

# THE MINERAL INDUSTRY OF WYOMING

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

In 1995, Wyoming climbed in rank from 14th to 13th 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 1995 was \$976 million, an 11% increase from that of 1994. This followed a 3.1% increase from 1993 to 1994 (based on final data). The State accounted for more than 2.5% of the U.S. total nonfuel mineral production value.

Wyoming's leading nonfuel minerals, by value, are soda ash and bentonite clays. In 1995, large increases in the values of both commodities accounted for the major portion of the State's increased nonfuel mineral production value. A smaller increase in construction and gravel also contributed to the State's rise in value. In 1994, the State's increased value mostly resulted from increases in bentonite and crushed stone, accompanied by a relatively small drop in the value of soda ash. Compared with that of 1994, other nonfuel minerals that increased in value in 1995 were grade-A helium, crushed stone, lime, and crude gypsum. Decreases were reported for portland cement and gemstones.

Compared with USGS estimates of the quantities produced in the other 49 States during 1995, Wyoming remained first in the production of soda ash and bentonite and second in grade-A helium. Additionally, the State was a significant producer of crude gypsum. Soda ash (sodium carbonate) is an inorganic chemical extensively used in the manufacture of glass, soap and detergents, paper, and textiles; and it is used in foods as sodium bicarbonate. The United States is the world's largest soda ash-producing nation. Wyoming, one of only two producing States, is home to the world's largest known natural deposit of trona,

the principal ore from which soda ash is refined. California produces a significantly smaller quantity of natural soda ash. Wyoming has not had any significant metal production since iron ore mining ceased in April 1984. A small tonnage of hand-cobbed beryllium concentrate was produced in Fremont County in 1986. In recent years, however, a modest amount of gold exploration has been taking place.

The Wyoming State Geological Survey<sup>2</sup> (WSGS) reported several of the State's soda ash manufacturers were expanding their operations in 1995. In January, FMC Wyoming Corp. announced plans to proceed with a \$45 million expansion project designed to increase its soda ash production by 25%. FMC, which has been the only wholly U.S.-owned soda ash producer, announced the sale of one-fifth of its interest to two Japanese companies, Sumitomo Corp. and Nippon Sheet Glass Co. All of the domestic soda ash producers now are partly foreign-owned; of the total investment, just under one-half is U.S.-owned. Wold Trona Co. continued with plans to construct a sixth trona mine and refining plant; construction of access roads began in 1995. Wold plans to produce a product called "Benetron" at its plant. Benetron is an acronym for "beneficiated trona" and can be used in applications not requiring as high a purity as that of regular soda ash. Benetron is about 96% to 97% pure soda ash, with regular soda ash being 99+% pure. Production of trona ceased for about 2 weeks after the collapse of a previously mined area at the Solvay Mineral Co.'s trona mine on February 3; mining resumed February 14, and full production was restored by the end of February.

In July 1995, the Wyoming Supreme Court ruled that

TABLE 1  
NONFUEL RAW MINERAL PRODUCTION IN WYOMING<sup>1 2</sup>

Mineral	1993		1994		1995 <sup>p</sup>	
	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)
Clays <sup>3</sup> thousand metric tons	2,410	\$73,400	2,530	\$91,300	2,590	\$152,000
Gemstones	NA	13	NA	13	NA	10
Sand and gravel (construction) thousand metric tons	3,400	15,000	3,210	13,100	4,500	18,900
Stone (crushed) do.	3,460	19,800	5,080	30,000	5,300	31,500
Combined value of cement [masonry (1993), portland (1994-95)], clays (common), gypsum [crude (1994-95)], helium (Grade-A), lime, and soda ash	XX	746,000	XX	746,000	XX	774,000
Total	XX	854,000	XX	880,000	XX	976,000

<sup>a</sup>Estimated. <sup>p</sup>Preliminary. NA Not available. XX Not applicable.

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

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

<sup>3</sup>Excludes certain clays; kind and value included with "Combined value" data.

counties can regulate construction aggregate by closing down producing companies in accordance with zoning and planning ordinances. Rissler & McMurry Co. opened a limestone aggregate quarry northwest of Alcova. The company had quarried limestone from a site on Bessemer Mountain west of Casper, but was prohibited from expanding that quarry due to opposition from individuals living near the site. Casper Construction Co. announced in November 1995 that it was abandoning efforts to continue production of river rock from a pit east of Casper due to objections from nearby residents. The company said it would move to a new source 20 miles east, near Glenrock, Converse County. Mountain Chemical Corp. announced plans to open another limestone quarry south of Laramie for chemical and cement manufacturing purposes. The company is adding a second kiln at its cement plant, nearly doubling capacity; the kiln is expected to be operational by early 1996.

Production of cut and polished decorative stone pieces of Wyoming Raven, a black granite, and Fantastico, a hard multicolored rock, continued at Sunrise Stone's quarry and fabricating plant in Platt County. In 1995, Sunrise acquired new polishing and engraving equipment and was producing finished monuments.

During 1995, Newmont Exploration Inc. dropped its option on the Rattlesnake Hills gold deposit in the Granite Mountains of central Wyoming. The property is currently held by Canyon Resources Corp., which is searching for a joint-venture partner. WSGS recently mapped the property and published the results in the Wyoming Geological Association's *1995 Guidebook to the Resources of Southwestern Wyoming*. WSGS investigations indicated gold occurred in Tertiary alkalic volcanics and in Archean exhalites. WSGS reported, based on unconfirmed reports, that more than a 9,000-kilogram (300,000-troy-ounce) resource has been identified with potential for expansion. Compass Minerals Co. of Reno, NV, continued to seek a joint-venture partner for its Copper King gold-copper property in the Laramie Range of southeastern Wyoming. The property is reported to contain a gold resource of about 16,000 kilograms (500,000 troy ounces), with some copper.

The State continued to receive considerable interest in diamonds, primarily in the State Line District in southeastern Wyoming and northern Colorado. This area has produced more than 120,000 diamonds to date. Radaurem Ltd. announced that its 140-metric-ton-per-hour mill on the Kelsey Lake property in the District would be in operation by December 1995. The Kelsey Lake kimberlites lie immediately south of the Colorado-Wyoming border and have yielded several gemstones, including a 14.2-carat diamond. Also, 10 "kimberlitic" diatremes and a 5-mile-long dike complex were recently discovered by Guardian Resources Ltd. in southwestern Wyoming. The company is drilling the property and the WSGS is conducting petrologic and geochemical studies of

the ultramafic breccia. In the same area, Royal Gold Inc. was reportedly testing several lamproites (potassium- and magnesium-rich rocks) for diamonds.

SF Phosphates Ltd. Co., which operates a soil conditioner manufacturing plant southeast of Rock Springs, began a \$30 million expansion project, doubling its sulfuric acid production capacity, in July. At this operation SF uses sulfur from the Carter Creek sulfur recovery plant north of Evanston, and phosphate mined north of Vernal, UT, the latter of which is shipped to the plant by slurry pipeline.

M-I Drilling Fluids Co., a subsidiary of Dresser Industries, purchased Fremont Chemical Co. of Riverton, a bentonite producer, during the third quarter of 1995.

Uranium continued to be mined in the State by in situ methods at Cogema Inc.'s operations at the Irigaray and Christensen Ranch properties in Johnson County and Power Resources, Inc.'s operations at the Highland and Morton Ranch properties in Converse County. Other companies with uranium development operations included Kennecott Uranium, Co., which continued to develop plans for an underground mine on Green Mountain, south of Jeffrey City in Fremont County, and Cameco U.S. Inc., which is investigating properties in the Red Desert area of Sweetwater County and the Boot Heel area of Albany County. Energy Fuels Nuclear Inc., a subsidiary of NUEXCO Inc., which announced plans in 1994 to begin uranium production from the Reno Ranch Deposit in Campbell County, idled all its milling operations.

WSGS discovered a nickel deposit during a 1995 reconnaissance in southeastern Wyoming. Anomalous mineralization was identified in a layered mafic-ultramafic complex. Samples contained maximum values of about 3.7% nickel, 4.4% copper, 0.29-troy-ounce-per-ton-gold, 0.024-ounce-per-ton platinum, 0.12-ounce-per-ton palladium, 0.19-ounce-per-ton silver, and 0.08% cobalt. Other WSGS work in the Granite Mountains resulted in the discovery of a 1,200-meter-long (4,000-foot-long) ruby schist. Rubies in the schist were mostly poor quality industrial grade, although several stones appeared to be gem to near-gem in quality. The largest stone discovered by WSGS measured 5 centimeters (2 inches) across. In the same area, WSGS is conducting resource studies on several jade deposits.

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<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 1995 USGS mineral production data are estimates as of Dec. 1995. For some commodities, especially 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 No. 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.

<sup>2</sup>This report includes information provided by the Wyoming State Geological Survey.

TABLE 2  
**WYOMING: CRUSHED STONE<sup>1</sup> SOLD OR USED BY PRODUCERS IN 1994, BY USE<sup>2</sup>**

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
<b>Coarse aggregate (+1 1/2 inch):</b>			
Riprap and jetty stone	55	\$556	\$10.10
<b>Coarse aggregate, graded:</b>			
Concrete aggregate, coarse	105	700	6.67
Bituminous aggregate, coarse	312	1,710	5.48
Bituminous surface-treatment aggregate	W	W	2.75
Railroad ballast	W	W	6.59
Other graded coarse aggregate	9	155	17.20
<b>Fine aggregate (-3/8 inch):</b>			
Stone sand, concrete	14	115	8.21
Stone sand, bituminous mix or seal	W	W	8.50
Screening, undesignated	6	9	1.50
<b>Coarse and fine aggregates:</b>			
Graded road base or subbase	867	2,090	2.41
Terrazzo and exposed aggregates	W	W	33.40
Crusher run or fill or waste	75	88	1.17
Roofing granules	1	25	25.00
Other construction materials	2,090	14,400	6.89
Agricultural: Agricultural limestone	39	275	7.05
Chemical and metallurgical: Lime manufacture	1	19	19.00
<b>Special:</b>			
Mine dusting or acid water treatment	9	250	27.80
Whiting or whiting substitute	2	88	44.00
Other fillers or extenders	42	1,560	37.10
Other specified uses not listed	45	200	4.44
<b>Unspecified:<sup>3</sup></b>			
Actual	1,190	6,100	5.13
Estimated	221	1,640	7.42
<b>Total</b>	<b>5,080</b>	<b>30,000</b>	<b>5.91</b>

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

<sup>1</sup>Includes granite, limestone, limestone-dolomite, marble, miscellaneous stone, quartzite, and volcanic cinder and scoria.

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

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

TABLE 3  
**WYOMING: CRUSHED STONE SOLD OR USED, BY KIND<sup>1</sup>**

Kind	1993				1994			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone <sup>2</sup>	7	925	\$3,990	\$4.31	10	1,520	\$6,120	\$4.04
Marble	1	74	2,450	33.10	1	93	3,250	31.60
Granite	2	2,380	W	W	3	3,410	19,900	5.30
Quartzite	1	W	W	6.28	1	W	W	10.00
Volcanic cinder and scoria	1	W	W	11.10	1	W	W	10.00
Miscellaneous stone	1	W	W	15.10	1	W	W	13.20
Total	XX	3,460	19,800	5.72	XX	5,080	30,000	5.91

<sup>1</sup>Revised. W Withheld to avoid disclosing company proprietary data; included with "Total." XX Not applicable.

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

<sup>3</sup>Includes "limestone-dolomite," reported with no distinction between the two.

TABLE 4  
**WYOMING: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1994, BY MAJOR USE CATEGORY<sup>1</sup>**

Use	Quantity (thousand metric tons)	Value (thousands)	Value per ton
Concrete aggregate (including concrete sand)	524	\$2,640	\$5.04
Plaster and gunite sands	2	18	9.00
Concrete products (blocks, brick, pipe, decorative, etc.)	18	43	2.39
Asphaltic concrete aggregates and other bituminous mixtures	484	2,500	5.17
Road base and coverings	1,310	4,850	3.69
Fill	147	434	2.95
Snow and ice control	31	167	5.39
Other <sup>2</sup>	35	188	5.37
Unspecified: <sup>3</sup>			
Actual	354	1,530	4.32
Estimated	298	751	2.52
Total or average	3,210	13,100	4.09

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

<sup>2</sup>Includes filtration and roofing granules.

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

TABLE 5  
**WYOMING: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1994, BY USE AND DISTRICT<sup>1</sup>**

(Thousand metric tons and thousand dollars)

Use	District 1		District 2	
	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products	260	1,250	264	1,390
Plaster and qunite sands	2	18	—	—
Concrete (blocks, brick, etc.)	( <sup>2</sup> )	W	18	W
Asphaltic concrete aggregates and road base materials	324	1,100	160	1,400
Road base and coverings	684	2,860	628	1,990
Fill	63	224	84	210
Snow and ice control	3	W	28	W
Other miscellaneous uses <sup>3</sup>	23	148	12	250
Unspecified: <sup>4</sup>				
Actual	354	1,530	—	—
Estimated	229	527	70	224
Total	1,940	7,660	1,270	5,460

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

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

<sup>2</sup>Less than 1/2 unit.

<sup>3</sup>Includes filtration and roofing granules.

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



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