percent lead for the veins and mineralized shear zones.

Metallic Ventures Inc. was also active in the area. They acquired several properties in the district and are currently evaluating the properties for drill site locations. The evaluation involves reviewing past exploration work and surface mapping and sampling. The main focus is high-grade vein and replacement deposits with a secondary emphasis on lower grade, surface minable, disseminated deposits.

Bromide Basin

Unico resumed work on its properties in the Bromide Basin area in late April 2002. Work included cleaning and rehabilitation of the entire 365-m- (1,200-ft-) long El Padre tunnel; cleaning and rehabilitation of the Turner-Kimball adit and exposing approximately 45 m (50 ft) of the Turner-Kimball vein along the main drift; and mapping and sampling of the newly discovered “New Vein.” Safety concerns restricted work to the main adit of the Bromide mine. Several hundred tons of ore was mined during 2002, mostly as a consequence of rehabilitating the two adits and exposing the Turner-Kimball vein.

Most of the ore in Bromide Basin is in high-grade veins and breccia pipes at structural intersections along the veins. The gold-copper-silver-bearing veins are 0.6 to 1.5 m (2-5 ft) wide and traceable for 120 to 366 m (400-1,200 ft) or more along strike. Gold values are generally greater than 34.3 g/t (1.0 oz/st) and the breccia pipes in the Bromide mine are reported to average 240 g/t (7.0 oz/st) gold. The recently discovered New Vein, located east of the Bromide vein, is similar to others in the area. The surface exposure of the vein is a 0.9-m (3-ft) wide, iron-stained zone that has a strike length of at least 152 m (500 ft). Surface samples average 42 g/t (1.24 oz/st) gold and 26 g/t (0.75 oz/st) silver (Dan Proctor, Unico, Inc., oral communication, 2003).

Planned work for 2003 includes extending the El Padre adit to intersect at least the Bromide vein, and possibly even farther to the Crescent vein, approximately 122 m (400 ft) below the existing workings. Minor development and limited drifting may be done on the vein structures, but no extensive mining is planned. No work is planned in 2003 for the Turner-Kimball mine, but future work includes driving a new adit below the existing workings to intersect the vein.

In March 2002, Unico announced a resource estimate of 136,000 mt (150,000 st) containing 11.5 mt (372,000 oz) of gold. This resource estimate is only for four veins/structures (Bromide, Crescent, Turner-Kimball, and Henrietta) and does not include the recently discovered New Vein or other known veins in the area.

Deer Trail Mine

During 2002, Unico continued to develop the 3400 area along the PTH tunnel level. Several thousand tons were mined from two manto deposits on the PTH level and a 56-m (185-ft) development raise was driven to develop the upper parts of the ore bodies. Work planned for

2003 includes underground drilling from the PTH tunnel level to explore the upper mantos and follow-up development. The amount and extent of the development will be dependent on the drill results. No work is planned in 2003 for the 8600 area ore bodies that are located 1,675 m (5,500 ft) northwest of the 3400 area.

Mantos in the 3400 area are in the Callville Limestone, are 1.2 to 1.5 m (4-5 ft) thick, and contain high-grade ore. Grades for recently mined "34 East" ore averaged 13.6 g/t (0.398 oz/st) gold, 141 g/t (41.1 oz/st) silver, 6.7 percent lead, 6.4 percent zinc, and 1.4 percent copper. In the same area, a higher grade manto, discovered in 2001, averaged 55 g/t (1.6 oz/st) gold, 6,200 g/t (180 oz/st) silver, 14.4 percent lead, 8.4 percent zinc, and 1.4 percent copper.

In March 2002, Unico announced a resource estimate for the Deer Trail mine of 166.2 kt (1.83 million st). Over half the tonnage was in Callville Limestone-hosted deposits in the 3400 area and nearly one-fourth was in Torowep Formation-hosted deposits in the 8600 area. The 3400 area resource estimate includes three ore blocks: (1) a drill-indicated, proven and probable resource of 27.2 kt (30,000 st), (2) a projected downdip 109 kt (120,000 st) resource representing an extension to the southwest from the known 34 East mineralization, and (3) an inferred 907 kt (1.0 million st) resource northwest of the PTH workings associated with the Red Fissure feeder zone. Average grades for the drill-indicated resource are 6.5 g/t (0.19 oz/st) gold, 538 g/t (15.7 oz/st) silver, 2.8 percent lead, and 6.3 percent zinc. Average grades for the projected southwest downdip extension are 9.6 g/t (0.28 oz/st) gold, 1,200 g/t (35 oz/st) silver, 5 percent lead, 6 percent zinc, and 2 percent copper. The 8600 area ore body resource includes an inferred resource of 450 kt (496,000 st) along the northwest extension of the Red Fissure, the main ore conduit, with an estimated grade of 3.4 g/t (0.10 oz/st) gold, 514 g/t (15 oz/st) silver, 5 percent lead, 12 percent zinc, and 0.5 percent copper. The total resource estimate also includes 169 kt (186,000 st) of tailings with an average grade of 1.4 g/t (0.04 oz/st) gold and 123 g/t (3.6 oz/st) silver. Additional resources not included in the above estimate are present in the area along additional fissures, including an area north of the 8600 area that assays 240 g/t (7 oz/st) silver.

American Fork District

Limited work was done by Unico on the Silver Bell mine in the American Fork district in Utah County. The workings have been cleaned and rehabilitated. Planned work for 2003 includes underground drilling below the existing workings to test for manto-style ore bodies adjacent to the main vein structure. Approximately 460 m (1,500 ft) of drilling is planned, mostly as short holes generally less than 61 m (200 ft) in length. The estimated resource for the vein, based on strike and dip projections, is 408 kt (450,000 st). Grade of the sulfide ore averages 0.61 g/t (0.018 oz/st) gold, 1,200 g/t (35 oz/st) silver, 5.0 percent lead, 12.0 percent zinc, and 3.5 percent copper. The above tonnage estimate is for the vein only and does not include any ore in the known and suspected manto deposits.

Tintic District

Chief Consolidated Mining Company, through its wholly-owned subsidiary Tintic Utah Metals, operated the Trixie gold-silver-copper mine between January and late March 2002. The recently discovered 75-85 extension ore body was being mined and stopped from the 600 level and above. The mine was operating at its planned capacity of 136 mt (150 st) per day. In late March, the mine experienced a cave-in that collapsed workings on and above the 600 level, and

the remaining reserves became uneconomic to mine. Fortunately, no one was killed in the cave-in. The mine was subsequently shut down and no information has been released on when, if ever, it will resume production.

Chief Consolidated also wrote off its reserves from the Burgin mine, currently estimated (proven and probable) at 975 kt (1.07 million st) of ore at an average grade of 566 g/t (16.5 oz/st) silver, 21 percent lead, and 6.7 percent zinc. The write-off was probably due to the unlikelihood of near-term production due to the difficult and expensive work required to bring the property into production, and low metal prices.

Chief Consolidated subsequently entered into talks to restructure its debt and is attempting to maximize the value of its extensive real estate holdings in the district. The company owns approximately 7,720 ha (19,300 acres) in the Main and East Tintic districts. The company hired a realtor firm in August with approval to sell approximately 2,000 ha (4,500 acres). In September, the company held talks with a number of shareholders to assist in developing a re-capitalization plan. No announcements have been made concerning the re-capitalization plan and/or future plans for the company. In spite of recent events, Chief still believes potential exists in the district for discovery and development of significant ore deposits. Before the mine cave-in, Chief was planning to drill several targets in the East Tintic district including follow-up drilling on a Trixie-like target with previous drill intercepts of up to 17.5 g/t (0.51 oz/st) gold over 1.5 m (5 ft). Only one drill hole was completed in 2002, and Chief is currently looking for joint-venture partners to explore this and other properties in the district.

In mid-2001, Atlas Mining Company signed a lease/option agreement on the Dragon halloysite property in the southern part of the Tintic district, about 4 km (2.5 miles) south of Eureka. During 2002, the mining plan was finalized, and the operation was permitted as a small underground mine. In addition, the company drilled five short holes to verify earlier drill-indicated reserves in the northwestern part of the ore body. The drilling confirmed the earlier estimates. Current reserves remain at 270 kt (300,000 st) with a potential resource of 910 kt (1 million st). Mining is scheduled to begin in the summer of 2003.

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Figure 1. Value of Utah's mineral production from 1998 through 2002.

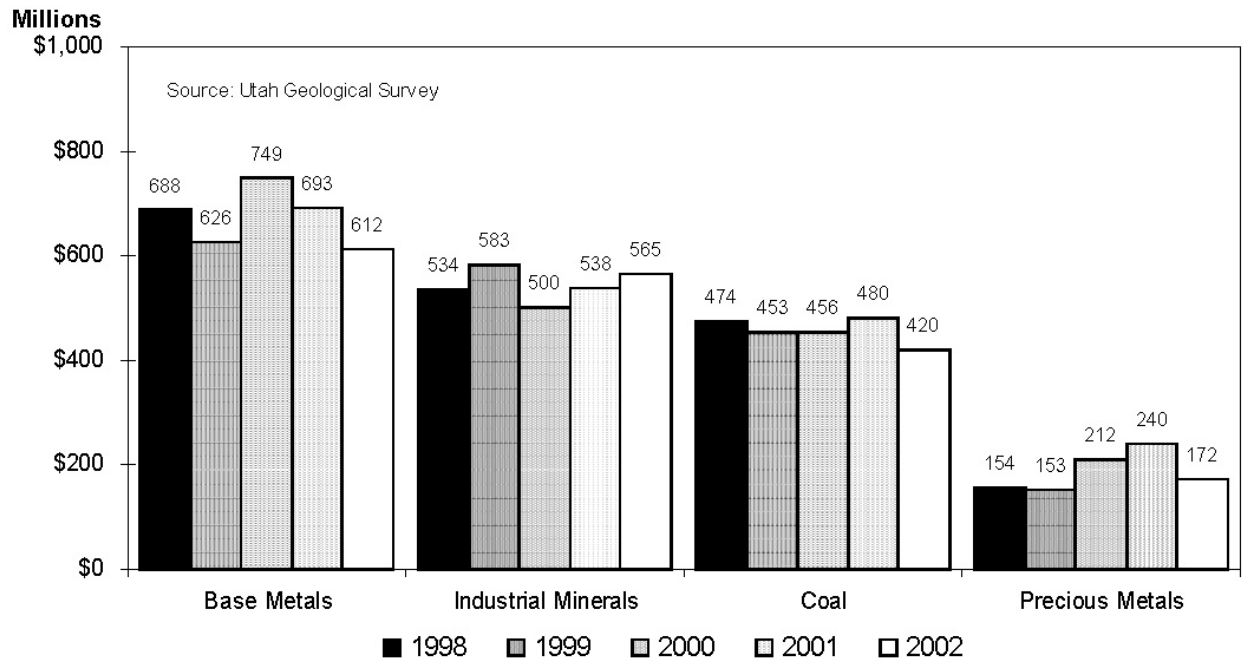


Figure 2. Value of Utah's nonfuel mineral production from 1991 through 2001.

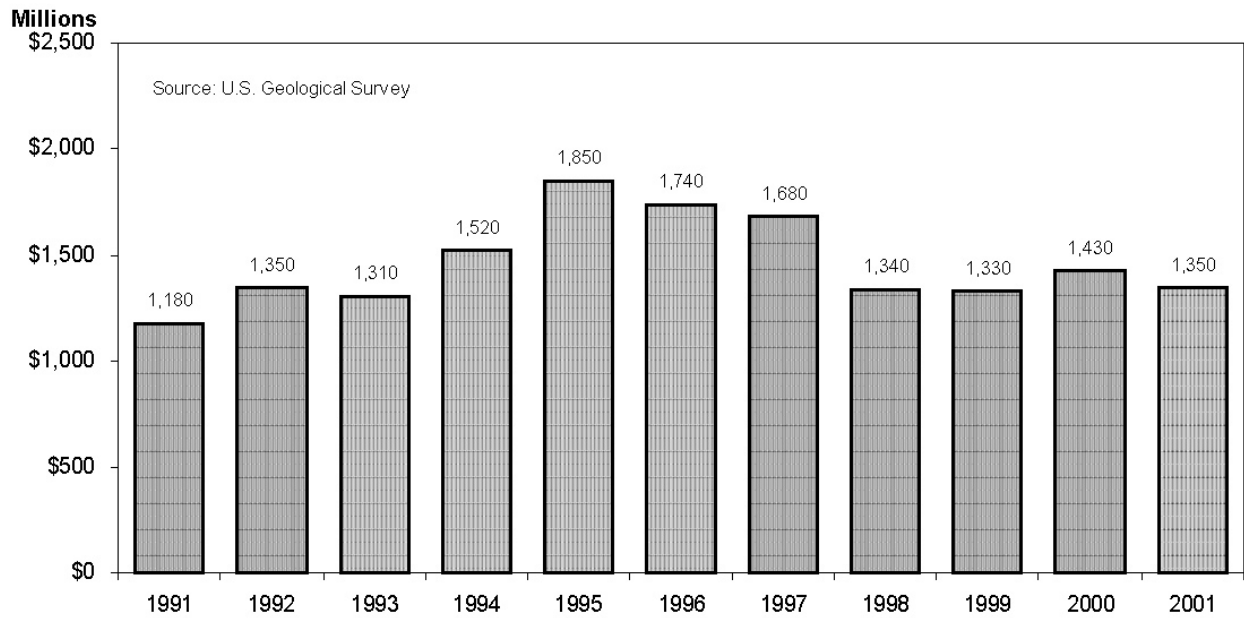


Figure 3. Location of brine processing plants around Great Salt Lake.

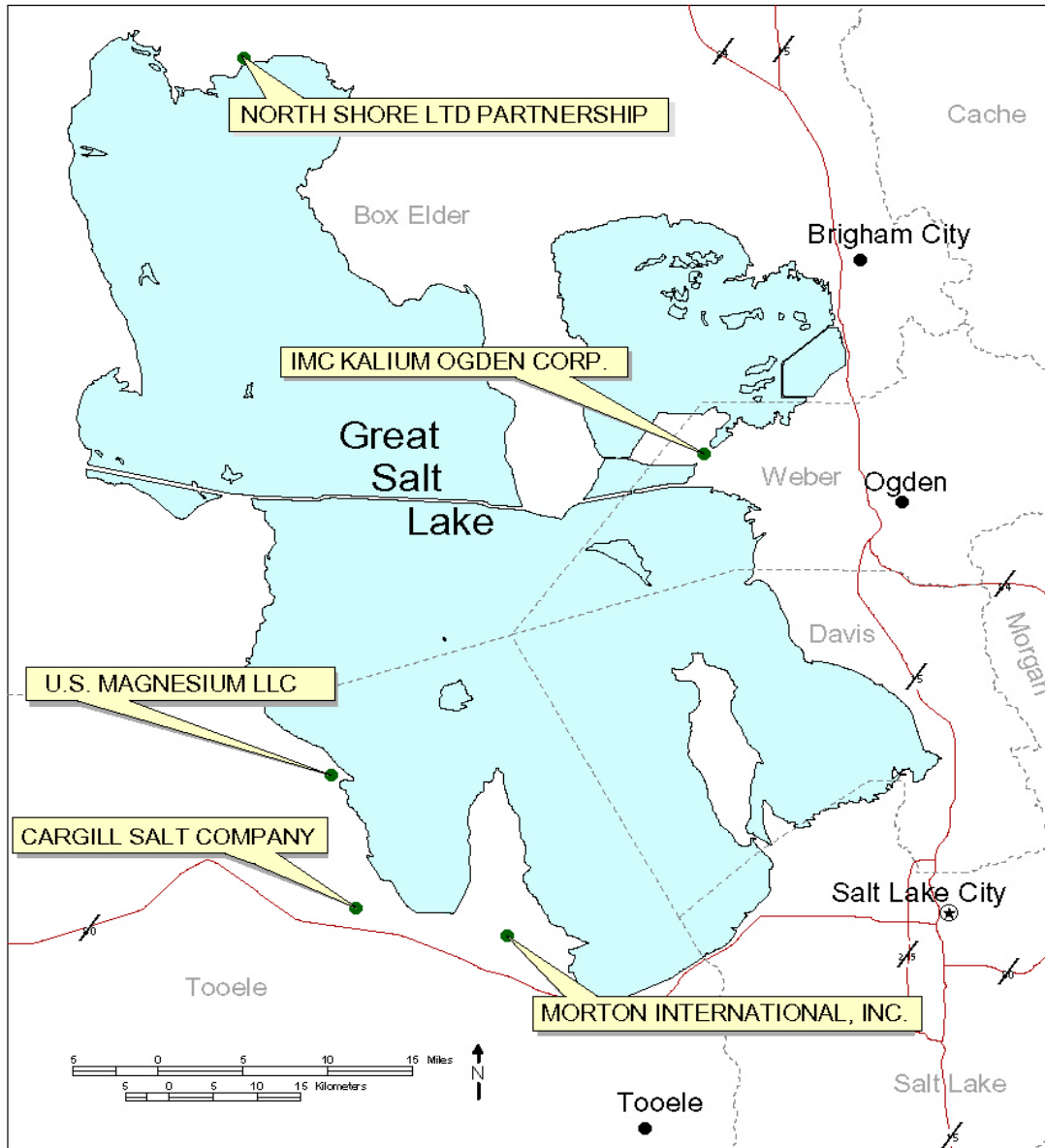


Figure 4. Utah's coal production from 1992 through 2002.

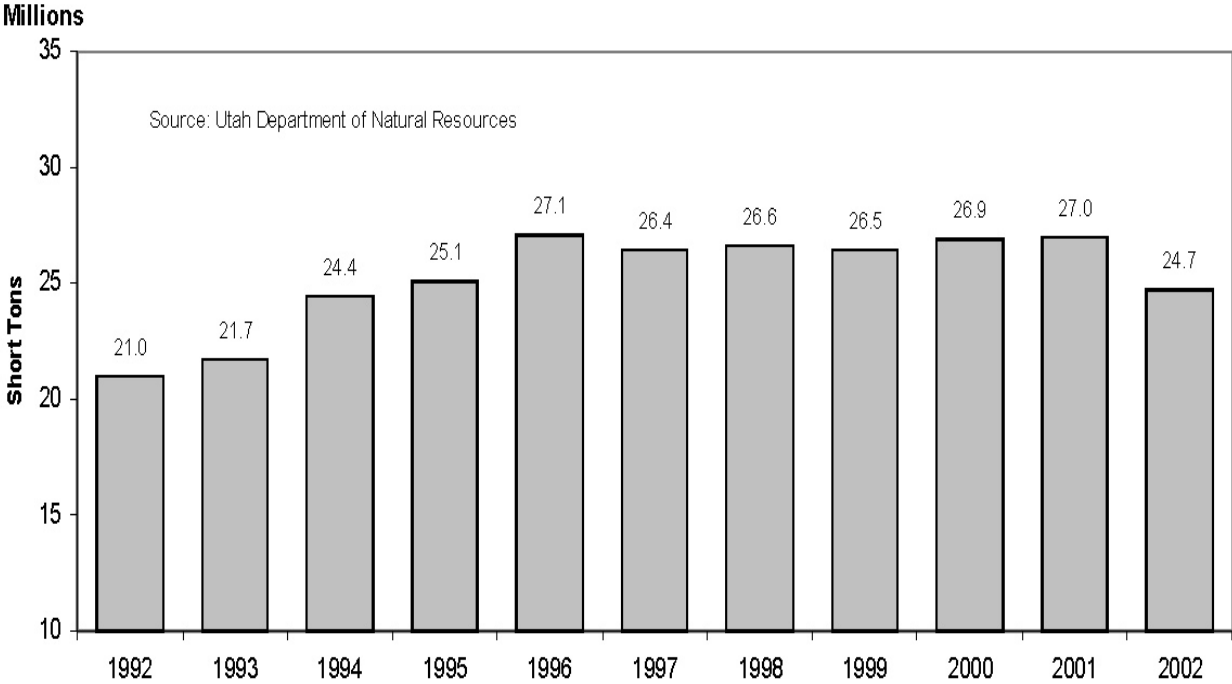


Figure 5. Major base- and precious-metals exploration areas in Utah during 2002.

