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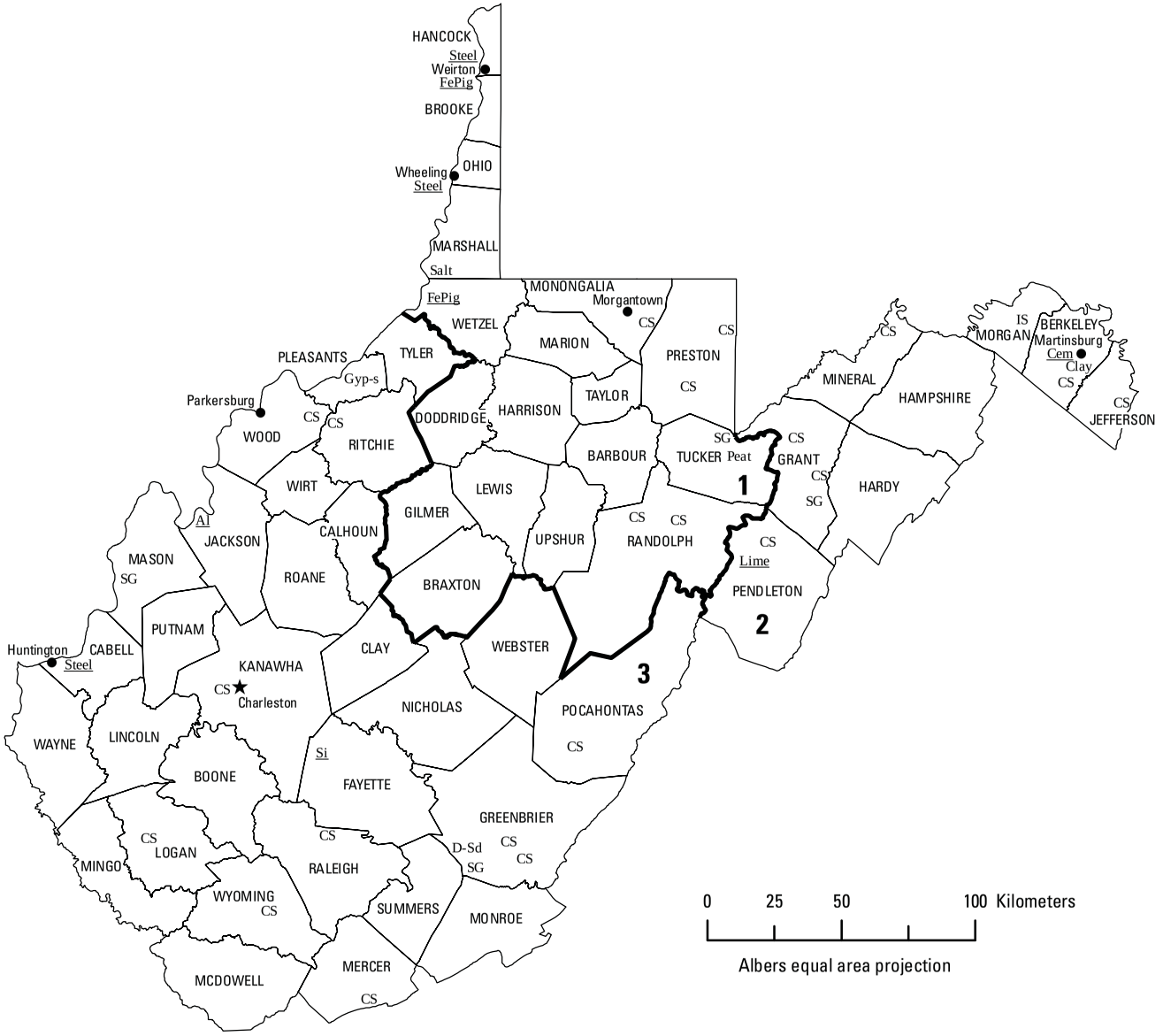
2007 Minerals Yearbook

WEST VIRGINIA [ADVANCE RELEASE]

U.S. Department of the Interior
U.S. Geological Survey

August 2010

WEST VIRGINIA



LEGEND

- County boundary
- ★ Capital
- ● City
- 1 Crushed stone/sand and gravel district boundary

MINERAL SYMBOLS (Major producing areas)

Al	Aluminum plant
Cem	Cement plant
Clay	Common clay
CS	Crushed stone
D-Sd	Dimension sandstone
FePig	Iron oxide pigment plant
Gyp-s	Synthetic gypsum
IS	Industrial sand
Lime	Lime plant
Peat	Peat
Salt	Salt
SG	Construction sand and gravel
Si	Silicon metal plant
Steel	Steel plant

Source: West Virginia Geological and Economic Survey/U.S. Geological Survey (2007).

The Mineral Industry of West Virginia

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

In 2007, West Virginia's nonfuel raw mineral production[1] was valued at $268 million, based upon annual U.S. Geological Survey (USGS) data. This was a $38 million, or 16.5%, increase from the State's total nonfuel mineral value of $230 million in 2006, which was a $21 million, or 10%, increase from that of 2005.

In 2007, crushed stone, based upon production value, continued to be West Virginia's leading nonfuel mineral commodity, accounting for nearly 59% of the State's total nonfuel mineral production value. Cement (portland and masonry), lime, industrial sand and gravel, and construction sand and gravel followed (in descending order of value). These five mineral commodities accounted for about 98% of the State's total value of nonfuel raw mineral production.

Crushed stone led the State's rise in nonfuel raw mineral production value with a $37 million, or 31%, increase in value, in part, resulting from a 1.4-million-metric-ton (Mt), or 10%, increase in the mineral commodity's production. This was followed by increases that took place in lime (data withheld—company proprietary data), construction sand and gravel, and industrial sand and gravel. A 57% increase in construction sand and gravel production resulted in a $2.15 million, or 62%, increase in its production value (table 1). The largest decrease in value took place in cement, followed by lesser decreases in salt and common clays.

West Virginia continued to rank 10th among 16 producing States in the quantity of salt produced in the State and remained a significant producer of crushed stone. The State's mines produced industrial minerals and coal; no metals were mined in West Virginia. Primary aluminum and raw steel were produced in the State, but both metals were processed from materials acquired from foreign and other domestic sources. In 2007, West Virginia continued to rank 9th in the Nation in the production of primary aluminum among 11 producing States.

Industry Trends and Developments

According to the West Virginia Geological and Economic Survey (WVGES), while coal continued to dominate economic mineral production in the State in 2007, West Virginia also produced stone (mainly limestone), clay, shale, sandstone, sand and gravel, and sand limestone. A total of 18.5 Mt of combined quarry production was reported in 2007 from 49 mining permits, an increase of 12% from that of 2006. An increase in limestone production in Monongalia County accounted for the majority of the West Virginia's increased output. Counties that had total (combined) quarry production ranging between 0.9 Mt and 4.5 Mt (between 1 million and 5 million short tons) included those of Berkeley, Grant, Greenbrier, Jefferson, Monongalia, Pendleton, and Randolph. Counties producing between 0.45 Mt and 0.9 Mt (between 0.5 million and 1 million short tons) included those of Morgan, Mercer, Raleigh, and Ritchie Counties (Britton, Blake, and Avary, 2008).

Commodity Review

Industrial Minerals

Stone, Crushed.—Limestone led the State's quarry production in 2007, accounting for about 89% of the total noncoal mineral production, based upon tonnage. The majority of West Virginia's limestone production was from a northeast-southwest trend in the counties along the eastern border with Virginia. The trend extended northeastward into the State's eastern panhandle along outcrop belts of thick carbonate units of Ordovician, Silurian, Devonian, and Mississippian age (spanning an age of from about 480 million years to about 320 million years). The county that produced the most limestone was Monongalia County, from which more than 3.6 Mt was quarried from the Greenbrier Limestone of Mississippian age (Britton, Blake, and Avary, 2008).

Although aggregate, by far, was the largest use for the State's limestone resources, additionally, limestone was processed for use in the production of cement and in steel production and for such uses as agricultural lime and ballast, flue gas desulfurization, fluidized bed combustion, low silica rock dust for the coal industry, metallurgical flux, stream revitalization, various chemical applications, and wastewater treatment.

Other Industrial Minerals.—The majority of West Virginia's sand and gravel was produced from Tucker and Grant Counties in the northern part of the State or in Logan and Raleigh Counties (mostly crushed sandstone) in southern West Virginia. Common clay and shale production, mostly used in the brick manufacturing industry, was limited to Berkeley County in the eastern panhandle (Britton, Blake, and Avary, 2008).

Government Programs

The WVGES continued geologic operations conducting geologic mapping, geochemical surveys, and research of the geology, mineral resources, and topography of the State and was an active participant in the STATEMAP program. STATEMAP is a component of the congressionally mandated National Cooperative Geologic Mapping Program (NCGMP), through which the USGS distributes Federal funds to support geologic mapping efforts through a competitive funding process. The

[1]The 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 2007 USGS mineral production data published in this chapter are those available as of June 2009. 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.

NCGMP has three primary components: (1) FEDMAP, which funds Federal geologic mapping projects, (2) STATEMAP, which is a matching-funds grant program with State geological surveys, and (3) EDMAP, a matching-funds grant program with universities that has a goal to train the next generation of geologic mappers. In cooperation with and as part of the STATEMAP program, reconnaissance bedrock mapping and geochemical sampling were carried out on the Milam and Cow Knob, West Virginia-Virginia quadrangles, located in the Valley and Ridge physiographic province, from May 2006 through July 2007. Preliminary bedrock geologic maps were produced for the Milam quadrangle and the Cow Knob quadrangle.

Additionally, a total of 52 bedrock samples were collected for geochemical analysis during the field season, the analytical results of which were combined with results from past year's STATEMAP projects in a geochemical database available to the general public as West Virginia Geological Survey Report of Investigations RI–34. Concurrent with the year's STATEMAP project, the geochemical database was brought up to date and summary statistics fully revised. A GIS-compatible version of the database was available from the WVGES (McDowell, 2007).

References Cited

Britton, J.Q., Blake, B.M., Jr., and Avary, K.L., 2008, West Virginia, *in* Annual review 2007: Mining Engineering, v. 60, no. 5, May, p. 130–133.

McDowell, R.R., comp., 2007 (update), Stratigraphic geochemical database for portions of Pendleton County, West Virginia, and adjacent Virginia counties: West Virginia Geological and Economic Survey, Report of Investigations No. 34, one 3.5-inch diskette. (Accessed August 5, 2010, at http://www.wvgs.wvnet.edu/www/statemap/statemap.htm).

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN WEST VIRGINIA[1, 2]

(Thousand metric tons and thousand dollars)

Mineral	2005		2006		2007	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, common	186	524	W	W	W	W
Gemstones, natural	NA	1	NA	1	NA	1
Sand and gravel:						
Construction	318	1,630	429	3,470	675	5,620
Industrial	369	17,800	333	17,200	345	17,600
Stone, crushed	14,600	108,000	14,500	120,000	15,900	157,000
Combined values of cement, lime, peat, salt, stone (dimension sandstone), and values indicated by symbol W	XX	81,100	XX	89,100	XX	87,400
Total	XX	209,000	XX	230,000	XX	268,000

NA Not applicable. W Withheld to avoid disclosing company proprietary data. Withheld value included in "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 no more than three significant digits; may not add to totals shown.

TABLE 2

WEST VIRGINIA: CRUSHED STONE SOLD OR USED, BY TYPE[1]

	2006			2007		
Type	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)
Limestone	23	13,700	$114,000	23	15,100	$152,000
Sandstone	6	893	5,550	7	858	5,260
Total	XX	14,500	120,000	XX	15,900	157,000

XX Not applicable.

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

TABLE 3

WEST VIRGINIA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2007, BY USE[1]

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Macadam	W	W
Riprap and jetty stone	144	876
Filter stone	W	W
Other coarse aggregate	117	964
Coarse aggregate, graded:		
Concrete aggregate, coarse	W	W
Bituminous aggregate, coarse	W	W
Bituminous surface-treatment aggregate	W	W
Railroad ballast	W	W
Other graded coarse aggregate	195	2,080
Fine aggregate (-⅜ inch):		
Stone sand, concrete	W	W
Stone sand, bituminous mix or seal	W	W
Screening, undesignated	W	W
Other fine aggregate	76	639
Coarse and fine aggregate:		
Graded road base or subbase	740	3,650
Unpaved road surfacing	W	W
Crusher run or fill or waste	416	2,480
Other coarse and fine aggregates	788	7,070
Other construction materials	4	12
Agricultural, limestone	W	W
Special, mine dusting or acid water treatment	W	W
Unspecified:[2]		
Reported	9,470	111,000
Estimated	2,500	20,000
Total	15,900	157,000

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

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

[2]Reported and estimated production without a breakdown by end use.

TABLE 4
WEST VIRGINIA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2007, BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1½ inch)[2]	W	W	W	W	W	W
Coarse aggregate, graded[3]	62	459	W	W	W	W
Fine aggregate (-⅜ inch)[4]	W	W	W	W	W	W
Coarse and fine aggregate[5]	W	W	W	W	W	W
Other construction materials	--	--	--	--	4	12
Agricultural[6]	W	W	W	W	W	W
Special[7]	W	W	W	W	--	--
Unspecified:[8]						
Reported	3,740	32,900	5,130	71,600	603	6,120
Estimated	166	1,300	1,100	9,000	1,200	9,500
Total	4,650	39,400	7,540	92,000	3,740	25,900

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

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

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

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

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

[5]Includes crusher run or fill or waste, graded road base or subbase, unpaved road surfacing, and other coarse and fine aggregates.

[6]Includes agricultural limestone.

[7]Includes mine dusting or acid water treatment.

[8]Reported and estimated production without a breakdown by end use.

TABLE 5
WEST VIRGINIA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2007,
BY MAJOR USE CATEGORY[1, 2]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregates and concrete products[3]	479	$4,170	$8.71
Fill	52	270	5.19
Unspecified:[4]			
Reported	3	27	9.00
Estimated	100	1,200	8.13
Total or average	675	5,620	8.32

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

[2]To avoid disclosing company proprietary data, no district tables were produced for 2007.

[3]Includes filtration.

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