

# THE MINERAL INDUSTRY OF WYOMING

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

In 1997, for the second consecutive year, Wyoming ranked 12th among the 50 States in total nonfuel mineral production value,<sup>1</sup> according to the U.S. Geological Survey (USGS). The estimated value for 1997 was \$996 million, a decrease of less than 8% from that of 1996. This followed a 10.9% increase from 1995 to 1996 (based on final 1996 data). The State accounted for 2.5% of the U.S. total nonfuel mineral production value.

Wyoming's leading nonfuel mineral, by value, was soda ash, followed by bentonite, grade-A helium, and portland cement. In 1997, a significant decrease in the value of soda ash accounted for virtually all of the State's drop in value (*table 1*). Portland cement, grade-A helium, and lime showed small increases; all other mineral commodities slightly decreased or remained unchanged. In 1996, an increase in the value of soda ash (nearly equal to the commodity's 1997 decrease) accounted for a large majority of Wyoming's substantial increase in value. Lime, portland cement, and bentonite values (and less so those of crushed stone and crude helium) contributed to the State's large rise in value.

Based on USGS estimates of the quantities of minerals produced in the 50 States during 1997, Wyoming remained first in soda ash and bentonite, second in Grade-A helium, and sixth in zeolites. Soda ash (sodium carbonate) is an inorganic chemical extensively used in the manufacture of glass, paper, soap and detergents, textiles, and as sodium bicarbonate in food products. The United States is the world's largest producer of soda ash. Wyoming, one of only two producing States, is home to the world's largest known natural deposit of trona. Trona is the principal ore from which soda ash is refined. California produces a significantly smaller quantity of natural soda ash. Wyoming has not had significant metal production since iron ore mining ceased in April 1984.

The following narrative information was provided by the Wyoming State Geological Survey<sup>2</sup> (WSGS). During 1997, the

<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>Ray E. Harris, Industrial Minerals and Uranium Geologist, and W. Dan Hausel, Senior Economic Geologist (Metals), both of the Wyoming State Geological Survey, coauthored the text of Wyoming.

Wyoming minerals industry continued to show considerable interest in gemstones (especially diamond), metals, industrial minerals, and uranium.

Exploration efforts in the State were varied. At least three companies continued to explore for diamond in the Green River Basin in southwestern Wyoming. One of these companies, Guardian Enterprises, reported finding another cryptovolcanic (has circular structure with brecciation of unknown, though presumed volcanic, origin) breccia pipe 0.8 kilometer north of its 1996 discovery near Cedar Mountain. A total of 11 pipes have now been found by the company. One of these, the DK pipe, yielded three gem-quality diamonds during drilling in 1996. Further north, Guardian reported finding 48 diamonds in an alluvial source. Guardian also identified several circular to elongate magnetic anomalies northeast of the Cedar Mountain pipes, which suggests the presence of a second cluster of pipes.

At the Kelsey Lake diamond mine in the State Line district in northern Colorado and southeastern Wyoming, Redaurum Limited continued to recover large diamonds including a 28.18 carat gemstone. This diamond was cut into a 16.8 carat gem (Denver Post, 1997). In a surprise development, Redaurum placed Kelsey Lake, along with its two African diamond mines, up for sale (Northern Miner, 1997). Kelsey Lake has been producing 65% gemstones (about 50% weighing greater than 1 carat) and 35% industrial stones.

In central Wyoming, a cryptovolcanic structure was drilled in the Seminoe Mountains and some exploration was reported along the flank of the Bighorn Mountains where G10 (diamond inclusion) pyropes have been reported. Other diamond exploration activities were reported in the Iron Mountain district and Eagle Rock area of the Laramie Mountains, the Black Hills, and the Granite Mountains.

During the year, the WSGS discovered gem-quality olivine (peridot) associated with olivine lamproite in the Leucite Hills of the Green River Basin. The WSGS recovered more than 10,000 carats of olivine from two anthills in the volcanic field.

Gold exploration was reported at a few locations in the State. In the Rattlesnake Hills area in central Wyoming, company drilling identified a 7,780-kilogram resource with potential for 31,100 kilograms of gold. Mineralization in the district occurs in exhalites, breccias, stockworks, and Tertiary alkalic volcanics. The property is currently controlled by Stratmore Resources.

Several companies also conducted cursory exploration following the discovery by the WSGS of significant nickel, cobalt, gold, platinum, palladium, and copper mineralization in the Puzzler Hill ultramafic complex in the Sierra Madre. Exploration for titanium resources was reported in the Laramie Range anorthosite complex. The Strong Creek deposit, containing a 272 million ton low-grade titaniferous magnetite resource, is currently being explored.

In 1997, the proposed abandonment of a rail line serving a bentonite processing plant in Casper threatened to deprive that plant of the primary transportation of its finished products to market. At yearend the situation remained unresolved. In the event of future rail line closure, the company (1 of 10 bentonite producers in Wyoming) planned to truck its products to its other plant across town where rail service was likely to continue. According to the WSGS, bentonite production overall continued to increase in the State, in part owing to a growing diversity of products made from and uses for the material.

In November 1997, Rissler-McMurry permitted a new limestone aggregate quarry about 3 kilometers west of Guernsey in Platte County. The limestone will be used for road construction projects in that area. The region's largest construction aggregate producer, Meridian Aggregates, continued production of crushed granite west of Cheyenne, in Laramie County.

In 1997, Mountain Cement permitted a new limestone quarry south of the existing quarry, assuring a continued supply of raw materials for its Laramie cement plant. Colorado Lien began production of limestone from the Hartville Quarry, 8 kilometers north of Guernsey, in Platte County. V.A. Resources of Casper acquired a permit to mine limestone at its Plumbago site, 48 kilometers northeast of Laramie. Basin Electric, which operates the coal-fired Laramie River Power Plant north of Wheatland and announced it was seeking a nearer source of limestone for use in the plant's emission control. The existing source is 64 kilometers from the plant, at the Bass Quarry in northwestern Goshen County.

Dimension stone production of cut and polished pieces of Wyoming Raven (black granite) and Fantastico (gneiss) continued at Sunrise Stone's quarry and fabricating plant. In 1997, an Italy-based stone producer acquired several sites to quarry dimension limestone and dimension granite in Wyoming. The company is proceeding with plans to construct a limestone fabricating (processing) plant in Laramie and a granite fabricating plant at another location in Wyoming.

V.A. Resources acquired the Plumbago Creek silica deposit in Albany County and the Cassa silica deposit in Platte County in 1996 and continued to permit both sites for future production. At yearend, a glass manufacturing company contacted the State and the WSGS regarding the utilization of one or more of these sites and the construction of a glass plant in the State.

Trona production in Wyoming is expected to have declined slightly in 1997 from 1996 and the record 1995 production levels. A major cause of this decline was the lack of railcars to ship refined products because of a railroad scheduling problem that took place in late 1997. Oriental Chemical Industry of the Republic of Korea began a major expansion project at its plant (OCI Chemicals) in the Green River Basin and is expected to increase its capacity by 33%. Tg Soda Ash, Inc. continued to develop plans to construct a new mine at its present site. The new mine will access trona bed 17. The current mine is developed in beds 24 and 25. Solvay Minerals continued with its major construction and expansion projects. The sinking of a new shaft at the Solvay Mine is on schedule. FMC Wyoming Corp. and General Chemical began operating with expanded capacity following the completion of expansion projects.

In 1997, U.S. Zeolite began mining clinoptilolite southeast of Bitter Creek in Sweetwater County. The zeolite is shipped to a facility in Utah for refining and shipping to markets. This is the first production of zeolite in Wyoming.

The First International Soda Ash Conference hosted by the USGS and the WSGS was held at Rock Springs in June. The proceedings of this conference will be published by the WSGS.

Uranium production in Wyoming is expected to increase over the 1996 level since a new operation achieved production in mid-1997. Rio Algom began in situ production of yellowcake at its Bill Smith site in the southern Powder River Basin northeast of Glenrock.

Uranium continues to be mined in Wyoming by in situ methods at Comin's operations at the Christiansen Ranch property in Johnson County. Cameco Corp. announced the purchase of Power Resources in situ operations at the Highland and Morton Ranch properties in Converse County, where production continued to increase. According to the WSGS, Wyoming was the leading producer of yellowcake in 1997 and was likely to continue to lead the nation in 1998.

#### **References Cited:**

- Denver Post, 1997, Gem of a find, September 25, p. 1C.
- Northern Miner, 1997, Redaurum to dispose of mining assets: Northern Miner, v. 83, no. 43, December 22-28, p. 6.

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

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1995		1996		1997 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays:						
Bentonite	2,940	89,900	3,030	98,400	3,010	97,900
Common	30	W	30	W	30	W
Gemstones	NA	11	NA	11	NA	12
Sand and gravel, construction	3,860	17,500	3,420	14,700	3,220	14,100
Stone, crushed	4,670	27,500	5,180	30,000	4,900	29,000
Combined value of cement (portland), gypsum (crude), helium (Grade-A), lime, soda ash, and values indicated by symbol W	XX	838,000	XX	935,000	XX	855,000
Total	XX	973,000	XX	1,080,000	XX	996,000

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  
CRUSHED STONE SOLD OR USED BY PRODUCERS IN WYOMING, 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/	12	1,550	\$6,430	\$4.15	4	1,620	\$5,330	\$3.29
Marble	1	90	3,110	34.51	1	91	3,230	35.39
Granite	2 r/	W	W	5.80 r/	2	W	W	6.10
Quartzite	4	W	W	11.36	4	W	W	11.59
Volcanic cinder and scoria	1	W	W	11.25	1	W	W	9.00
Traprock	1	W	W	5.90	5	W	W	3.00
Other miscellaneous stone	1	11	67	6.09	--	--	--	--
Total	XX	4,670	27,500	5.88	XX	5,180	30,000	5.79

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

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

2/ Includes "limestone-dolomite," reported with no distinction between the two.

TABLE 3  
 WYOMING: CRUSHED STONE SOLD OR USED BY PRODUCERS  
 IN 1996, BY USE 1/ 2/ 3/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Coarse aggregate (+1 1/2 inch), other coarse aggregate 4/	17	\$220	\$12.94
<b>Coarse aggregate, graded:</b>			
Concrete aggregate, coarse	W	W	7.56
Bituminous surface-treatment aggregate	W	W	3.38
Railroad ballast	W	W	6.00
<b>Fine aggregate (-3/8 inch):</b>			
Stone sand, concrete	38	325	8.55
Stone sand, bituminous mix or seal	W	W	8.89
<b>Coarse and fine aggregates:</b>			
Graded road base or subbase	1,160	3,110	2.67
Terrazzo and exposed aggregate	73	1,570	21.45
Other coarse and fine aggregates	W	W	11.56
Other construction materials	536	4,860	9.07
<b>Special:</b>			
Mine dusting or acid water treatment	9	250	27.78
Whiting or whiting substitute	2	100	50.00
Other fillers or extenders	39	1,540	39.44
Other specified uses not listed	24	193	8.04
<b>Unspecified: 5/</b>			
Actual	3,220	17,500	5.45
Estimated	55	300	5.45
Total	5,180	30,000	5.79

W Withheld to avoid disclosing company proprietary data; included with "Other construction materials."

1/ To avoid disclosing company proprietary data, no district tables were produced for 1996.

2/ Includes granite, limestone, limestone-dolomite, marble, miscellaneous stone, quartzite, traprock, and volcanic cinder and scoria.

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

4/ Includes riprap and jetty stone.

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

TABLE 4  
 WYOMING: 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 and concrete products	855	\$4,410	\$5.16
Asphaltic concrete aggregates and other bituminous mixtures	455	2,450	5.39
Road base and coverings	1,030	3,800	3.68
Fill	191	478	2.50
Snow and ice control	34	310	9.12
Other miscellaneous uses 2/	15	45	3.00
Unspecified: 3/			
Actual	400	1,810	4.52
Estimated	444	1,350	3.04
Total or average	3,420	14,700	4.28

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

2/ Includes filtration.

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

TABLE 5  
 WYOMING: 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	429	1,790	427	2,620
Asphaltic bituminous mixtures	W	W	W	W
Road base and coverings	626	2,410	406	1,390
Fill	64	266	126	211
Snow and ice control	W	W	W	W
Other miscellaneous uses 2/	177	1,030	326	1,780
Unspecified: 3/				
Actual	400	1,810	--	--
Estimated	321	982	123	366
Total	2,020	8,290	1,410	6,360

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 filtration.

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