



2005 Minerals Yearbook

TEXAS

THE MINERAL INDUSTRY OF TEXAS

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the University of Texas at Austin, Bureau of Economic Geology, for collecting information on all nonfuel minerals.

In 2005, Texas nonfuel raw mineral production was valued¹ at \$2.72 billion, based upon annual U.S. Geological Survey (USGS) data. This was a 16.7% increase from the State's total nonfuel mineral value of \$2.33 billion² for 2004, which followed a 6.4% increase from 2003 to 2004. Texas was sixth among the 50 States (fifth in 2004) in total nonfuel mineral production value and accounted for nearly 5% of the U.S. total value.

In 2005, about 97% of Texas' nonfuel mineral value resulted from the production of the State's top six industrial minerals, which are, in descending order of value—cement (portland and masonry), crushed stone, construction sand and gravel, salt, industrial sand and gravel, and lime. Cement alone accounted for nearly 37% of Texas' total nonfuel mineral value and together with the State's other two major construction nonfuel minerals, crushed stone and construction sand and gravel, accounted for more than 84% of the same total value. Leading the way with the largest increases in nonfuel mineral value were the same three mineral commodities—crushed stone, up \$202 million; cement, up about \$162 million (portland cement, up \$151 million); and construction sand and gravel, up \$36 million. With crushed stone production up nearly 10%, its unit value rose by 21%. Cement production rose a more moderate 4%, while its overall value rose 19%. While construction sand and gravel production decreased slightly more than 1%, the commodity's value rose by more than 8%.

Also up in production and value were industrial sand and gravel, value up \$5 million, Grade-A helium, up more than \$2 million, and ball clay and fuller's earth, each up about \$1 million each. The most substantial decreases in value took place in the those of gypsum, down \$7 million, lime and dimension stone, down about \$3 million each, and crude helium, down more than \$2 million.

In 2005, Texas was the only State that produced brucite and it continued to be first in rank among producing States in the quantity of crushed stone produced; second in the production of portland cement, salt, industrial sand and gravel, crude helium (of two producing States), ball clay, and talc (listed in descending order of value); third in zeolites; fifth in lime; seventh in masonry cement and dimension stone, and ninth in fuller's earth. Also, the State was a significant producer of gemstones. While the State rose in rank to first from second

¹The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the 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 2005 USGS mineral production data published in this chapter are those available as of December 2006. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>.

²This figure is a revision to the previously published \$2.29 billion in the The Mineral Industry of Texas chapter in the U.S. Geological Survey Minerals Yearbook, Area Reports: Domestic 2004 Volume II, resulting from a revision in crushed stone value from \$582 million to \$621 million (table 1).

in the production of common clays and to seventh from eighth in bentonite, it decreased to third from second in construction sand and gravel and to seventh from second in the production of gypsum. The Texas metal industry produced primary aluminum, raw steel, refined copper, and smaller amounts of other metals. Sources of plant feed included ores, blister and anode copper, and scrap metal acquired from foreign or other domestic sources. In 2005, the State continued to be third in rank in primary aluminum production and was the leading producer of electrolytically refined copper. Texas also remained one of the Nation's leading raw steel-producing States (precise rank withheld owing to proprietary data of producers in other States). Production of raw steel decreased 11% in 2005 with an output of 3.51 million metric tons (Mt) down from 3.95 Mt in 2004, as reported by the American Iron and Steel Institute (2006, p. 74).

The following narrative information includes information provided by the Texas Bureau of Economic Geology³ (BEG). In 2005, the mineral industry, as monitored by the BEG, remained a significant and diverse component of the Texas economy with a considerable majority of the State's nonfuel minerals achieving increases in production and value from 2004. Annual job growth in natural resources and mining, as reported by the Texas Workforce Commission (2006⁴), increased 2.7% from December 2004 through December 2005. This number includes mining and support services for nonfuel minerals as well as oil and gas extraction and coal mining. Steady though modest gains were made in the growth of construction industry employment. The Commission reported an increase of about 3.2% in the number of jobs Statewide in 2005 showing continued steady growth from the 1.2% increase of 2004 and the 0.5% increase of 2003 from that of 2002.

Exploration and Development

According to the BEG, minerals exploration and resource development has been gradually increasing in Texas during the past several years. Several companies were seeking to expand current operations and to acquire additional properties with mineral resources to develop; also, the State agency anticipated the rate of company consolidations would be on the increase during the next several years.

In addition to work in the industrial minerals sector, preparations continued in the early development of the State's first significant metal mining operation in recent years, Silver Standard Resources, Inc.'s Shafter silver mine project. Except

³Sigrid Clift, Research Associate, Texas Bureau of Economic Geology, and J. Richard Kyle, Professor, Department of Geological Sciences, both of the John A. and Katherine G. Jackson School of Geosciences, University of Texas at Austin, coauthored the text of the State mineral industry information provided by the Texas Bureau of Economic Geology.

⁴References that include a section mark (§) are included in the Internet References Cited section.

for the extraction of magnesium chloride from seawater and from subsurface brine to produce magnesium metal, producing as recently as 1998, no major nonfuel mineral metal mining operation has been active in Texas since the Lone Star Steel Co. terminated operations at its Cass County iron ore mine and sintering plant in the mid-1980s (White and Garner, 1992, p. 480). The mining of Texas iron ores to produce steel was discontinued in 1985 and 1986, accompanied by the closure of several steel mills in 1986. From 1987 through 1994 small quantities of iron ore were produced, but only for industrial use in nonmetal markets, such as cattle feed nutrient, road aggregate, and the manufacture of cement.

Silver Standard continued preparatory work for its underground silver mine, located in the Shafter district in Presidio County in southwest Texas (Trans-Pecos region), 32 kilometers (km) north of the Mexican border and 64 km south of the City of Marfa. As outlined by the company, the Shafter Silver Project had a measured reserve of 0.6 Mt averaging 339 grams per ton (g/t) (nearly 10 troy ounces per short ton) silver and an indicated reserve of 1.29 Mt averaging 348 g/t, along with additional inferred resources. Based upon the company's scoping study, Shafter could be mined at a rate as high as 295,000 metric tons of ore per year initially producing about 99,500 kilograms (kg) (3.2 million troy ounces) of silver per year with average production at nearly 80,900 kg (2.6 million troy ounces) of silver during a mine life of about 7 years (Silver Standard Resources, Inc., 2007§). In addition to the silver mineralization at Shafter, there are zinc, as well as copper and some minor gold occurrences farther to the west that are potential targets for exploration (Silver Standard Resources, Inc., 2001b). Silver Standard held all permits required to commence production at Shafter and planned further evaluation of the Shafter site, including updates of the operating and capital costs of the scoping study; the company planned to renew all mining permits as they come up for renewal (Silver Standard Resources, Inc., 2007§). During 2005, Silver Standard began ground water investigations to evaluate mine de-watering plans and mine needs for process water. The mine hoist, installed by Goldfields Mining Corp. in the late 1970s as part of its exploration activities at the Shafter deposit, was inspected to evaluate its potential for modifications that would allow for the company's planned production rates. Although interest had been high by Goldfields for opening a silver mine at the Shafter deposit and start production in early 1981, the decline in prices for silver (and most other metals) in 1981 caused the company to curtail operations. [U.S. Department of the Interior (U.S. Bureau of Mines (USBM) and USGS) Minerals Yearbooks (MYB) were used to research Texas metal production information for various years. Minerals Yearbooks for 1932-1993, are available over the Internet courtesy of the University of Wisconsin Ecology and Natural Resources Collection and may be accessed online at URL <http://minerals.usgs.gov/minerals/pubs/usbmmmyb.html>. The MYB's for 1994 (USBM) and 1995-present (USGS) may be accessed online by way of URL <http://minerals.usgs.gov/minerals/pubs/myb.html>.]

Silver Standard had previously in 2003 completed transport to Shafter of a used 725 ton-per-day (800 short ton-per-day) mill, the components of which it had purchased from American

Reclamation, Inc. The previous owner, Sunshine Mining and Refining Co., last operated the mill, the 16:1 mill, at its former silver mine in Silver Peak, NV. Silver Standard purchased the used components to help reduce overall capital costs of the project and thereby lower the price of silver at which the company could economically put the mine into production.

The Shafter District area had been mined for silver since the 1880s and was host to the largest known silver deposit in Texas. From 2.1 Mt of ore extracted at the Shafter deposit, total recorded production from the property was nearly 1.1 million kg (35 million troy ounces) of silver. The deposit was mined from 1883 through September 1942 when the Presidio Mine closed down in part owing to labor difficulties, excessive water in lower levels, a lowering of ore grade, and depletion of ore reserves. The last substantial quantities of silver produced in the State came from the old Hazel Mine in Culberson County in 1947, after which silver production tailed off (Martin, 1949, p. 1507). Most of the permitting for the current Shafter project was completed in 2001, and the project has been awaiting higher silver prices for a final feasibility study to be completed. A major road, U.S. Highway 67, and a major powerline traverse the property; the nearby town of Shafter has 30 to 40 inhabitants (Silver Standard Resources, Inc. 2001a§).

Commodity Review

Industrial Minerals

Cement and Crushed Stone.—Hanson Building Materials America opened a major new crushed stone facility in Bridgeport, Wise County, northwest of Dallas, in January. Hanson also sold its 50% interest in Campbell Concrete and Materials, L.P., a ready-mixed concrete business operating in Houston to its joint-venture partner, Lehigh Cement Co., a wholly owned subsidiary of Heidelberg Cement AG (Clift and Kyle, 2006, p. 115). Southern Star Concrete, Inc. was acquired by two South American companies, Compañía de Cemento Argos S.A. (“Argos”) and Cementos del Caribe S.A. (“Caribe”). Concerns were raised about how concrete and cement supplies might be affected under the companies' new management and direction.

Common Clays.—Rockwood Holdings, Inc. parent company of Southern Clay Products, Inc. of Gonzales, TX, acquired the rheological additives and carbonless developers businesses of Süd-Chemie AG, Munich, Germany. These businesses will be incorporated into Rockwood's Clay Additives business unit that includes Southern Clay Products.

Environmental Issues

“Sentinels of Safety Awards,” cosponsored by the U.S. Department of Labor's Mine Safety and Health Administration (MSHA) and the National Mining Association (NMA), were made to Stonewall Materials of Oklahoma LLC's quarry in Palo Pinto County, Mineral Wells, TX, in the small company category, and with “Special Safety Recognition” to Texas Crushed Stone Co. Inc.'s Georgetown Quarry and Plant operation in Williamson County, Georgetown, TX, and Fordyce

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TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN TEXAS^{1,2}

(Thousand metric tons and thousand dollars)

Mineral	2003		2004		2005	
	Quantity	Value	Quantity	Value	Quantity	Value
Cement:						
Masonry	307	36,100 ^e	319	38,000 ^e	395	48,500 ^e
Portland	11,100	747,000 ^e	11,200	800,000 ^e	11,600	951,000 ^e
Clays:						
Common	2,110	8,890	2,160	8,890	2,340	8,680
Fuller's earth	27	2,400	W	W	W	W
Kaolin	33	7,150	W	W	W	W
Gemstones	NA	201	NA	201	NA	201
Gypsum, crude	1,810	12,300	2,450	18,800	1,540	11,800
Lime	1,630	110,000	1,630	115,000	1,610	112,000
Salt	9,640	116,000	9,870	118,000	9,600	118,000
Sand and gravel:						
Construction	86,200	425,000	81,700	436,000	80,700	472,000
Industrial	1,930	81,700	2,790	109,000	2,840	114,000
Stone:						
Crushed	126,000	595,000	122,000	621,000 ^f	134,000	823,000
Dimension	87	16,400	64	15,200	44	12,200
Talc, crude	246	W	258	W	W	W
Combined values of brucite, clays (ball, bentonite), helium, zeolites (2004-05), and values indicated by symbol W						
	XX	33,300	XX	46,300	XX	49,300
Total	XX	2,190,000	XX	2,330,000 ^f	XX	2,720,000

^eEstimated. ^fRevised. NA Not available. W Withheld to avoid disclosing company proprietary data. Withheld values included in "Combined values" data. XX Not applicable.

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

²Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 2
TEXAS: CRUSHED STONE SOLD OR USED, BY KIND¹

Kind	2004			2005		
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)
Limestone ²	115 ^r	116,000	\$593,000 ^r	104	129,000	\$792,000
Dolomite	1	W	W	1	W	W
Calcareous Marl	2	1,500	6,090	1	21	125
Marble	3	59	992	3	55	1,160
Shell	(3)	W	W	(3)	W	W
Granite	1	W	W	1	W	W
Traprock	1	W	W	1	W	W
Sandstone and quartzite	4	816 ^r	4,450 ^r	4	857	7,420
Volcanic cinder	--	--	--	1	W	W
Miscellaneous stone	8 ^r	2,030 ^r	9,680 ^r	8	1,760	9,880
Total	XX	122,000	621,000 ^r	XX	134,000	823,000

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

¹Data are rounded to no more than three significant digits; may not add to totals shown.

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

³Sales/distribution yards.

TABLE 3
TEXAS: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2005, BY USE¹

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	445	3,260
Filter stone	1,400	19,400
Other coarse aggregates	1,830	12,700
Total	3,670	35,300
Coarse aggregate, graded:		
Concrete aggregate, coarse	10,500	73,400
Bituminous aggregate, coarse	2,640	17,300
Bituminous surface-treatment aggregate	927	5,920
Railroad ballast	W	W
Other graded coarse aggregates	3,630	31,200
Total	17,700	128,000
Fine aggregate (-¾ inch):		
Stone sand, concrete	3,130	17,900
Stone sand, bituminous mix or seal	476	2,890
Screening, undesignated	134	1,010
Other fine aggregates	1,640	9,670
Total	5,380	31,400
Coarse and fine aggregate:		
Graded road base or subbase	13,100	62,100
Terrazzo and exposed aggregate	(2)	(2)
Crusher run or fill or waste	588	2,710
Other coarse and fine aggregates	13,200	75,900
Total	26,900	141,000
Other construction materials	123	365
Agricultural:		
Agricultural limestone	(3)	(3)
Poultry grit and mineral food	(3)	(3)
Other agricultural uses	13	127
Total	1,160	6,640
Chemical and metallurgical:		
Cement manufacture	12,000	43,600
Lime manufacture	(3)	(3)
Sulfur oxide removal	(3)	(3)
Special:		
Asphalt fillers or extenders	(3)	(3)
Other fillers or extenders	(3)	(3)
Other miscellaneous uses and other specified uses not listed	9	104
Unspecified:⁴		
Reported	53,400	349,000
Estimated	11,300	66,400
Total	64,700	415,000
Grand total	134,000	823,000

W Withheld to avoid disclosing company proprietary data; included with "Other graded coarse aggregates."

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Withheld to avoid disclosing company proprietary data; included with "Other coarse and fine aggregates."

³Withheld to avoid disclosing company proprietary data; included in "Grand total."

⁴Reported and estimated production without a breakdown by end use.

TABLE 4
TEXAS: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2005, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3		District 4	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction:								
Coarse aggregate (+1½ inch) ²	W	W	--	--	W	W	W	W
Coarse aggregate, graded ³	W	W	W	W	W	W	W	W
Fine aggregate (-¾ inch) ⁴	W	W	W	W	W	W	W	W
Coarse and fine aggregates ⁵	W	W	W	W	W	W	W	W
Other construction materials	--	--	--	--	27	51	--	--
Agricultural ⁶	--	--	W	W	--	--	--	--
Chemical and metallurgical ⁷	--	--	--	--	W	W	W	W
Special ⁸	--	--	--	--	--	--	--	--
Other miscellaneous uses	--	--	--	--	--	--	--	--
Unspecified: ⁹								
Reported	--	--	--	--	523	3,090	--	--
Estimated	183	1,000	--	--	766	4,500	159	919
Total	616	6,050	506	2,250	4,300	22,500	4,000	24,200
	District 5		District 6		District 7		District 8	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction:								
Coarse aggregate (+1½ inch) ²	62	548	W	W	2,590	18,500	W	W
Coarse aggregate, graded ³	W	W	--	--	12,500	78,400	W	W
Fine aggregate (-¾ inch) ⁴	W	W	--	--	4,140	23,800	W	W
Coarse and fine aggregates ⁵	2,940	15,900	W	W	17,700	80,000	W	W
Other construction materials	--	--	--	--	95	315	--	--
Agricultural ⁶	W	W	--	--	W	W	--	--
Chemical and metallurgical ⁷	W	W	--	--	W	W	--	--
Special ⁸	W	W	--	--	W	W	--	--
Other miscellaneous uses	9	104	--	--	--	--	--	--
Unspecified: ⁹								
Reported	17,500	108,000	--	--	18,200	114,000	9,010	64,600
Estimated	7,700	46,000	39	230	2,300	13,000	--	--
Total	38,000	231,000	157	1,270	63,600	351,000	11,600	107,000
	District 9		Unspecified districts					
	Quantity	Value	Quantity	Value				
Construction:								
Coarse aggregate (+1½ inch) ²	--	--	--	--				
Coarse aggregate, graded ³	W	W	32	526				
Fine aggregate (-¾ inch) ⁴	W	W	--	--				
Coarse and fine aggregate ⁵	W	W	286	3,090				
Other construction materials	--	--	--	--				
Agricultural ⁶	--	--	--	--				
Chemical and metallurgical ⁷	--	--	--	--				
Special ⁸	--	--	--	--				
Other miscellaneous uses	--	--	--	--				
Unspecified: ⁹								
Reported	8,190	58,600	--	--				
Estimated	151	890	--	--				
Total	10,600	74,800	318	3,610				

See footnotes at end of table.

TABLE 4--Continued
 TEXAS: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2005, BY USE AND DISTRICT¹

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

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes filter stone, riprap and jetty stone, and other coarse aggregate.

³Includes bituminous aggregate (coarse), bituminous surface-treatment aggregate, concrete aggregate (coarse), railroad ballast, and other graded coarse aggregate.

⁴Includes screening (undesignated), stone sand (bituminous mix or seal), stone sand (concrete), and other fine aggregates.

⁵Includes crusher run or fill or waste, graded road base or subbase, terrazzo and exposed aggregate, and other coarse and fine aggregates.

⁶Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.

⁷Includes cement and lime manufacture, and sulfur oxide removal.

⁸Includes asphalt fillers or extenders and other fillers or extenders.

⁹Reported and estimated production without a breakdown by end use.

TABLE 5
 TEXAS: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2005, BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	31,200	\$206,000	\$6.59
Plaster and gunite sands	776	4,170	5.37
Concrete products (blocks, bricks, pipe, decorative, etc.)	230	2,150	9.36
Asphaltic concrete aggregates and other bituminous mixtures	1,190	7,960	6.70
Road base and coverings	3,720	19,000	6.10
Road and other stabilization (cement)	1,530	9,460	6.18
Fill	5,840	14,400	2.46
Other miscellaneous uses ²	130	925	7.12
Unspecified: ³			
Reported	14,800	91,800	6.22
Estimated	21,300	116,000	5.46
Total or average	80,700	472,000	5.84

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes filtration.

³Reported and estimated production without a breakdown by end use.

TABLE 6
TEXAS: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2005, BY USE AND DISTRICT^{1,2}

(Thousand metric tons and thousand dollars)

Use	Districts 1 and 2		Districts 3 and 4		District 5	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregates (including concrete sand)	2,350	16,600	1,690	11,300	7,280	47,200
Concrete products (blocks, bricks, pipe, decorative, etc.) ³	77	537	94	483	208	2,050
Asphaltic concrete aggregates and other bituminous mixtures	111	1,350	--	--	320	1,900
Road base and coverings ⁴	216	1,750	41	175	1,310	8,900
Fill	370	1,270	133	419	1,490	3,780
Other miscellaneous uses ⁵	87	478	14	60	27	375
Unspecified: ⁶						
Reported	71	405	--	--	2,540	18,500
Estimated	4,500	25,000	1,900	10,300	5,900	31,200
Total	7,820	47,400	3,840	22,800	19,100	114,000
	Districts 6 and 8		Districts 7 and 9		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregates (including concrete sand)	10,300	63,000	7,360	51,600	2,280	16,000
Concrete products (blocks, bricks, pipe, decorative, etc.) ³	387	1,170	239	2,090	--	--
Asphaltic concrete aggregates and other bituminous mixtures	249	1,050	509	3,670	--	--
Road base and coverings ⁴	2,740	14,600	949	2,990	--	--
Fill	3,260	6,800	592	2,110	--	--
Other miscellaneous uses ⁵	2	12	--	--	--	--
Unspecified: ⁶						
Reported	7,060	40,000	4,920	31,900	171	940
Estimated	5,500	25,000	3,600	19,600	--	--
Total	29,400	157,000	18,100	114,000	2,450	16,900

W Withheld to avoid disclosing company proprietary data; included in "Other miscellaneous uses." -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Districts 1 and 2, 3 and 4, 6 and 8, and 7 and 9 are combined to avoid disclosing company proprietary data.

³Includes plaster and gunite sands.

⁴Includes road and other stabilization (cement).

⁵Includes filtration.

⁶Reported and estimated production without a breakdown by end use.