

# 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 1997, Utah climbed in rank to fifth from sixth nationally in total nonfuel mineral production value,<sup>1</sup> according to the U.S. Geological Survey (USGS). The estimated value for 1997 was \$1.76 billion, a less than 2% increase of from that of 1996. This followed a 6.5% decrease from 1995 to 1996 (based on final 1996 data). The State accounted for about 4.5% of the U.S. total nonfuel mineral production value.

Metals accounted for nearly three-quarters of Utah's nonfuel mineral production value, copper being the majority of the State's entire metal value. In 1997, increases in construction sand and gravel (*table 1*), phosphate rock, and copper (unit price and production) values together with smaller increases in crushed stone (*table 1*), potash, portland cement, and molybdenum accounted for most of the increases in nonfuel mineral value. (All listings are in descending order of relative change.) The largest decreases occurred in magnesium metal, down 14%, and gold, down 9%. Silver, salt, and gemstones also showed small decreases. In 1996, a decrease in the value of copper accounted for most of the State's decrease in nonfuel mineral value. Nearly all other mineral commodities showed an increase, especially molybdenum, salt (*table 1*), gold, magnesium metal, and potash. A small drop occurred in phosphate rock; other decreases were marginal.

Based on USGS estimates of the quantities produced in the United States during 1997, Utah remained the only State to produce beryllium concentrates; second in copper and second of 3 magnesium metal- and 4 potash-producing States; third in molybdenum and third of 3 States that produce mercury; fourth in phosphate rock and grade-A helium; fifth in silver; and sixth in salt and bentonite. Utah rose to 2d from 3d in gold, and to 10th from 13th in construction sand and gravel and dropped from 3d to 4th in magnesium compounds. Additionally, the State was a significant producer of lime.

The following narrative information was provided by the Utah Geological Survey<sup>2</sup> (UGS). According to the UGS, the total value

<sup>1</sup>The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending on the minerals or 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 1997 USGS mineral production data published in this chapter are estimates as of January 1998. For some commodities (for example, construction sand and gravel, crushed stone, and portland cement), estimates are updated periodically. To obtain the most current information, please contact the appropriate USGS mineral commodity specialist. Call MINES FaxBack at (703) 648-4999 from a fax machine with a touch-tone handset, and request Document # 1000 for a telephone listing of all mineral commodity specialists, or call USGS information at (703) 648-4000 for the specialist's name and number. This telephone listing may also be retrieved over the Internet at <http://minerals.er.usgs.gov/minerals/contacts/comdir.html>. All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved by way of MINES FaxBack or over the Internet at <http://minerals.er.usgs.gov/minerals/>.

<sup>2</sup>Robert Gloyn, a Senior Geologist with the Utah Geological Survey authored the text of mineral industry information provided by the Utah Geological Survey.

of metallic minerals and industrial rocks and minerals produced in Utah for 1997, estimated at about \$ 1.76 billion, can be divided into categories as follows: base metals—about \$938 million; industrial rocks and minerals, gemstones, and fossils—\$533 million; and precious metals—\$289 million. (All nonfuel mineral values and quantities of minerals produced cited in the remainder of this narrative are from UGS company surveys and UGS estimates.) Base and precious metal production was relatively high, but prices were lower for most metals. Industrial mineral production reached new highs for several commodities; prices increased modestly for most commodities but were lower for several others. Excluding sand and gravel operations, 51 large mines (greater than two hectares surface disturbance) were active in 1997. These included three base metal operations, two precious metal mines, and 46 industrial mineral operations. Ninety-six small mines (fewer than two hectares surface disturbance) reported production in 1996 (latest data available). The number of small mines were grouped by production as follows: industrial rocks and minerals—66, gemstones—13, precious metals—11, fossils—3, and other—3.

Base metal production was the largest contributor to the value of minerals produced in Utah. In descending order of value the main commodities were: copper, magnesium metal, molybdenum, and beryllium. Copper production in 1997 was estimated by the UGS to be slightly higher than the 1996 production of about 300,000 metric tons of metal. Molybdenum production was estimated at about 17,250 tons of molybdenum concentrate (MoS<sub>2</sub>), slightly less than in 1996. The copper and molybdenum production was from Kennecott Utah Copper Corp.'s Bingham Canyon Mine. Other contributions to Utah's base metal production include beryllium oxide produced by Brush Wellman Inc. from bertrandite ores mined at Topaz Mountain and magnesium metal produced from Great Salt Lake brines by Magnesium Corp. of America. Beryllium and magnesium metal production in 1997 was estimated to be about the same level as in 1996. No iron, lead, or zinc production was reported in Utah for 1997.

Industrial minerals were the second-largest contributor to the value of minerals produced in 1997. Major commodities produced by group or individual commodity in descending order of value include: (1) salines, including sulfate of potash, salt, potash, and magnesium chloride, (2) sand and gravel, and crushed stone, (3) portland cement, (4) phosphate, (5) lime, limestone, and dolomite, (6) gilsonite, (7) common clay and bentonite, and (8) gypsum.

Salines were produced by six companies in Utah; 1997 production is estimated at 2.5 million tons, substantially less than in 1996. Portland cement was produced by two companies in Utah; both are operating near their combined annual capacity of 900,000 tons of cement and have plans to expand. Phosphate was

produced by SF Phosphates Ltd. in Uintah County; 1997 production is estimated at 2.25 tons of ore. Two companies produced quick or hydrated lime in Utah with a combined capacity of nearly 500,000 tons per year. Several other companies mined limestone for direct use in electric power plants, in steel mills, and for use as aggregate in construction. Three companies produced gilsonite from veins in eastern Utah; 1997 production is estimated at more than 55,000 tons, similar to 1996 production. Nearly 160,000 tons of common clay and over 40,000 tons of bentonite were produced by four companies in 1997. Common clay production was slightly lower than in 1996, but 1997 bentonite production was about the same as 1996 production. Six companies produced gypsum in Utah for 1997; production was more than 330,000 tons, slightly higher than in 1996. Most gypsum was used for making wall board, but some was used in cement plants and for agricultural purposes. Commodities produced in lesser amounts include: fuller's earth, building stone, decorative stone, lightweight aggregate, masonry cement, and gemstones.

Precious metal production in 1997 is estimated at nearly 25 tons of gold and 149 tons of silver. Gold was produced from three surface mines, two primary producers (Barrick Gold Corp.'s Barrick Mercur Mine and Kennecott Minerals Co.'s Barneys Canyon Mine) and one by-product producer (Kennecott's Bingham Canyon Mine). Silver was produced as a secondary metal at the Mercur mine and as a by-product metal at the Bingham Canyon Mine. About 75% of the gold and over 90% of the silver produced were from the Bingham Canyon Mine.

Operator surveys indicate that most base metal production will remain relatively steady in 1998 but with some decrease in molybdenum production due to lower grade ore. Precious metal production, particularly gold, will show a sharp decline in 1998 due to final mill shutdown at the Mercur Mine, phasing out of production at the Barneys Canyon Mine, and scheduled mining of a lower gold grade portion of copper deposit at the Bingham Canyon Mine. However, industrial mineral production should remain at current high levels and should even increase with new mine development and expansion of existing facilities.

Several new industrial mineral mines or quarries began production in 1997; mining was completed at one precious metal operation, and the anticipated opening of three base metal mines was postponed.

New operations in Utah for 1997 include at least two aggregate quarries, one railroad ballast quarry, one dimension stone quarry, three clay pits, two gypsum mines, one gilsonite mine, one perlite mine, and one beryllium open-pit adjacent to an existing

operation. In addition, permits have been granted from two new saline operations which should be producing within several years.

Mining ceased at the Barrick Mercur Mine in March 1997 after 15 years of mining. The mill will continue to operate until late 1998, and mine closure reclamation will continue through 2010.

Construction and mining at Summo Minerals Corp.'s Lisbon Valley copper mine in southeastern Utah has been delayed at least 12 to 15 months because the U.S. Interior Board of Land Appeals issued a Partial Stay preventing Summo from mining. The stay was issued after the Final Environmental Impact Statement and Record of Decision to permit mining was appealed by a Moab, Utah-based environmental group. Summo is hopeful that the stay will be lifted by April or May 1998, so construction can proceed. Start-up at the Nevada Star Resource Corp.'s O. K. copper mine in Beaver County has also been delayed due to a change in ownership and acquisition/evaluation of adjacent copper properties. A feasibility study for the combined properties is being prepared, and arrangements are being made to obtain project financing. Nevada Star Resource Corp. expects project financing to be in place by mid-1998 with construction and mine development to start immediately after. Mining will not begin as quickly as originally anticipated at Tintic Metals L.L.C.'s Burgin lead-zinc-silver mine in the East Tintic district. Additional work is concentrating on improving milling and recovery techniques and on mine planning and water disposal. The Burgin Mine start up could be postponed as much as several years while the joint-venture develops more easily mined ore in adjacent properties.

Mineral exploration statewide remains at a relatively low level. Thirty-four Notices of Intent (NOI) to explore were filed with the Utah Division of Oil, Gas and Mining in 1997 compared to 32 in 1996 and 22 in 1995. Over 60% of the NOIs were for precious metals with or without associated base metals. Nearly all of the precious metal NOIs were from individuals or from small to medium sized companies. Very few NOIs were from major or multi-national companies. The other NOIs were mostly for industrial minerals including limestone, phosphate, black sands, clay, cinders, and hydrocarbons.

Kennecott released information on its new magnetite-copper skarn discovery at Bingham Canyon. The discovery, named the Fortuna skarn, occurs east of the North Ore Shoot deposit and is in skarns developed from the Jordan Limestone along the Copperton anticline. No reserves have been announced, but reported intercepts include 20 meters of 4.4 % copper and 3.3 grams per metric ton gold and 60 meters of 4.0 % copper and 1.8 grams per metric ton gold.

No other major discoveries have been announced.

TABLE 1  
NONFUEL RAW MINERAL PRODUCTION IN UTAH 1/ 2/

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral		1995		1996		1997 p/	
		Quantity	Value	Quantity	Value	Quantity	Value
Beryllium concentrates	metric tons	5,040	6	5,260	6	5,300	6
Clays:							
Bentonite		38	W	W	1,400	45	1,080
Common		386	4,280	298	4,510	401	4,220
Fuller's earth		--	--	W	32	--	--
Gemstones		NA	939	NA	1,150	NA	221
Iron ore, usable		144	1,700	--	--	--	--
Salt		2,160	54,800	1,720	70,400	1,800	67,100
Sand and gravel, construction		23,800	80,200	24,700	80,500	33,000	110,000
Stone, crushed		4,140	14,800	4,380	19,100	6,000	27,000
Combined value of cement, copper, gold, gypsum (crude), helium (Grade-A), lime, magnesium compounds, magnesium metal, mercury, molybdenum, phosphate rock, potash, silver, stone (dimension quartzite and sandstone), and value indicated by symbol W							
		XX	1,700,000	XX	1,560,000	XX	1,550,000
Total		XX	1,850,000	XX	1,730,000	XX	1,760,000

p/ Preliminary. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined value" data.

XX Not applicable.

1/ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

2/ Data are rounded to three significant digits; may not add to totals shown.

TABLE 2  
UTAH: CRUSHED STONE SOLD OR USED, BY KIND 1/

Kind	1995				1996			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone 2/	16	2,080	\$8,860	\$4.25	10	1,480	\$8,500	\$5.76
Dolomite	2	W	W	2.65	4	W	W	3.42
Sandstone	3	W	W	5.46	3	W	W	5.78
Granite	--	--	--	--	1	W	W	3.33
Quartzite	--	--	--	--	1	W	W	9.00
Volcanic cinder and scoria	--	--	--	--	1	W	W	10.83
Total	XX	4,140	14,800	3.58	XX	4,380	19,100	4.35

W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.

1/ Data are rounded to three significant digits except unit value; 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 1996, BY USE 1/ 2/ 3/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Fine aggregate (-3/8 inch), screening, undesignated	10	\$40	\$4.00
Coarse and fine aggregates:			
Graded road base or subbase	690	2,080	3.02
Unpaved road surfacing	90	262	2.91
Other construction materials 4/	1,500	4,480	2.98
Agricultural, poultry grit and mineral food	W	W	21.60
Chemical and metallurgical:			
Cement manufacture	W	W	5.15
Lime manufacture	W	W	6.18
Flux stone	W	W	10.15
Sulfur oxide removal	W	W	6.94
Special:			
Mine dusting or acid water treatment	W	W	22.84
Other specified uses not listed	W	W	8.73
Unspecified: 5/			
Actual	240	890	3.71
Estimated	32	71	2.22
Total	4,380	19,100	4.35

W Withheld to avoid disclosing company proprietary data; included in "Total."

1/ To avoid disclosing company proprietary data; "District tables were not produced in 1996."

2/ Includes dolomite, granite, limestone, limestone-dolomite, quartzite, sandstone, and volcanic cinder and scoria.

3/ Data are rounded to three significant digits, except unit value; may not add to totals shown.

4/ Includes bituminous aggregate (coarse), crusher run (select material or fill), other coarse aggregate, riprap and jetty stone, stone sand (bituminous mix or seal), and terrazzo and exposed aggregate.

5/ Includes production reported without a breakdown by use and with estimates for nonrespondents.

TABLE 4  
 UTAH: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1996,  
 BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Value per ton
Concrete aggregate (including concrete sand)	4,760	\$15,400	\$3.23
Plaster and gunite sands	475	1,460	3.08
Concrete products (blocks, bricks, pipe, decorative, etc.)	164	581	3.54
Asphaltic concrete aggregates and other bituminous mixtures	1,550	6,790	4.37
Road base and coverings	4,770	15,100	3.17
Fill	3,470	6,760	1.95
Snow and ice control	29	73	2.52
Other miscellaneous uses 2/	252	917	3.64
Unspecified: 3/			
Actual	2,890	10,300	3.56
Estimated	6,310	23,200	3.68
Total or average	24,700	80,500	3.26

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes filtration and roofing granules.

3/ Includes production reported without a breakdown by end use and with estimates for nonrespondents.

TABLE 5  
 UTAH: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1996,  
 BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2	
	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 2/	1,570	5,550	3,700	11,100
Asphaltic/bituminous mixtures	679	2,370	W	W
Road base and coverings	1,230	3,890	2,300	6,480
Fill	949	2,120	2,370	4,390
Snow and ice control	14	35	W	W
Other miscellaneous uses 3/	60	352	403	1,420
Unspecified: 4/				
Actual	4	15	2,860	10,200
Estimated	501	1,500	4,460	13,500
Total	5,000	15,800	16,100	47,100
	District 3		District unspecified	
	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 2/	127	806	--	--
Asphaltic/bituminous mixtures	W	W	225	908
Road base and coverings	1,020	3,850	222	895
Fill	153	257	--	--
Snow and ice control	W	W	--	--
Other miscellaneous uses 3/	453	2,710	--	--
Unspecified: 4/				
Actual	22	57	--	--
Estimated	1,340	8,150	--	--
Total	3,120	15,800	447	1,800

W Withheld to avoid disclosing company proprietary data; included with "Other miscellaneous uses."

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes plaster and gunite sands.

3/ Includes filtration and roofing granules.

4/ Includes production reported without a breakdown by end use and with estimates for nonrespondents.