THE MINERAL INDUSTRY OF SOUTH CAROLINA

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

South Carolina ranked 27th in the Nation in total nonfuel mineral production value[1] in 1997, according to the U.S. Geological Survey (USGS). The State was 26th in 1996. The estimated value for 1997 was $507 million, a nearly 3% increase from that of 1996. This followed a 10.3% increase from 1995 to 1996 (based on final 1996 data). The State accounted for more than 1% of the U.S. total nonfuel mineral production value.

In 1997, most nonfuel mineral commodities increased in value, led by a 6% rise of $9 million in the value of crushed stone and a nearly 4%, $7 million increase in portland cement (*table 1*). Vermiculite, crude mica, and silver dropped slightly, and dimension granite and gemstones virtually remained the same. Only gold, dropping by about 16%, showed any significant decrease. In 1996, most of the State's increase was accounted for by a $30 million increase in the value of portland cement and a $14 million rise in crushed stone (*table 1*).

Based on USGS estimates of the quantities produced in the 50 States in 1997, South Carolina remained first of 2 States that produced vermiculite and fourth in masonry cement. The State rose to 6th from 8th in the production of common clays and dropped from 2d to 3d in kaolin, from 4th to 5th in crude mica, and from 9th to 10th of the 13 gold-producing States. Additionally, significant quantities of portland cement, crushed stone, and industrial sand and gravel were produced in South Carolina. Primary aluminum and raw steel also were produced in the State, but from raw materials that were acquired from other domestic and foreign sources. South Carolina remained seventh of 14 States in the production of primary aluminum in 1997.

The following narrative information was provided by the South Carolina Geological Survey.[2] The Brewer Gold Co. neared the final stages of reclaiming its Brewer Gold Mine in Chesterfield County. Brewer mined and processed gold ore from 1987 to 1993. The Brewer Mine was an open pit mining operation that used cyanide heap leach to extract gold. While extracting and processing about 5,540 kilograms of gold, approximately 93 hectares of land was disturbed by an open pit, leach pads, and process facilities.

About 73 hectares were affected directly by the location of heap leach pads, waste rock dump, and the open pit. The original reclamation plan called for the open pit to be reclaimed as a deepwater lake and the leach pads and waste rock dumps to be encapsulated in clay upon final reclamation. However, Brewer changed its plans based on the amount of rock with acid generation potential encountered during mining and the poor water quality that the company anticipated would accumulate in the open pit after mining. The conceptual reclamation plan for the mine and facilities evolved during the final stages of mining to consider backfilling the open pit with mine waste. Backfilling the open pit with the leach pad waste and waste rock would reduce the land directly affected by the mine facilities from 93 hectares to approximately 20 hectares. This also would provide a better method to prevent the oxidation of sulfide minerals and the minimization of long term maintenance of the reclaimed site during and after closure.

The final decision to backfill the open pit was made in 1994, and following review and approval of the revised reclamation and closure plan, final reclamation activities began in 1995. The pit backfill involved the selective placement of about 5.1 million cubic meters of mine waste that was placed according to its potential for acid generation. Mine waste that had been leached with cyanide solutions were first rinsed to lower and acceptable levels of toxicity. Mine waste with acid generation potential was either placed below the anticipated groundwater level (limited oxygen in the reducing environment would prevent oxidation of the sulfide minerals) or well above the anticipated water level in the backfilled pit (limiting moisture and thereby limiting oxidation). Oxidized mine waste with neutralizing potential was placed at the zone where the water table would ultimately rise. The backfilled pit was capped with approximately 186,000 square meters of geosynthetic clay liner (GCL). The GCL was covered with about 1 meter of low permeability soil and topped with soil for vegetation.

With planned completion of the earth moving phase and capping of the backfilled pit during 1998, final closure activities for the Brewer Gold Mine site will be about 90% complete. Remaining reclamation work will involve the final design on the water treatment facility to treat groundwater outflow from the backfilled pit, closure of the existing water treatment facility, establishment of a stable vegetative growth to protect the backfilled pit's clay cap, and the continued establishment maintenance of vegetative growth throughout the remaining 73 hectares.

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[1]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/.

[2]Craig Kennedy, Geologist with the South Carolina Geological Survey, authored the text of State minerals information submitted by that agency.

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN SOUTH CAROLINA 1/ 2/

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1995		1996		1997 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Cement:						
Masonry	W	W	286	27,142 e/	292	28,228 e/
Portland	2,210	155,723	2,368	185,696 e/	2,416	193,124 e/
Clays:						
Common	1,224	4,910	1,256	4,855	1,353	5,551
Fire	24	W	24	W	--	--
Kaolin	373	16,765	387	18,100	306	20,576
Gemstones	NA	W	NA	16	NA	16
Peat	W	W	--	--	3	10
Sand and gravel:						
Construction	8,880	29,012	8,780	29,000	9,000	30,500
Industrial	839	20,451	761	19,486	799	19,573
Stone, crushed	22,000	132,000	23,800	146,000	24,600	155,000
Combined value of gold, manganiferous ore (1995), mica (crude), silver, stone (dimension granite), vermiculite, and values indicated by symbol W	XX	88,688	XX	62,700	XX	54,315
Total	XX	447,298	XX	493,257	XX	506,893

e/ Estimated. 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
SOUTH CAROLINA: 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	9	3,140	$14,000	$4.44	7	3,740	$18,300	$4.88
Calcareous marl	2	W	W	2.64	2	W	W	2.90
Granite	23	16,600	109,000	6.57	24	17,700	119,000	6.71
Marble	1	W	W	6.65	1	W	W	6.79
Total	XX	22,000	132,000	5.98	XX	23,800	146,000	6.15

W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.
1/ Data are rounded to three significant digits; may not add to totals shown.

TABLE 3
SOUTH CAROLINA: 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) 4/	323	$3,020	$9.34
Coarse aggregate, graded 5/	3,440	26,600	7.75
Fine aggregate (-3/8 inch) 6/	1,300	5,910	4.54
Coarse and fine aggregates:			
Graded road base or subbase	1,020	5,420	5.33
Crusher run or fill or waste	1,900	10,900	5.72
Other coarse and fine aggregates	45	331	7.36
Chemical and metallurgical, cement manufacture	W	W	2.84
Unspecified: 7/			
Actual	14,600	90,100	6.16
Estimated	W	W	5.74
Total	23,800	146,000	6.15

W Withheld to avoid disclosing company proprietary data; included in "Total."
1/ To avoid disclosing company proprietary data; "District tables were not produced for 1996."
2/ Includes calcareous marl, granite, limestone, and marble.
3/ Data are rounded to three significant digits; may not add to totals shown.
4/ Includes filter stone, macadam, and riprap and jetty stone.
5/ Includes bituminous aggregate (coarse), bituminous surface treatment aggregate, concrete aggregate (coarse), other graded coarse aggregate, and railroad ballast.
6/ Includes screening (undesignated), stone sand (bituminous mix or seal) and stone sand (concrete).
7/ Includes production reported without a breakdown by end use and with estimates for nonrespondents.

TABLE 4
SOUTH CAROLINA: 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)	3,460	$13,100	$3.78
Concrete products (blocks, bricks, pipe, decorative, etc.)	249	606	2.43
Asphaltic concrete aggregates and other bituminous mixtures	165	664	4.02
Road base and coverings	82	204	2.49
Fill	764	1,260	1.65
Snow and ice control	18	100	5.56
Other miscellaneous uses	86	356	4.14
Unspecified: 2/			
Actual	1,730	5,950	3.44
Estimated	2,230	6,820	3.06
Total or average	8,780	29,000	3.31

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Includes production reported without a breakdown by end use and with estimates for nonrespondents.

TABLE 5
SOUTH CAROLINA: 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		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products	132	590	2,140	7,540	1,430	5,530
Asphaltic concrete aggregates and road base and coverings 2/	198	901	513	816	317	509
Other miscellaneous uses	–	–	–	–	86	356
Unspecified: 3/						
Actual	–	--	162	540	1,570	5,410
Estimated	197	903	520	1,260	1,510	4,660
Total	527	2,390	3,340	10,200	4,910	16,500

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Includes fill, and snow and ice control.
3/ Includes production reported without a breakdown by end use and with estimates for nonrespondents.