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The Nanotechnology Consumer Products Inventory

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Introduction

After more than twenty years of basic and applied research, nanotechnologies are gaining in commercial use. Nanoscale materials now are in electronic, cosmetics, automotive and medical products. But it has been difficult to find out how many "nano" consumer products are on the market and which merchandise could be called "nano."

This is the first publicly available on-line inventory of nanotechnology-based consumer products. The inventory is an essential resource for consumers, citizens, policymakers, and others who are interested in learning about how nanotechnology is entering the marketplace. It is meant to be international and expanding. Additions to the inventory will be made periodically, as new information is received.[1]

While not comprehensive, this inventory gives the public the best available look at the 200+ nanotechnology-based consumer products currently on the market. Prior to this inventory, the figure most often cited by the U.S. government was that approximately 80 consumer products using nanotechnology or containing nanomaterials were being sold.

Methodology

Beginning in 2005, the Project began compiling products and materials using or containing nanotechnology from around the globe for inclusion in the consumer inventory. Entry to the list is based primarily on online, English language information provided by the product manufacturers. It does not include nanotechnology consumer products which companies have not identified as such. Any statements, claims and views expressed by a manufacturer or third-party contained in this inventory are solely those of the party making the statement or claim.

The information contained within the inventory is solely based on information that can be readily found on the internet; non-internet based sources have not been used. By taking this approach, all entries can be validated by anyone with internet access.

Products have been identified for inclusion in the inventory following systematic web-based searches. These have ranged from exploratory searches, through searches on specific categories of goods, to following up leads from multiple sources (including media articles). Information from relevant listservs and Really Simple Syndication (RSS) feeds was also used.

Products in this inventory satisfy three criteria:

- They can be readily purchased by consumers, and
- They are identified as nano-based by the manufacturer OR another source, and
- The nano-based claims for the product appear reasonable.

In every instance, we have tried to identify specific products from specific producers. However, since nanotechnology has broad applications in a variety of fields, we have included a number of "generic" products that you can find in many places on the market such as computer processor chips (identified in the inventory by the **Generic** icon). In

[1] Users are encouraged to submit new and updated information to nano@wilsoncenter.org.

some cases, companies offer several similar nanotechnology-based products and product lines. To reduce redundancy, we have just included a few samples in this inventory and hope that they will provide an initial baseline for understanding how nanotechnology is being commercialized.

We have made no attempt to verify manufacturer claims about the use of nanotechnology in any products, nor have we conducted any independent testing of the products.

This is a dynamic inventory, and will be updated on a regular basis.

Summary

As of March 8, 2006, the nanotechnology consumer products inventory contained 212 products or product lines. For each entry, information is provided on:

- Product name
- Company, manufacturer or supplier
- Country of origin
- Category and subcategory
- Product picture
- Product description
- Hyperlink to product web page
- Date of update

Products are grouped according to eight main categories (Figure 1) that are loosely based on publicly available consumer product classification systems. These include:

- **Appliances** (Heating, cooling and air; large kitchen appliances; laundry and clothing care)
- **Automotive** (Exterior; maintenance and accessories)
- **Goods for Children** (Basics; toys and games)
- **Electronics and Computers** (Audio; cameras and film; computer hardware; display; mobile devices and communications; television; video)
- **Food and Beverage** (Cooking; food; storage; supplements)
- **Health and Fitness** (Clothing; cosmetics; filtration; personal care; sporting goods; sunscreen)
- **Home and Garden** (leaning; construction materials; home furnishings; luxury; paint)
- **Cross-Cutting** (Coatings)

As new products are entered, new categories and sub-categories will be added as needed.

Products by Category

The total number of products in the inventory is 212. Products with relevance to more than one category have been accounted for multiple times in Figure 1. The largest main category is *Health and Fitness*, with a total of 125 products. This includes products like cosmetics and sunscreens. Associated with each category are a number of appropriate sub-categories that allow for further organization of the products. For example, *Paint* is a sub-category under *Home and Garden*, while *Display* is a sub-category under *Electronics and Computers*. The *Cross-Cutting* category was included as a grouping of products that are multi-functional. Currently, the only sub-category under *Cross-Cutting* is *Coatings*.

In addition, 45 products have a *"generic"* designation, indicating that they are commercial technologies that will be used in, or are currently appearing in, a range of consumer products.

Figure 2 illustrates the sub-categories associated with the largest main category, *Health and Fitness*. It includes *Clothing* (34 products), *Sporting Goods* (33), *Cosmetics* (31), *Personal Care* (23), *Sunscreen* (8), and *Filtration* (6). Again, products with relevance to multiple categories have been accounted for multiple times. The *Clothing* sub-category is the largest in the inventory.

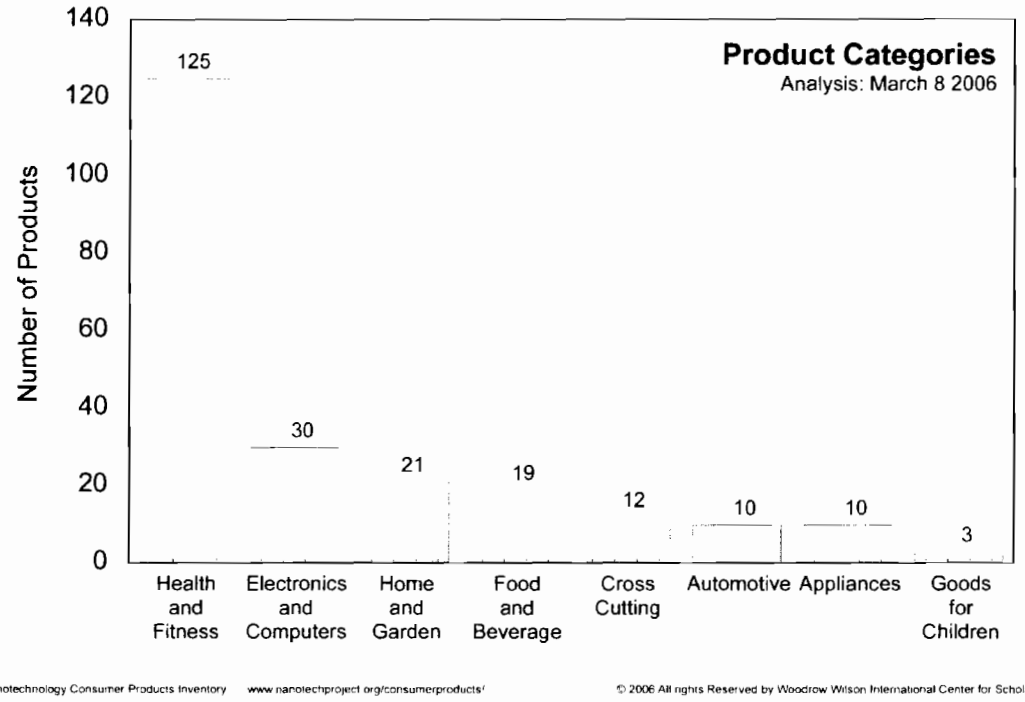


Figure 1. Number of products, according to category. Because some products are grouped into multiple categories, the total number of products in this chart exceeds 212.

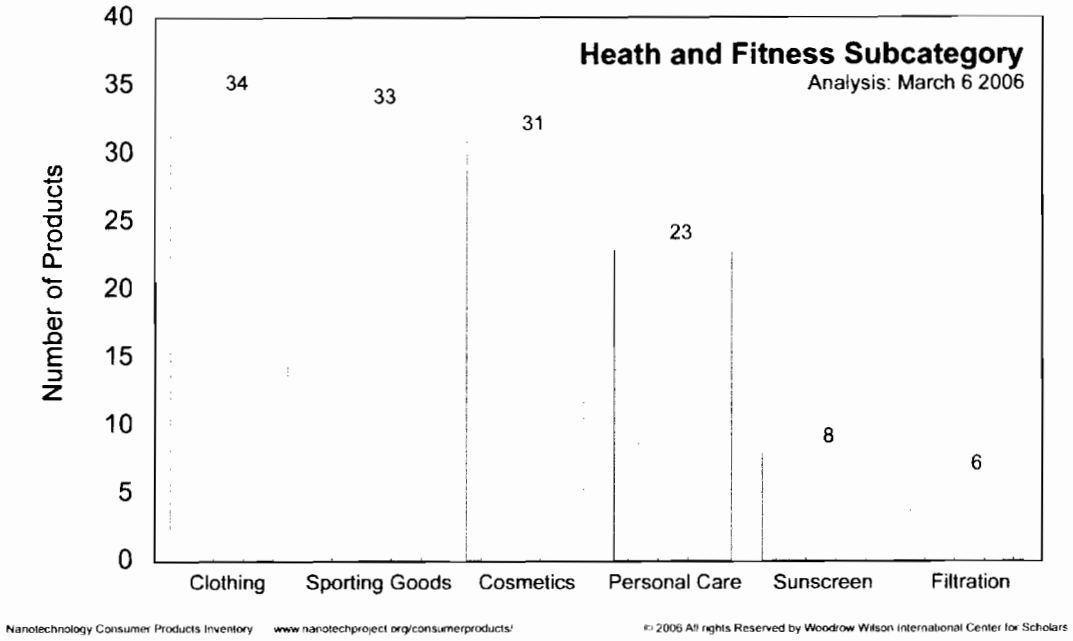
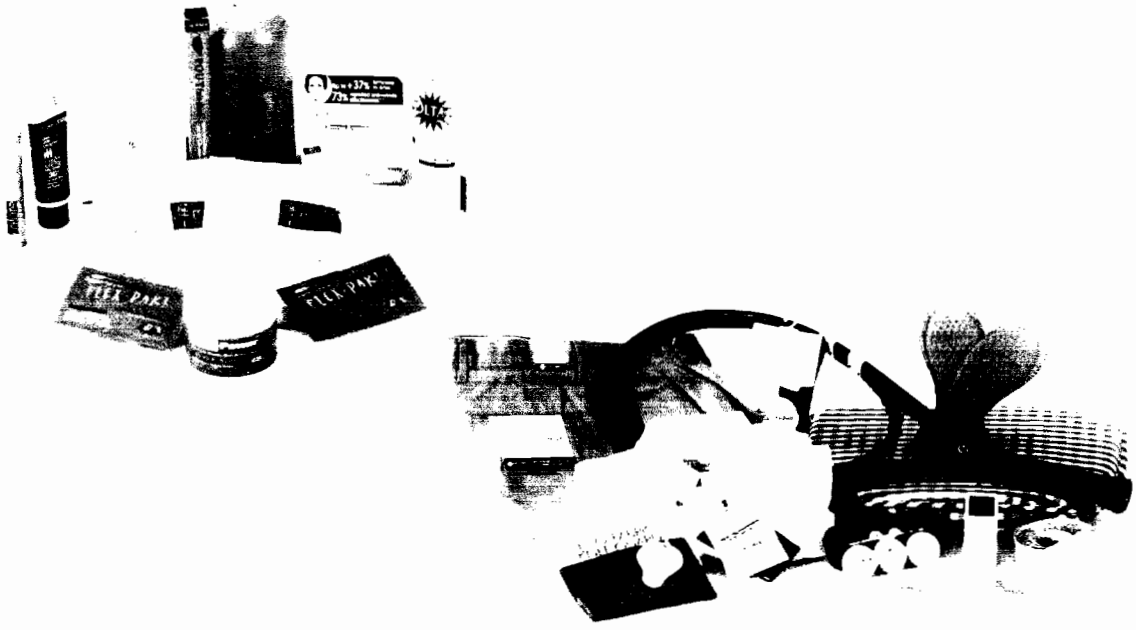


Figure 2. Number of products per sub-category within the category *Health and Fitness*



Regions of Origin

The inventory includes products from 15 different countries, including the United States, Korea, Japan, United Kingdom, Germany, France, China, Taiwan, Australia, Israel, Finland, Mexico, Switzerland, New Zealand and Sweden. Figure 3 illustrates the breakdown of products by region and indicates that companies based in the United States have the most products, with a total of 126, followed by companies in Asia (42), Europe (35), and elsewhere around the world (7). Two products have not been included in this figure because they are headquartered in multiple countries.

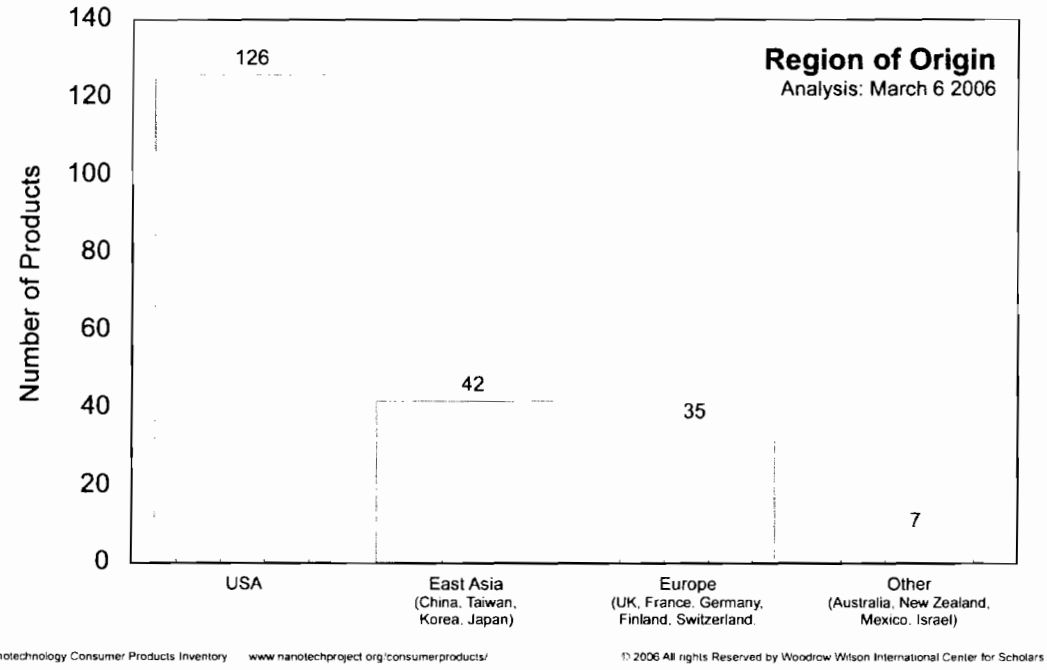


Figure 3. Number of products per region.

Major Types of Engineered Nanomaterials Used

As Figure 4 indicates, there is a small set of materials explicitly referenced in nanotechnology consumer products. The most common material mentioned in the product descriptions is carbon (29 products), which includes fullerenes and nanotubes. Silver is the second most referenced (25 products), followed by silica (14), titanium dioxide (8), zinc oxide (8), and cerium oxide (1). By our estimate, there are also a total of 15 products in the inventory, including food and dietary supplements, that are ingested into the body and a total of 56 products, including cosmetics, sunscreens, and select personal care products, that are applied directly on the skin.

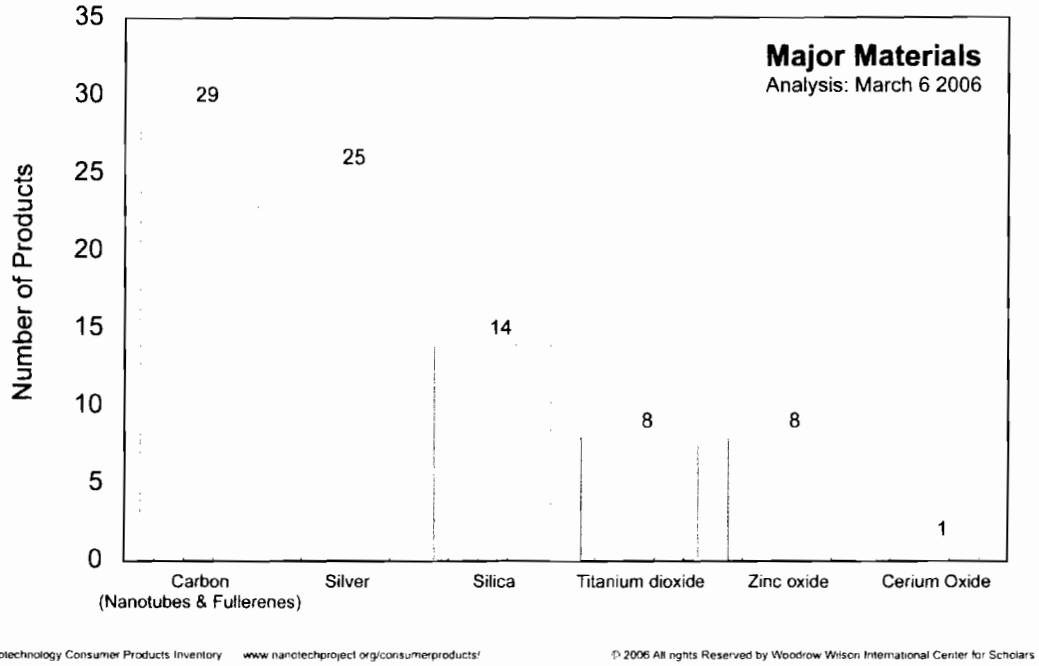
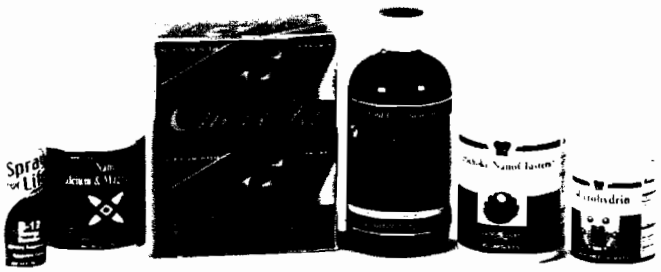


Figure 4. Numbers of products associated with specific materials.



Using the Inventory

Browse

All products in the inventory can be viewed by selecting "Browse". Ten products at a time are shown: use Next Page and Previous Page to move forward and backward through the inventory.

Simple Search

To carry out a simple search, enter a word or words in the search box, and select Search. All products are returned that contain the entered words as part of the product name, product description, category, sub-category, company name or country of origin.

Advanced Search

To carry out a more advanced search, select Advanced Search. This takes you to a page which allows you to search for specific key words within different fields (product name, category, sub-category, product description, company name or country of origin).

Further Information

Clicking on the product name in any list of products will take you to a summary page displaying more detailed information. Once on this page, clicking again on the product name will take you to the manufacturer's web site.

Home

Clicking on the inventory title or "home" link at any point will return to the inventory home page.

"Generic" Generic

These items aren't typically available directly as consumer products, but may be found in many different products.

Nanotechnology 101

Nanotechnology is the art and science of manipulating matter at the nanoscale (down to 1/100,000 the width of a human hair) to create new and unique materials and products. The opportunities to do things differently with nanotechnology have enormous potential to change society. An estimated global research and development investment of nearly $9 billion per year is anticipated to lead to new medical treatments and tools; more efficient energy production, storage and transmission; better access to clean water; more effective pollution reduction and prevention; and stronger, lighter materials. And these are just a few of the more significant ways in which people are discussing using the technology.

For more information on nanotechnology, check out the following websites:

Myths and realities of nanotech (BBC):
http://news.bbc.co.uk/1/hi/sci/tech/3920685.stm

Guide to Nanotech Future (BBC):
http://news.bbc.co.uk/1/shared/spl/hi/pop_ups/05/sci_nat_nanotechnology___building_the_future_from_the_bottom_up/html/1.stm

Big Picture on nanoscience (Wellcome Trust):
http://www.wellcome.ac.uk/node5954.html

Nanotechnology: Small science, big deal (Science Museum):
www.sciencemuseum.org.uk/antenna/nano/

Woodrow Wilson Center Project on Emerging Nanotechnologies:
www.nanotechproject.org

U.S. Nanotechnology Initiative:
www.nano.gov

Nanomaterials

Nanomaterials
Nanotechnology
Protein Encapsulation
Ultra Fine Materials
Due Diligence
Patents for License
Useful Links
Contact MPS
MPS Home Page

Integration into [illegible]
Formulations

- Application
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- SBIR and [illegible]
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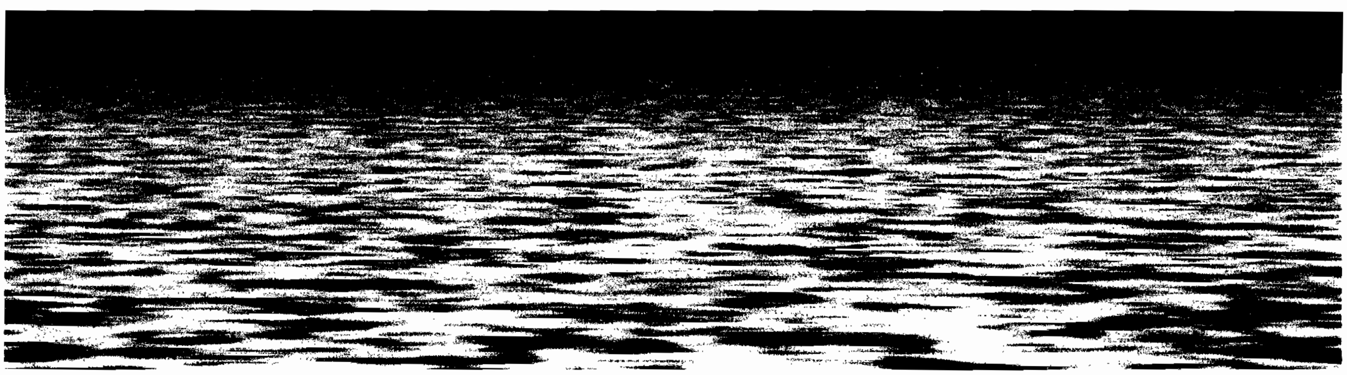
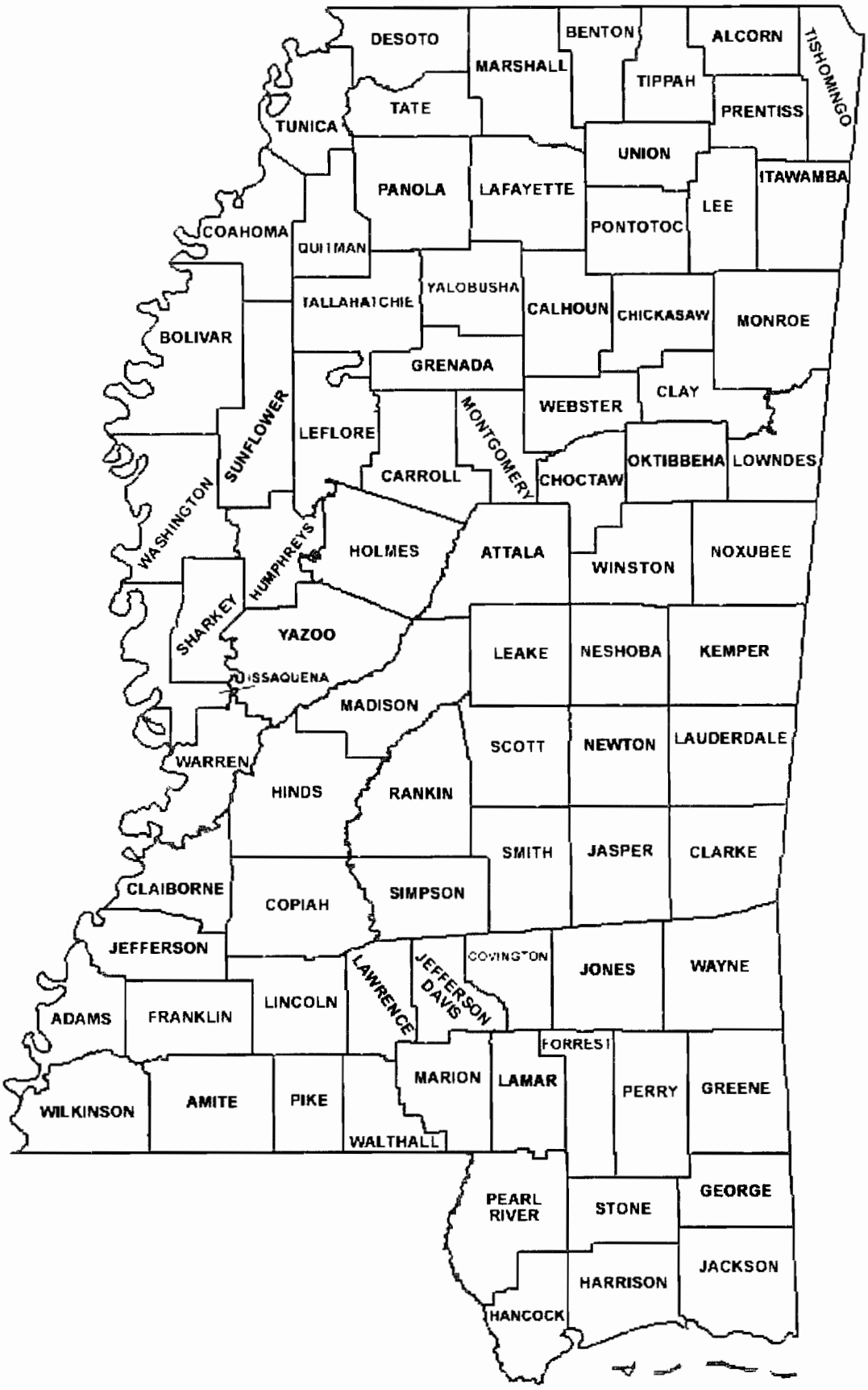
  [illegible] reports

MicroPowder Solutions, LLC [illegible] Missoula, MT
59802
(406) [illegible]





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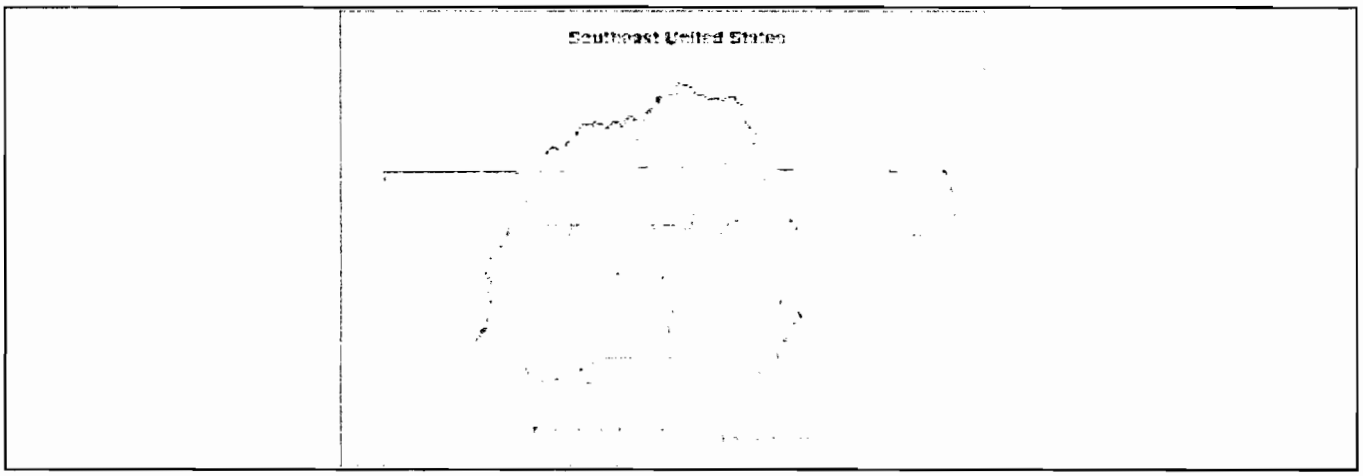

Tishomingo County is located in the northeast corner of Mississippi adjacent to Alabama on the east and Tennessee on the north. The county is located approximately 90 minutes (driving time) east of Memphis, Tennessee, 60 minutes west of Huntsville, Alabama, 30 minutes west of Florence-Muscle Shoals-Sheffield, Alabama, 60 minutes northeast of Tupelo, Mississippi, and 60 minutes southeast of Jackson, Tennessee. Tishomingo County is located at the juncture of water, rail, and highway transportation which makes the locality one of the best manufacturing and distribution sites in the Southeastern United States.

The labor force commuting area consists of an eight county area in Mississippi, Alabama, and Tennessee with a population over 300,000 and a civilian labor force of 143,000. Manufacturing employment in the region is 36,579

The county has a five member board of supervisors while the municipalities in the county have a mayor/alderman system of government. The county contains six municipalities. Belmont and Golden have a trade area population of 18,514; Burnsville has a trade area population of 9,120; Iuka has a trade area population of 27,634; and Tishomingo and Paden have a trade area population of 4,260. The county, all six municipalities, a port authority, the local electric power association, and the private sector coordinate and cooperate on economic development projects via the Tishomingo County Development Foundation, a non-profit local economic and community development organization.

Job Classification	Average Hourly Wage Rate
Assembler	$11.82
Blow mold machine operator	$ 9.70
Chemical operators	$16.04
Clerical worker	$12.53
Clerk, production	$11.97
Clerk, purchasing	$13.00
Clerk, stockroom	$14.86
CNC Technician	$12.59
Crane operator	$12.08
Cushion builders	$10.10
Cushion finishers	$ 9.44
Customer service	$10.76
Cutter/saw operator	$10.85
Drafter	$10.16
Drill operator	$10.26
Electrician	$19.92
Engineer	$17.36
Extruder operator	$16.70
Finisher	$10.06
Fork lift operator	$11.66
Frame builders	$ 8.78
Grinder operator	$13.75
Heavy equipment operator	$10.98
Injection mold operator	$ 8.78
Inspector	$13.63
Janitor	$10.32
Kiln operator	$11.75
Lab technician	$15.72
Lead/foreperson	$14.87
Lumber handlers	$ 8.27
Machine operator A (metal)	$11.71
Machine operator B (metal)	$15.99
Machine operator C (metal)	$13.40
Machine setup	$13.05
Machinist	$15.42
Maintenance worker	$15.59
Mechanic	$18.93
Mill operator	$15.95
Millwright	$16.80
Painter	$13.73
Quality control	$15.58

Screw machine operator	$14.47
Semiskilled worker (NOC)	$ 9.60
Sheet metal worker	$ 8.45
Ship/load/materials worker	$11.40
Skilled worker (NOC)	$11.07
Supervisor	$11.86
Tool & die maker	$16.62
Trucker	$15.23
Upholsterer	$12.36
Warehouse/storekeeper	$12.81
Welder, production	$12.00
Woodworking	$ 8.56

Source: North Mississippi Industrial Development Association Wage Survey, 2004, Alcorn, Itawamba, Prentiss, Tippah, and Tishomingo Counties

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The TENNESSEE-TOMBIGBEE WATERWAY

TTW DEVELOPMENT AUTHORITY
AREA ECON DEV AGENCIES
TTW DEVELOPMENT COUNCIL

CLICK ON MAPS FOR LARGER IMAGES

Map of Locks and Dams

America's New Transportation Artery

US Army Corps of Engineers Map of the Tenn-Tom Waterway
(also available as part of the *Touring the Tenn-Tom Waterway* Brochure
-click here to access request form)

Tracy W. Lusk
Consulting Geological Engineer
Oxford, Mississippi

August 9, 1984

Mr. Edward E. Miller
700 Hillsboro Road
Franklin, Tennessee 37064

Dear Mr. Miller:

In 1970, I conducted an exploration program in Tishomingo County, Mississippi, for limestone for use as aggregate in concrete and asphalt. This study consisted of the usual procedures involved in an economic mineral appraisal - study of area outcrops, type of exposed material, topographic conditions and core drilling. It was also known to have been explored previously by the recipient of this letter.

The core drilling in 1970 consisted of coring five (5) holes. The spacing and location of each hole was critically considered in order to best cover the acreage. These holes ranged in depth from 75 feet to 230 feet. Each hole was continuously cored and all were in limestone at total depth. The core from the 230-foot hole was tested by Pittsburg Testing Laboratory, Nashville, Tennessee. The tests were based on the specifications of the Mississippi State Highway Department, which meets the standards of the Bureau of Public Roads. The test results were well within the specification limits.

Chemical analyses were also run on the cores to determine the calcium content for use as agricultural lime, another viable product. These tests were conducted by Pittsburg Testing and the Mississippi State Chemical Laboratory. The calcium content proved to be very good.

In 1971, Medusa Cement Company drilled and cored thirty-three (33) additional holes on the limestone deposit which included several properties not previously explored by me. One of these holes was cored to a depth of 301.8 feet and was still in limestone at total depth. This drilling provided factual information that proved a much larger acreage should be included in the deposit estimate.

The additional drill and core hole information expanded the proven acreage to a minimum of 216 acres. I consider this acreage to be very conservative. The deposit could well cover in excess of 300 acres. Also, the deeper coring (301.8 feet) proves a greater thickness. However, to stay on the conservative side the following estimates are based on 216 acres and a thickness of 250 feet.

Summation of Reserves

Reid property	44,700,000 tons
Gant property	43,000,000 tons
Hiawassee property	29,000,000 tons
Sanders property	69,000,000 tons
Total	185,700,000 tons

Should the additional acreage (300+ acres) be proven, a reasonable assumption, the in-place limestone would be in excess of 250,000,000 tons. At $0.05 per ton royalty the ultimate value is $12,500,000 and your two thirds (2/3) interest amounts to $8,333,333.

In January 1941, the Mellen & Gear No. 1 E.K.Wood well for oil and gas (D & A) was drilled in the southeast corner of Section 21, Township 4 South, Range 11 East, Tishomingo County, Mississippi. The total depth of the well was 1845 ft. The top of the limestone was encountered at 70 ft. and continued in limestone to total depth, a thickness of 1775 ft. Such a thickness would extend the mining time by many years as the tonnage estimate would jump to more than 1 billion tons.

I sincerely hope this provides the information that you need. Should there be a need for further assistance, please let me know.

Respectfully submitted,

Tracy W. Lusk

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Tracy W. Lusk

Consulting Geological Engineer

106 Country Club Rd.

Oxford, Mississippi 38655

Phone
Office: 232-7320
Home: 234-2838

October 8, 1990

Mr. Edward E. Miller
700 Hillsboro Road
Franklin, Tennessee 37064

Dear Mr. Miller:

A brief review of previous studies conducted for limestone in Tishomingo County, Mississippi, is in order to better evaluate contiguous properties. In 1970, I conducted an exploration program in the southeast corner of Section 21 and the southwest corner of Section 22, T.4S., R.11E. The program was designed to evaluate the economic feasibility of utilizing the limestone as an aggregate in concrete and asphalt. The most significant phase of the program was the core drilling, which consisted of coring five (5) holes. The holes were located to best cover the acreage and ranged in depth from 75 feet to 230 feet. Each hole was tested by Pittsburg Testing Laboratory, Nashville, Tennessee. The tests were based on specifications of the Mississippi State Highway Department, which meets the standards of the U. S. Bureau of Public Roads. The tests proved to be within the specification limits.

In 1971, Medusa Cement Company drilled and cored thirty-three (33) additional holes on the previously cored property as well as adjacent lands. One of their holes was cored to a depth of 301.8 feet and was still in limestone at total depth. This drilling proved a much larger acreage (216 acres). A conservative estimate of the proven reserves was 185,700,000 tons.

These exploration studies soon led to mining the limestone which has continued.

In 1978, eighty-nine (89) holes were drilled on the 214 acres in Sections 15, 16, 24, T.4S., R.11E., Tishomingo County, Mississippi, in which you own the mineral rights. These holes proved the 214 acres to be underlain with limestone. Using the same conservative thickness of 250 feet, the in-place limestone is estimated to be 183,980,000 tons.

Also, the overburden consists of sand and gravel. Tests have indicated the sand to be suitable for use as fine aggregate in concrete and asphalt, a much needed product in this area. I have personally searched for a quality sand in Tishomingo County with little success.

Of considerable importance is the fact that this property fronts on the main road. This definitely enhances the value as transportation is a major cost in a bulk commodity.

Inasmuch as your mineral deed is subject to only a $0.05 per ton royalty, your value in the deposit is a sizable sum. At a very conservative net royalty of $0.15 the value is in excess of $29,500,000. However, I would expect the net royalty to be more on todays market.

A well for oil and gas was drilled in 1941, in Section 21, T.4S, 11E. This well encountered 1775 feet of limestone and was in limestone at total depth. With this being the only aggregate grade limestone deposit in the state of Mississippi, its value is still further enhanced.

Hopefully this provides you the needed information. If I can be of further assistance, please let me know.

Respectfully submitted,

Tracy W. Lusk
Consulting Geological Engineer

TWL/11

Enclosure

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Research Associate

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(601) 232-~~7232~~ 7320 Telex: 534577

THE MINERAL INDUSTRY OF MISSISSIPPI

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Mississippi Department of Environmental Quality, Office of Geology, for collecting information on all nonfuel minerals.

In 1999, the preliminary estimated value[1] of nonfuel mineral production for Mississippi was $168 million, according to the U.S. Geological Survey (USGS). This was about a 6% increase from that of 1998,[2] following a 9.1% decrease in 1998 from 1997.

Construction sand and gravel was Mississippi's leading nonfuel mineral, accounting for about 41% of the State's value in 1999. It was followed by portland cement, fuller's earth, and industrial sand and gravel. Most of the State's rise in value in 1999 resulted from a $5 million increase in construction sand and gravel, further supported by smaller yet significant increases in crushed stone, portland cement, and ball clay (listings are in descending order of increase). Small decreases occurred in bentonite and common clay, while gemstones was unchanged (table 1). In 1998, a $30.1 million decrease in the value of crushed stone was countered somewhat by increases in portland cement and construction sand and gravel.

Based upon USGS estimates of the quantities of minerals produced in the 50 States during 1999, Mississippi remained second in fuller's earth and fourth in ball clay and bentonite. Additionally, the State was a significant producer of construction sand and gravel and common clays. Metals produced in Mississippi, especially raw steel, were processed from materials received from other domestic and foreign sources.

The following narrative information was provided by the Mississippi Department of Environmental Quality's (DEQ) Office of Geology[3] (MOG). Calendar year 1999 was the end of an era for the mining company, Vulcan Materials Co., when its impressive 60-meter-deep (200 feet) aggregate quarry in Tishomingo County was put up for final bond release. The company had been mining in the same Mississippian age limestone quarry since before the Mississippi Surface Mining and Reclamation Act of 1977. Vulcan's established presence in Mississippi can be seen throughout the State in the riprap used in road and bridge building projects and in U.S. Army Corps of Engineers projects.

The Commission on Environmental Quality approved Unimin Corp. for a Class I surface mining permit to expand its clay mine an additional 68 hectares (ha). Unimin holds multiple Class I surface mining permits dating back to 1978 and totaling more than 260 ha. Unimin's large bentonite clay mine is in Monroe County near the town of Aberdeen.

Efforts to amend Mississippi's 1977 Surface Mining and Reclamation Act, the State's noncoal surface mining law, passed in the State Senate but failed in the State House of Representatives. (Similar legislation also failed to pass in the 1997 and the 1998 legislative sessions.) The MOG, the Mississippi Mining Coalition, and the Mississippi Asphalt Paving Association led the efforts to tighten up the 1977 law. According to the MOG, the new bill would have updated the current law for the benefit of the State as well as industry, which assisted in drafting it.

The new law would have reduced the current 60% after-the-fact permit rate by changing a present provision that allows an operator a 10-day grace period to file for a permit, without penalty, after being found by the State to be mining without a valid permit. The current statutes put the onus on government enforcement agencies to "chase after" violators of the law rather than on the operators to abide by mine permitting regulations from the beginning. Also, the current statutes provide for a "temporary permit" to be issued automatically as soon as an application for surface mining is deemed administratively complete. Consequently, the Mississippi Commission on Environmental Quality (CEQ) could issue a permit (in order to guarantee the reclamation of the mine) to an operator who may have already adversely affected an environmentally or culturally sensitive site. Currently, the CEQ both (1) issues the permits for surface mines and (2) enforces laws governing activities at the same mines. According to the MOG, the new law was intended to tighten the permit process, as well as to divide the regulatory authority between the Environmental Quality Permit Board and the CEQ, as it is with all other statutes pertaining to the Mississippi DEQ. Additionally, the legislation would have eliminated the 4-acre (1.6-ha) surface mine permit exemption rule and modified the permit classification system that thoroughly describes how a permit is issued but not how a mine is operated or reclaimed.

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[1]The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon 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 1999 USGS mineral production data published in this chapter are preliminary estimates as of May 2000 and are expected to change. For some mineral commodities, such as, 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. A telephone listing for the specialists may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals/contacts/comdir.html, by using MINES FaxBack at (703) 648-4999 from a fax machine with a touch-tone handset (request Document #1000 for a telephone listing of all mineral commodity specialists), or by calling USGS information at (703) 648-4000 for the specialist's name and number. All Mineral Industry Surveys–mineral commodity, State, and country–also may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals; facsimile copies may be obtained from MINES FaxBack.

[2]Values, percentage calculations, and rankings for 1998 may vary from the Minerals Yearbook, Area Reports: Domestic 1998, Volume II, owing to the revision of preliminary 1998 to final 1998 data. Data for 1999 are preliminary and are expected to change; related rankings may also be subject to change.

[3]James E. Starnes, Geologist with the Mississippi Department of Environmental Quality's Office of Geology, provided the Mississippi minerals industry information.

TABLE 4
MISSISSIPPI: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1998,
BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate 2/	2,390	$12,200	$5.09
Concrete products (blocks, bricks, pipe, decorative, etc.)	94	570	6.06
Asphaltic concrete aggregates and other bituminous mixtures	2,000	10,700	5.33
Road base and coverings	1,110	5,140	4.62
Fill	251	412	1.64
Unspecified: 3/			
Actual	3,510	18,100	5.14
Estimated	3,990	17,400	4.37
Total or average	13,300	64,400	4.83

1/ Data are rounded to no more than three significant digits, may not add to totals shown.
2/ Includes plaster and gunite sand.
3/ Reported and estimated production without a breakdown by end use.

TABLE 5
MISSISSIPPI: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1998, BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3		Unspecified districts 2/	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate 3/	W	W	1,320	5,890	W	W	154	913
Asphaltic concrete aggregates and other bituminous mixtures	872	4,670	1,070	5,810	--	--	61	190
Road base and covering	W	W	570	2,700	W	W	50	185
Fill	60	70	48	152	115	159	28	32
Unspecified: 4/								
Actual	2,490	11,600	714	5,030	313	1,440	--	--
Estimated	777	3,710	2,030	8,130	1,180	5,570	--	--
Total	5,610	27,900	5,750	27,700	1,700	7,510	294	1,320

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 production within the State with no district reported.
3/ Includes concrete products and plaster and gunite sand.
4/ Reported and estimated production without a breakdown by end use.

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

(Thousand metric tons and thousand dollars)

Mineral	1997		1998		1999 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays:						
Common	503	3,460	502	3,410	507	3,320
Fuller's earth	388	28,100	372 r/	30,400 r/	371	30,200
Gemstones	NA	1	NA	1	NA	1
Sand and gravel: Construction	13,000	59,600	13,300	64,400	14,100	69,400
Stone: Crushed 3/	5,180	32,900	789	2,790	800	5,740
Combined values of cement (portland), clays (ball, bentonite), sand and gravel (industrial), stone (crushed marl)	XX	51,300	XX	58,400 r/	XX	59,100
Total	XX	175,000	XX	159,000 r/	XX	168,000

p/ Preliminary. r/ Revised. NA Not available. 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.
3/ Excludes certain stones; kind and value included with "Combined values" data.

TABLE 2
MISSISSIPPI: CRUSHED STONE SOLD OR USED, BY KIND 1/

Kind	1997				1998			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	12	5,180	$32,900	$6.36	3	789	$2,790	$3.54
Calcareous marl	1	W	W	W	2	W	W	W
Total or average	XX	5,180	32,900	6.36	XX	789	2,790	3.54

W Withheld to avoid disclosing company proprietary data. XX Not applicable.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 3
MISSISSIPPI: CRUSHED STONE SOLD OR USED BY PRODUCERS
IN 1998, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Agricultural: Agricultural limestone	W	W	W
Chemical and metallurgical: Cement manufacture	W	W	W
Unspecified 3/	W	W	W
Total or average	789	2,790	3.54

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/ Includes limestone; excludes calcareous marl to avoid disclosing company proprietary data.
3/ Estimated production without a breakdown by end use.