



MINERAL INDUSTRY SURVEYS



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Explosives, Annual

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APPARENT CONSUMPTION OF INDUSTRIAL EXPLOSIVES AND BLASTING AGENTS IN THE UNITED STATES, 1987

Apparent consumption of explosives and blasting agents in the United States during 1987 approximated 4.5 billion pounds, representing an annual growth of 15%, according to the Bureau of Mines, U.S. Department of the Interior. Apparent consumption is determined from reported manufacturer sales.

Unprocessed ammonium nitrate consumption improved by a significant 19% during the year and accounted for 91% of the increase in total explosives use. Liquids, and other high explosives increased by 15% and 9% respectively. Permissibles declined 4% compared to 1986.

All principal consuming industries except quarrying and nonmetal mining and all other purposes used larger quantities of explosives and blasting agents in 1987 than in 1986. About 72% of the total was utilized in the mining of coal. Nearly all permissibles and 77% of ammonium nitrate-fuel oil blasting agents and unprocessed ammonium nitrate were consumed in coal mining. Other high explosives were used primarily in quarrying and nonmetal mining (43%) and construction (30%). The major uses of water gels and slurries were in coal mining (41%) and quarrying and nonmetal mining (33%).

Seven States were collectively responsible for 55% of all explosives and blasting agents consumed in the United States in 1987. These were, in decreasing order of consumption: Kentucky, Pennsylvania, Ohio, West Virginia, Wyoming, Georgia, and Alabama.

Prepared in the Branch of Industrial Minerals, August 3, 1988.

Classification of Industrial Explosives and Blasting Agents

"Apparent consumption" of explosives and blasting agents, as used in this report, means sales reported to the Institute of Makers of Explosives (IME) by IME members and provided to the Bureau of Mines on a proprietary basis, plus sales by nonmember manufacturers reported directly to the Bureau on Form 6-1439-A. Classification of explosives and blasting agents by type and use appears as reported by the manufacturers. Sales of explosives and blasting agents imported by nonmanufacturers are not included, but may be locally important. Some quantities are published in such a way to avoid disclosing company proprietary data.

The principal distinction between explosives and blasting agents is related to their sensitivity to initiation. Explosives are cap-sensitive but blasting agents are not, and therefore require a primer. Only "high" explosives are currently reported. "Low" explosives, which burn very rapidly but do not detonate, include principally black powder and propellants. Black powder has not been reported in industrial use since 1971. Both explosives and blasting agents vary widely in composition, although most blasting agents are essentially mixtures of ammonium nitrate plus a fuel.

Water gels and slurries may be either explosives or blasting agents, but for convenience are classified in a separate category.

The five product classifications used in this report are the same as those adopted by IME. These are as follows:

1. Permissibles.--Grades of high explosives approved by brand name by the Mine Safety and Health Administration or the U.S. Bureau of Mines for use, in a prescribed manner, in underground coal mines, including water gels and slurries.

2. Other High Explosives.--All high explosives except

(a) permissibles and

(b) any water gels or slurries that would otherwise be classified as high explosives.

Included in the "Other High Explosives" classification are all formulations packaged in metal containers.

3. Packaged and Bulk Water Gels, Slurries, and Emulsions.--All water gels, slurries, and emulsions, packaged or in bulk, made by addition of more than 5% water to high explosives or blasting agents, except those approved as permissibles.

4. Ammonium Nitrate-Fuel Oil Blasting Agents.--Without regard to packaging or container, and having a density less than 1.0 gram per cubic centimeter (cc).

5. Unprocessed Ammonium Nitrate.--Prilled or grained ammonium nitrate for use in blasting agents.

Companies covered by this report, including IME members, are as follows:

- * American Cyanamid Company--New Castle, Pennsylvania
- Apache Powder Company--Benson, Arizona
- Atlas Powder Company--Dallas, Texas
- Austin Powder Company--Cleveland, Ohio
- C-I-L Inc.--Willowdale, Ontario, Canada
- * Columbia Nitrogen Corp.--Augusta, Georgia/Garden City, Georgia 1/
- E. I. du Pont de Nemours & Co., Inc.--Wilmington, Delaware
- * El Dorado Chemical Co.--St. Louis, Missouri
- Ensign Bickford Company--Simsbury, Connecticut
- Goex Inc.--Cleburne, Texas
- * W.R. Grace & Co. ACG--Memphis, Tennessee
- * Hawkeye Chemical Company--Clinton, Iowa
- Independent Explosives Company of Pennsylvania--Scranton, Pennsylvania
- Ireco Incorporated--Salt Lake City, Utah
- Mining Services International--Salt Lake City, Utah
- Nitrochem Energy Corp.--Allentown, Pennsylvania
- Sierra Chemical Company--Reno, Nevada
- Southern Explosives Corporation--Glasgow, Kentucky
- * Thermex Energy Corporation--Dallas, Texas
- Trojan Corp.--Salt Lake City, Utah
- * UNOCAL Corporation--Los Angeles, California
- * La Roche Ind., Inc.--Atlanta, Georgia

* Indicates non IME members.

1/ Formerly, Kaichem International Corp.

TABLE 1.--Salient statistics of industrial explosives and blasting agents sold for consumption in the United States, 1986-87

(Thousand pounds)

| Class | 1986 | 1987 |
|--|-------------|-----------|
| Permissibles----- | 35,439 | 33,853 |
| Other high explosives----- | 131,789 | 143,247 |
| Water gels, slurries, and emulsions----- | 420,090 | 481,358 |
| Ammonium nitrate-fuel oil blasting agents----- | 648,438 | 629,915 |
| Unprocessed ammonium nitrate----- | r/2,687,080 | 3,209,884 |
| Total----- | r/3,922,836 | 4,498,257 |

r/Revised.

TABLE 2.--Industrial explosives and blasting agents sold for consumption in the United States, by class and use, 1986-87

(Thousand pounds)

| Class | Coal mining | | Metal mining | | Quarrying and nonmetal mining ^{1/} | | Construction work | | All other purposes ^{2/} | | Total | |
|--|-------------|-----------|--------------|---------|---|---------|-------------------|---------|----------------------------------|---------|-------------|-----------|
| | 1986 | 1987 | 1986 | 1987 | 1986 | 1987 | 1986 | 1987 | 1986 | 1987 | 1986 | 1987 |
| Permissibles----- | 34,971 | 33,391 | 7 | -- | 155 | 248 | 245 | 214 | 61 | -- | 35,439 | 33,853 |
| Other high explosives----- | 18,004 | 23,171 | 7,027 | 9,013 | 63,249 | 62,250 | 37,403 | 43,355 | 6,106 | 5,458 | 131,789 | 143,247 |
| Water gels and slurries----- | 180,201 | 195,737 | 57,153 | 63,125 | 128,854 | 160,412 | 38,582 | 55,758 | 15,300 | 6,326 | 420,090 | 481,358 |
| Ammonium nitrate-fuel oil blasting agents----- | 416,914 | 399,728 | 32,670 | 29,269 | 117,785 | 134,337 | 53,821 | 63,860 | 27,248 | 2,721 | 648,438 | 629,915 |
| Unprocessed ammonium nitrate----- | r/1,916,247 | 2,568,735 | 222,987 | 238,876 | 275,177 | 125,664 | 128,600 | 145,725 | 144,069 | 130,884 | r/2,687,080 | 3,209,884 |
| Total----- | r/2,566,337 | 3,220,762 | 319,844 | 340,283 | 585,220 | 482,911 | 258,651 | 308,912 | 192,784 | 145,389 | r/3,922,836 | 4,498,257 |

r/Revised.

^{1/}Some quantities of this use for 1987 are included with "All other purposes" to avoid disclosing company proprietary data.

^{2/}Includes some quantities from quarrying and nonmetal mining for 1987.

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TABLE 3.--Industrial explosives and blasting agents sold for consumption in the United States, by State and use, 1987

(Thousand pounds)

| State | Use | | | | | Total |
|--|-------------|--------------|---|-------------------|----------------------------------|-----------|
| | Coal mining | Metal mining | Quarrying and nonmetal mining ^{1/} | Construction work | All other purposes ^{1/} | |
| Alabama----- | 190,363 | 137 | 14,113 | 2,962 | 139 | 207,714 |
| Alaska----- | 597 | -- | 77 | 7,400 | -- | 8,074 |
| Arizona----- | 41,565 | 93,953 | 3,168 | 610 | 384 | 139,680 |
| Arkansas----- | 686 | 211 | 6,387 | 6,476 | 335 | 14,095 |
| California----- | 17,990 | 2,370 | 15,800 | 14,420 | 52 | 50,632 |
| Colorado----- | 92,844 | 664 | 2,507 | 2,856 | 530 | 99,401 |
| Connecticut----- | 50 | 183 | 11,275 | 2,193 | -- | 13,701 |
| Delaware----- | -- | -- | -- | 11 | -- | 11 |
| District of Columbia ^{2/} ----- | -- | -- | -- | -- | -- | -- |
| Florida----- | -- | 50 | 29,428 | 10,421 | 710 | 40,609 |
| Georgia----- | 178,016 | -- | 33,321 | 1,099 | 10 | 212,446 |
| Hawaii----- | -- | -- | 453 | 23 | 271 | 747 |
| Idaho----- | 11,165 | 17,415 | 1,431 | 183 | 7 | 30,201 |
| Illinois----- | 91,714 | 376 | 19,662 | 4,651 | 1,525 | 117,928 |
| Indiana----- | 135,144 | 634 | 14,463 | 905 | -- | 151,146 |
| Iowa----- | 7,838 | -- | 11,952 | 3,014 | 5,224 | 28,028 |
| Kansas----- | 1,974 | -- | 12,338 | 853 | 47 | 15,212 |
| Kentucky----- | 741,915 | 8,869 | 21,915 | 58,535 | 10,399 | 841,633 |
| Louisiana----- | -- | -- | 1,308 | 97 | 289 | 1,694 |
| Maine----- | -- | -- | 633 | 2,897 | -- | 3,530 |
| Maryland----- | 1,399 | 22 | 4,564 | 1,071 | -- | 7,056 |
| Massachusetts----- | 41 | 90 | 13,595 | 5,899 | 790 | 20,415 |
| Michigan----- | 2,356 | 33,832 | 11,030 | 950 | 1,826 | 49,994 |
| Minnesota----- | 3,661 | 55,562 | 3,920 | 1,606 | 4,221 | 68,970 |
| Mississippi----- | -- | -- | 74 | 43 | 313 | 430 |
| Missouri----- | 49,039 | 1,052 | 33,908 | 30,745 | 258 | 115,002 |
| Montana----- | 80,933 | 29,624 | 1,858 | 315 | 416 | 113,146 |
| Nebraska----- | -- | -- | -- | 3,070 | 207 | 3,277 |
| Nevada----- | 43,871 | 36,634 | 2,336 | 1,410 | 54 | 84,305 |
| New Hampshire----- | -- | -- | 1,384 | 3,376 | -- | 4,760 |
| New Jersey----- | 130,433 | -- | 7,386 | 1,111 | 44 | 138,974 |
| New Mexico----- | 68,862 | 26,940 | 2,239 | 18,683 | 8,287 | 125,011 |
| New York----- | 2,472 | 169 | 11,836 | 4,503 | -- | 18,980 |
| North Carolina----- | 19,305 | 395 | 43,165 | 3,041 | -- | 65,906 |
| North Dakota----- | 169 | -- | -- | 1 | 23 | 193 |
| Ohio----- | 229,537 | 772 | 16,592 | 33,761 | 6,397 | 287,059 |
| Oklahoma----- | 13,559 | 2,042 | 17,660 | 8,271 | 211 | 41,743 |
| Oregon----- | 4,831 | -- | 488 | 6,348 | 1 | 11,668 |
| Pennsylvania----- | 322,980 | 342 | 31,434 | 5,132 | 9,303 | 369,191 |
| Rhode Island----- | -- | -- | 587 | 746 | -- | 1,333 |
| South Carolina----- | -- | -- | 1,799 | 352 | -- | 2,151 |
| South Dakota----- | 1,900 | 46 | 122 | 1,801 | 146 | 4,015 |
| Tennessee----- | 54,437 | 1,923 | 22,750 | 13,826 | 5 | 92,941 |
| Texas----- | 23,604 | 54 | 21,932 | 17,448 | 1,382 | 64,420 |
| Utah----- | 12,163 | 12,513 | 2,237 | 304 | 23 | 27,240 |
| Vermont----- | -- | -- | 527 | 344 | 1,012 | 1,883 |
| Virginia----- | 121,598 | 147 | 12,990 | 2,822 | 44 | 137,601 |
| Washington----- | 9,403 | 6,649 | 6,310 | 7,025 | 20 | 29,407 |
| West Virginia----- | 263,133 | 938 | 2,661 | 10,223 | 3,534 | 280,489 |
| Wisconsin----- | 1,909 | 81 | 3,740 | 2,482 | 2,754 | 10,966 |
| Wyoming----- | 247,306 | 5,594 | 3,556 | 2,597 | 1,069 | 260,122 |
| Undistributed----- | -- | -- | 3/ | -- | 83,127 | 83,127 |
| Total----- | 3,220,762 | 340,283 | 482,911 | 308,912 | 145,389 | 4,498,257 |

1/Some quantities of this use are included in "Undistributed" to avoid disclosing company proprietary data.

2/Included with Maryland.

3/Undistributed quantity for this use is included with undistributed "All other purposes."

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TABLE 4.--Industrial explosives and blasting agents sold for consumption in the United States, by State and class, 1987

(Thousand pounds)

| State | Class | | | | | Total |
|--|-----------------------|-----------------------|-------------------------------------|---|-------------------------------|-----------|
| | Fixed high explosives | | Water gels, slurries, and emulsions | Blasting Agents | | |
| | Permissibles | Other high explosives | | Ammonium nitrate-fuel oil blasting agents | Unprocessed ammonium nitrate/ | |
| Alabama----- | 976 | 1,875 | 10,746 | 7,058 | 187,059 | 207,714 |
| Alaska----- | -- | 5,901 | 1,203 | 970 | -- | 8,074 |
| Arizona----- | -- | 2,346 | 17,073 | 3,325 | 116,936 | 139,680 |
| Arkansas----- | 5 | 543 | 7,826 | 2,354 | 3,367 | 14,095 |
| California----- | 9 | 2,814 | 10,171 | 9,968 | 27,670 | 50,632 |
| Colorado----- | -- | 2,220 | 11,089 | 11,987 | 74,105 | 99,401 |
| Connecticut----- | -- | 3,714 | 3,378 | 4,905 | 1,704 | 13,701 |
| Delaware----- | 1 | 8 | -- | 2 | -- | 11 |
| District of Columbia ² /----- | -- | -- | -- | -- | -- | -- |
| Florida----- | -- | 2,147 | 34,985 | 2,447 | 1,030 | 40,609 |
| Georgia----- | -- | 2,861 | 13,104 | 7,055 | 189,426 | 212,446 |
| Hawaii----- | -- | 234 | 114 | 399 | -- | 747 |
| Idaho----- | -- | 1,054 | 521 | 356 | 28,270 | 30,201 |
| Illinois----- | 20 | 4,343 | 19,312 | 10,976 | 83,277 | 117,928 |
| Indiana----- | 11 | 2,961 | 34,139 | 42,157 | 71,878 | 151,146 |
| Iowa----- | 123 | 4,219 | 4,098 | 1,729 | 17,859 | 28,028 |
| Kansas----- | 4 | 1,633 | 1,929 | 10,468 | 1,178 | 15,212 |
| Kentucky----- | 19,204 | 8,850 | 58,809 | 204,344 | 550,426 | 841,633 |
| Louisiana----- | -- | 589 | 19 | 1,086 | -- | 1,694 |
| Maine----- | -- | 1,912 | 464 | 1,154 | -- | 3,530 |
| Maryland----- | 2 | 1,236 | 3,636 | 982 | 1,200 | 7,056 |
| Massachusetts----- | -- | 6,228 | 5,458 | 8,729 | -- | 20,415 |
| Michigan----- | 2 | 2,023 | 17,195 | 12,655 | 18,119 | 49,994 |
| Minnesota----- | -- | 686 | 15,795 | 10,985 | 41,504 | 68,970 |
| Mississippi----- | -- | 342 | 13 | 75 | -- | 430 |
| Missouri----- | 1,563 | 9,043 | 11,123 | 18,773 | 74,500 | 115,002 |
| Montana----- | 51 | 1,663 | 4,144 | 1,514 | 105,774 | 113,146 |
| Nebraska----- | -- | 252 | -- | 390 | 2,635 | 3,277 |
| Nevada----- | -- | 854 | 2,827 | 8,085 | 72,539 | 84,305 |
| New Hampshire----- | -- | 2,690 | 419 | 1,651 | -- | 4,760 |
| New Jersey----- | -- | 2,836 | 2,494 | 3,211 | 130,433 | 138,974 |
| New Mexico----- | -- | 1,451 | 12,472 | 1,065 | 110,023 | 125,011 |
| New York----- | 6 | 4,479 | 5,422 | 6,177 | 2,896 | 18,980 |
| North Carolina----- | -- | 6,392 | 13,999 | 2,447 | 43,068 | 65,906 |
| North Dakota----- | -- | 70 | 1 | -- | 122 | 193 |
| Ohio----- | 93 | 5,022 | 15,025 | 44,863 | 222,056 | 287,059 |
| Oklahoma----- | -- | 581 | 5,346 | 22,527 | 13,289 | 41,743 |
| Oregon----- | -- | 1,988 | 697 | 2,852 | 6,131 | 11,668 |
| Pennsylvania----- | 968 | 9,454 | 30,994 | 38,192 | 289,583 | 369,191 |
| Rhode Island----- | -- | 549 | 206 | 578 | -- | 1,333 |
| South Carolina----- | -- | 143 | 1,968 | 40 | -- | 2,151 |
| South Dakota----- | -- | 23 | 387 | 662 | 2,943 | 4,015 |
| Tennessee----- | 437 | 9,948 | 8,913 | 27,063 | 46,580 | 92,941 |
| Texas----- | -- | 3,473 | 6,982 | 23,425 | 30,540 | 64,420 |
| Utah----- | 61 | 2,505 | 3,185 | 340 | 21,149 | 27,240 |
| Vermont----- | -- | 770 | 391 | 722 | -- | 1,883 |
| Virginia----- | 6,402 | 5,979 | 14,256 | 12,650 | 98,314 | 137,601 |
| Washington----- | -- | 3,468 | 667 | 1,182 | 24,090 | 29,407 |
| West Virginia----- | 3,810 | 2,827 | 7,089 | 46,557 | 220,206 | 280,489 |
| Wisconsin----- | -- | 1,995 | 1,215 | 37 | 7,719 | 10,966 |
| Wyoming----- | 105 | 4,053 | 60,059 | 8,746 | 187,159 | 260,122 |
| Undistributed----- | -- | -- | -- | -- | 83,127 | 83,127 |
| Total----- | 33,853 | 143,247 | 481,358 | 629,915 | 3,209,884 | 4,498,257 |

1/Some quantities of this class of explosives are included in "Undistributed" to avoid disclosing company proprietary data.
 2/Included with Maryland.

TABLE 5.--Permissible explosives sold for consumption in the United States,
by State and use, 1987

(Thousand pounds)

| State | Use | | | | | Total |
|-----------------------------|-------------|--------------|-------------------------------|------------------|--------------------|--------|
| | Coal mining | Metal mining | Quarrying and nonmetal mining | Costruction work | All other purposes | |
| Alabama----- | 894 | -- | 61 | 21 | -- | 976 |
| Alaska----- | -- | -- | -- | -- | -- | -- |
| Arizona----- | -- | -- | -- | -- | -- | -- |
| Arkansas----- | 5 | -- | -- | -- | -- | 5 |
| California----- | 9 | -- | -- | -- | -- | 9 |
| Colorado----- | -- | -- | -- | -- | -- | -- |
| Conneticut----- | -- | -- | -- | -- | -- | -- |
| Delaware----- | -- | -- | -- | 1 | -- | 1 |
| District of Columbia1/----- | -- | -- | -- | -- | -- | -- |
| Florida----- | -- | -- | -- | -- | -- | -- |
| Georgia----- | -- | -- | -- | -- | -- | -- |
| Hawaii----- | -- | -- | -- | -- | -- | -- |
| Idaho----- | -- | -- | -- | -- | -- | -- |
| Illinois----- | 20 | -- | -- | -- | -- | 20 |
| Indiana----- | 11 | -- | -- | -- | -- | 11 |
| Iowa----- | 116 | -- | 7 | -- | -- | 123 |
| Kansas----- | 4 | -- | -- | -- | -- | 4 |
| Kentucky----- | 19,204 | -- | -- | -- | -- | 19,204 |
| Louisiana----- | -- | -- | -- | -- | -- | -- |
| Maine----- | -- | -- | -- | -- | -- | -- |
| Maryland----- | -- | -- | 2 | -- | -- | 2 |
| Massachusetts----- | -- | -- | -- | -- | -- | -- |
| Michigan----- | -- | -- | -- | 2 | -- | 2 |
| Minnesota----- | -- | -- | -- | -- | -- | -- |
| Mississippi----- | -- | -- | -- | -- | -- | -- |
| Missouri----- | 1,563 | -- | -- | -- | -- | 1,563 |
| Montana----- | 51 | -- | -- | -- | -- | 51 |
| Nebraska----- | -- | -- | -- | -- | -- | -- |
| Nevada----- | -- | -- | -- | -- | -- | -- |
| New Hampshire----- | -- | -- | -- | -- | -- | -- |
| New Jersey----- | -- | -- | -- | -- | -- | -- |
| New Mexico----- | -- | -- | -- | -- | -- | -- |
| New York----- | -- | -- | -- | 6 | -- | 6 |
| North Carolina----- | -- | -- | -- | -- | -- | -- |
| North Dakota----- | -- | -- | -- | -- | -- | -- |
| Ohio----- | 90 | -- | 3 | -- | -- | 93 |
| Oklahoma----- | -- | -- | -- | -- | -- | -- |
| Oregon----- | -- | -- | -- | -- | -- | -- |
| Pennsylvania----- | 932 | -- | 36 | -- | -- | 968 |
| Rhode Island----- | -- | -- | -- | -- | -- | -- |
| South Carolina----- | -- | -- | -- | -- | -- | -- |
| South Dakota----- | -- | -- | -- | -- | -- | -- |
| Tennessee----- | 194 | -- | 80 | 163 | -- | 437 |
| Texas----- | -- | -- | -- | -- | -- | -- |
| Utah----- | 13 | -- | 48 | -- | -- | 61 |
| Vermont----- | -- | -- | -- | -- | -- | -- |
| Virginia----- | 6,402 | -- | -- | -- | -- | 6,402 |
| Washington----- | -- | -- | -- | -- | -- | -- |
| West Virginia----- | 3,778 | -- | 11 | 21 | -- | 3,810 |
| Wisconsin----- | -- | -- | -- | -- | -- | -- |
| Wyoming----- | 105 | -- | -- | -- | -- | 105 |
| Total----- | 33,391 | -- | 248 | 214 | -- | 33,853 |

1/Included with Maryland.

TABLE 6.--Other high explosives sold for consumption in the United States,
by State and use, 1987

(Thousand pounds)

| State | Use | | | | | Total |
|-----------------------------|-------------|--------------|-------------------------------|------------------|--------------------|---------|
| | Coal mining | Metal mining | Quarrying and nonmetal mining | Costruction work | All other purposes | |
| Alabama----- | 373 | 136 | 413 | 896 | 57 | 1,875 |
| Alaska----- | 232 | -- | 36 | 5,633 | -- | 5,901 |
| Arizona----- | 267 | 1,653 | 323 | 73 | 30 | 2,346 |
| Arkansas----- | 15 | 31 | 271 | 221 | 5 | 543 |
| California----- | 94 | 144 | 720 | 1,804 | 52 | 2,814 |
| Colorado----- | 228 | 180 | 691 | 666 | 455 | 2,220 |
| Conneticut----- | 32 | 51 | 3,116 | 515 | -- | 3,714 |
| Delaware----- | -- | -- | -- | 8 | -- | 8 |
| District of Columbia1/----- | -- | -- | -- | -- | -- | -- |
| Florida----- | -- | 1 | 972 | 1,090 | 84 | 2,147 |
| Georgia----- | 81 | -- | 2,508 | 272 | -- | 2,861 |
| Hawaii----- | -- | -- | -- | 20 | 214 | 234 |
| Idaho----- | -- | 299 | 715 | 33 | 7 | 1,054 |
| Illinois----- | 1,235 | 100 | 2,276 | 719 | 13 | 4,343 |
| Indiana----- | 1,166 | 253 | 1,526 | 16 | -- | 2,961 |
| Iowa----- | 107 | -- | 2,361 | 1,746 | 5 | 4,219 |
| Kansas----- | 43 | -- | 1,454 | 89 | 47 | 1,633 |
| Kentucky----- | 6,253 | 208 | 1,503 | 868 | 18 | 8,850 |
| Louisiana----- | -- | -- | 302 | -- | 287 | 589 |
| Maine----- | -- | -- | 308 | 1,604 | -- | 1,912 |
| Maryland----- | 55 | 21 | 802 | 358 | -- | 1,236 |
| Massachusetts----- | 41 | -- | 3,648 | 2,482 | 57 | 6,228 |
| Michigan----- | 609 | 511 | 427 | 208 | 268 | 2,023 |
| Minnesota----- | -- | 208 | 324 | 154 | -- | 686 |
| Mississippi----- | -- | -- | 13 | 43 | 286 | 342 |
| Missouri----- | 200 | 626 | 5,893 | 2,324 | -- | 9,043 |
| Montana----- | 461 | 64 | 535 | 187 | 416 | 1,663 |
| Nebraska----- | -- | -- | -- | 245 | 7 | 252 |
| Nevada----- | 204 | 403 | 83 | 111 | 53 | 854 |
| New Hampshire----- | -- | -- | 827 | 1,863 | -- | 2,690 |
| New Jersey----- | -- | -- | 2,425 | 411 | -- | 2,836 |
| New Mexico----- | 290 | 403 | 54 | 605 | 99 | 1,451 |
| New York----- | 34 | 110 | 2,534 | 1,801 | -- | 4,479 |
| North Carolina----- | 170 | 136 | 4,188 | 1,898 | -- | 6,392 |
| North Dakota----- | 47 | -- | -- | -- | 23 | 70 |
| Ohio----- | 1,659 | 132 | 1,589 | 1,592 | 50 | 5,022 |
| Oklahoma----- | 56 | 7 | 245 | 95 | 178 | 581 |
| Oregon----- | -- | -- | 222 | 1,766 | -- | 1,988 |
| Pennsylvania----- | 2,358 | 59 | 5,527 | 1,170 | 340 | 9,454 |
| Rhode Island----- | -- | -- | 193 | 356 | -- | 549 |
| South Carolina----- | -- | -- | 114 | 29 | -- | 143 |
| South Dakota----- | -- | -- | -- | 23 | -- | 23 |
| Tennessee----- | 583 | 1,243 | 3,161 | 4,956 | 5 | 9,948 |
| Texas----- | 72 | 54 | 1,603 | 843 | 901 | 3,473 |
| Utah----- | 570 | 99 | 1,733 | 84 | 19 | 2,505 |
| Vermont----- | -- | -- | 216 | 147 | 407 | 770 |
| Virginia----- | 1,953 | 147 | 3,118 | 761 | -- | 5,979 |
| Washington----- | 120 | 1,114 | 1,624 | 607 | 3 | 3,468 |
| West Virginia----- | 1,626 | 42 | 777 | 378 | 4 | 2,827 |
| Wisconsin----- | -- | -- | 536 | 1,459 | -- | 1,995 |
| Wyoming----- | 1,937 | 578 | 344 | 126 | 1,068 | 4,053 |
| Total----- | 23,171 | 9,013 | 62,250 | 43,355 | 5,458 | 143,247 |

1/Included with Maryland.

TABLE 7.--Packaged and bulk water gels, slurries, and emulsions sold for consumption in the United States, by State and use, 1987

(Thousand pounds)

| State | Use | | | | | Total |
|--|-------------|--------------|-------------------------------|------------------|--------------------|---------|
| | Coal mining | Metal mining | Quarrying and nonmetal mining | Costruction work | All other purposes | |
| Alabama----- | 1,756 | 1 | 6,982 | 1,925 | 82 | 10,746 |
| Alaska----- | 365 | -- | 11 | 827 | -- | 1,203 |
| Arizona----- | 9 | 14,390 | 2,565 | 109 | -- | 17,073 |
| Arkansas----- | 666 | 180 | 2,139 | 4,511 | 330 | 7,826 |
| California----- | -- | 415 | 7,063 | 2,693 | -- | 10,171 |
| Colorado----- | 8,195 | 258 | 463 | 2,098 | 75 | 11,089 |
| Conneticut----- | 16 | 125 | 2,835 | 402 | -- | 3,378 |
| Delaware----- | -- | -- | -- | -- | -- | -- |
| District of Columbia ¹ /----- | -- | -- | -- | -- | -- | -- |
| Florida----- | -- | 49 | 26,985 | 7,429 | 522 | 34,985 |
| Georgia----- | -- | -- | 13,064 | 40 | -- | 13,104 |
| Hawaii----- | -- | -- | 54 | 3 | 57 | 114 |
| Idaho----- | 81 | 403 | 32 | 5 | -- | 521 |
| Illinois----- | 12,730 | 276 | 4,954 | 1,352 | -- | 19,312 |
| Indiana----- | 29,017 | 376 | 4,706 | 40 | -- | 34,139 |
| Iowa----- | 41 | -- | 3,175 | 882 | -- | 4,098 |
| Kansas----- | 183 | -- | 1,703 | 43 | -- | 1,929 |
| Kentucky----- | 45,804 | 8,661 | 2,714 | 1,630 | -- | 58,809 |
| Louisiana----- | -- | -- | 16 | 1 | 2 | 19 |
| Maine----- | -- | -- | 133 | 331 | -- | 464 |
| Maryland----- | 19 | 1 | 3,113 | 503 | -- | 3,636 |
| Massachusettes----- | -- | 90 | 3,880 | 855 | 633 | 5,458 |
| Michigan----- | 189 | 12,957 | 3,723 | 325 | 1 | 17,195 |
| Minnesota----- | 37 | 14,246 | 1,388 | 124 | -- | 15,795 |
| Mississippi----- | -- | -- | -- | -- | 13 | 13 |
| Missouri----- | 4,469 | 426 | 4,323 | 1,905 | -- | 11,123 |
| Montana----- | 250 | 2,690 | 1,076 | 128 | -- | 4,144 |
| Nebraska----- | -- | -- | -- | -- | -- | -- |
| Nevada----- | 118 | 1,407 | 1,215 | 87 | -- | 2,827 |
| New Hampshire----- | -- | -- | 87 | 332 | -- | 419 |
| New Jersey----- | -- | -- | 2,102 | 348 | 44 | 2,494 |
| New Mexico----- | 9,611 | 25 | 2,185 | 648 | 3 | 12,472 |
| New York----- | -- | 51 | 2,929 | 2,442 | -- | 5,422 |
| North Carolina----- | 28 | 213 | 12,976 | 782 | -- | 13,999 |
| North Dakota----- | -- | -- | -- | 1 | -- | 1 |
| Ohio----- | 2,579 | 640 | 2,860 | 8,932 | 14 | 15,025 |
| Oklahoma----- | 1,090 | -- | 2,487 | 1,736 | 33 | 5,346 |
| Oregon----- | -- | -- | 28 | 668 | 1 | 697 |
| Pennsylvania----- | 10,151 | 283 | 14,575 | 1,745 | 4,240 | 30,994 |
| Rhode Island----- | -- | -- | 114 | 92 | -- | 206 |
| South Carolina----- | -- | -- | 1,672 | 296 | -- | 1,968 |
| South Dakota----- | 100 | 46 | 122 | 119 | -- | 387 |
| Tennessee----- | 1,709 | 673 | 4,966 | 1,565 | -- | 8,913 |
| Texas----- | -- | -- | 4,753 | 2,191 | 38 | 6,982 |
| Utah----- | 55 | 2,790 | 168 | 168 | 4 | 3,185 |
| Vermont----- | -- | -- | 182 | 21 | 188 | 391 |
| Virginia----- | 7,342 | -- | 5,913 | 957 | 44 | 14,256 |
| Washington----- | -- | 191 | 56 | 418 | 2 | 667 |
| West Virginia----- | 4,981 | 896 | 450 | 762 | -- | 7,089 |
| Wisconsin----- | -- | 81 | 296 | 838 | -- | 1,215 |
| Wyoming----- | 54,146 | 285 | 3,179 | 2,449 | -- | 60,059 |
| Total----- | 195,737 | 63,125 | 160,412 | 55,758 | 6,326 | 481,358 |

¹Included with Maryland.

TABLE 8.--Ammonium nitrate-fuel oil blasting agents sold for consumption
in the United States, by State and use, 1987

(Thousand pounds)

| State | Use | | | | | Total |
|-----------------------------|-------------|--------------|-------------------------------|------------------|--------------------|---------|
| | Coal mining | Metal mining | Quarrying and nonmetal mining | Costruction work | All other purposes | |
| Alabama----- | 6,405 | -- | 533 | 120 | -- | 7,058 |
| Alaska----- | -- | -- | 30 | 940 | -- | 970 |
| Arizona----- | 17 | 2,600 | 280 | 428 | -- | 3,325 |
| Arkansas----- | -- | -- | 1,048 | 1,306 | -- | 2,354 |
| California----- | -- | 1,553 | 3,535 | 4,880 | -- | 9,968 |
| Colorado----- | 11,937 | -- | -- | 50 | -- | 11,987 |
| Conneticut----- | 2 | 7 | 3,620 | 1,276 | -- | 4,905 |
| Delaware----- | -- | -- | -- | 2 | -- | 2 |
| District of Columbia1/----- | -- | -- | -- | -- | -- | -- |
| Florida----- | -- | -- | 1,353 | 990 | 104 | 2,447 |
| Georgia----- | 42 | -- | 6,216 | 787 | 10 | 7,055 |
| Hawaii----- | -- | -- | 399 | -- | -- | 399 |
| Idaho----- | 96 | 115 | -- | 145 | -- | 356 |
| Illinois----- | 8,412 | -- | 2,430 | 134 | -- | 10,976 |
| Indiana----- | 36,604 | 5 | 5,513 | 35 | -- | 42,157 |
| Iowa----- | 16 | -- | 1,496 | -- | 217 | 1,729 |
| Kansas----- | 609 | -- | 9,138 | 721 | -- | 10,468 |
| Kentucky----- | 185,524 | -- | 7,911 | 10,878 | 31 | 204,344 |
| Louisiana----- | -- | -- | 990 | 96 | -- | 1,086 |
| Maine----- | -- | -- | 192 | 962 | -- | 1,154 |
| Maryland----- | 125 | -- | 647 | 210 | -- | 982 |
| Massachusetts----- | -- | -- | 6,067 | 2,562 | 100 | 8,729 |
| Michigan----- | -- | 5,584 | 6,794 | 277 | -- | 12,655 |
| Minnesota----- | 26 | 10,831 | 68 | 60 | -- | 10,985 |
| Mississippi----- | -- | -- | 61 | -- | 14 | 75 |
| Missouri----- | 165 | -- | 15,520 | 3,088 | -- | 18,773 |
| Montana----- | 1,267 | -- | 247 | -- | -- | 1,514 |
| Nebraska----- | -- | -- | -- | 390 | -- | 390 |
| Nevada----- | -- | 6,024 | 999 | 1,062 | -- | 8,085 |
| New Hampshire----- | -- | -- | 470 | 1,181 | -- | 1,651 |
| New Jersey----- | -- | -- | 2,859 | 352 | -- | 3,211 |
| New Mexico----- | 428 | -- | -- | 637 | -- | 1,065 |
| New York----- | -- | -- | 5,971 | 206 | -- | 6,177 |
| North Carolina----- | -- | 9 | 2,133 | 305 | -- | 2,447 |
| North Dakota----- | -- | -- | -- | -- | -- | -- |
| Ohio----- | 33,103 | -- | 9,412 | 1,099 | 1,249 | 44,863 |
| Oklahoma----- | 12,413 | 2,035 | 1,639 | 6,440 | -- | 22,527 |
| Oregon----- | -- | -- | 238 | 2,614 | -- | 2,852 |
| Pennsylvania----- | 26,323 | -- | 10,440 | 1,105 | 324 | 38,192 |
| Rhode Island----- | -- | -- | 280 | 298 | -- | 578 |
| South Carolina----- | -- | -- | 13 | 27 | -- | 40 |
| South Dakota----- | -- | -- | -- | 662 | -- | 662 |
| Tennessee----- | 11,122 | 7 | 9,643 | 6,291 | -- | 27,063 |
| Texas----- | 4,512 | -- | 12,977 | 5,697 | 239 | 23,425 |
| Utah----- | 46 | 39 | 203 | 52 | -- | 340 |
| Vermont----- | -- | -- | 129 | 176 | 417 | 722 |
| Virginia----- | 10,316 | -- | 1,972 | 362 | -- | 12,650 |
| Washington----- | -- | 460 | 257 | 450 | 15 | 1,182 |
| West Virginia----- | 41,528 | -- | 577 | 4,452 | -- | 46,557 |
| Wisconsin----- | -- | -- | 4 | 33 | -- | 37 |
| Wyoming----- | 8,690 | -- | 33 | 22 | 1 | 8,746 |
| Total----- | 399,728 | 29,269 | 134,337 | 63,860 | 2,721 | 629,915 |

1/Included with Maryland.

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TABLE 9.--Unprocessed ammonium nitrate sold for consumption in the United States, by State and use, 1987

(Thousand pounds)

| State | Use | | | | | Total |
|------------------------------------|-------------|--------------|---|------------------|----------------------------------|-----------|
| | Coal mining | Metal mining | Quarrying and nonmetal mining ^{1/} | Costruction work | All other ^{1/} purposes | |
| Alabama | 180,935 | -- | 6,124 | -- | -- | 187,059 |
| Alaska | -- | -- | -- | -- | -- | -- |
| Arizona | 41,272 | 75,310 | -- | -- | 354 | 116,936 |
| Arkansas | -- | -- | 2,929 | 438 | -- | 3,367 |
| California | 17,887 | 258 | 4,482 | 5,043 | -- | 27,670 |
| Colorado | 72,484 | 226 | 1,353 | 42 | -- | 74,105 |
| Conneticut | -- | -- | 1,704 | -- | -- | 1,704 |
| Delaware | -- | -- | -- | -- | -- | -- |
| District of Columbia ^{2/} | -- | -- | -- | -- | -- | -- |
| Florida | -- | -- | 118 | 912 | -- | 1,030 |
| Georgia | 177,893 | -- | 11,533 | -- | -- | 189,426 |
| Hawaii | -- | -- | -- | -- | -- | -- |
| Idaho | 10,988 | 16,598 | 684 | -- | -- | 28,270 |
| Illinois | 69,317 | -- | 10,002 | 2,446 | 1,512 | 83,277 |
| Indiana | 68,346 | -- | 2,718 | 814 | -- | 71,878 |
| Iowa | 7,558 | -- | 4,913 | 386 | 5,002 | 17,859 |
| Kansas | 1,135 | -- | 43 | -- | -- | 1,178 |
| Kentucky | 485,130 | -- | 9,787 | 45,159 | 10,350 | 550,426 |
| Louisiana | -- | -- | -- | -- | -- | -- |
| Maine | -- | -- | -- | -- | -- | -- |
| Maryland | 1,200 | -- | -- | -- | -- | 1,200 |
| Massachusetts | -- | -- | -- | -- | -- | -- |
| Michigan | 1,558 | 14,780 | 86 | 138 | 1,557 | 18,119 |
| Minnesota | 3,598 | 30,277 | 2,140 | 1,268 | 4,221 | 41,504 |
| Mississippi | -- | -- | -- | -- | -- | -- |
| Missouri | 42,642 | -- | 8,172 | 23,428 | 258 | 74,500 |
| Montana | 78,904 | 26,870 | -- | -- | -- | 105,774 |
| Nebraska | -- | -- | -- | 2,435 | 200 | 2,635 |
| Nevada | 43,549 | 28,800 | 39 | 150 | 1 | 72,539 |
| New Hampshire | -- | -- | -- | -- | -- | -- |
| New Jersey | 130,433 | -- | -- | -- | -- | 130,433 |
| New Mexico | 58,533 | 26,512 | -- | 16,793 | 8,185 | 110,023 |
| New York | 2,438 | 8 | 402 | 48 | -- | 2,896 |
| North Carolina | 19,107 | 37 | 23,868 | 56 | -- | 43,068 |
| North Dakota | 122 | -- | -- | -- | -- | 122 |
| Ohio | 192,106 | -- | 2,728 | 22,138 | 5,084 | 222,056 |
| Oklahoma | -- | -- | 13,289 | -- | -- | 13,289 |
| Oregon | 4,831 | -- | -- | 1,300 | -- | 6,131 |
| Pennsylvania | 283,216 | -- | 856 | 1,112 | 4,399 | 289,583 |
| Rhode Island | -- | -- | -- | -- | -- | -- |
| South Carolina | -- | -- | -- | -- | -- | -- |
| South Dakota | 1,800 | -- | -- | 997 | 146 | 2,943 |
| Tennessee | 40,829 | -- | 4,900 | 851 | -- | 46,580 |
| Texas | 19,020 | -- | 2,599 | 8,717 | 204 | 30,540 |
| Utah | 11,479 | 9,585 | 85 | -- | -- | 21,149 |
| Vermont | -- | -- | -- | -- | -- | -- |
| Virginia | 95,585 | -- | 1,987 | 742 | -- | 98,314 |
| Washington | 9,283 | 4,884 | 4,373 | 5,550 | -- | 24,090 |
| West Virginia | 211,220 | -- | 846 | 4,610 | 3,530 | 220,206 |
| Wisconsin | 1,909 | -- | 2,904 | 152 | 2,754 | 7,719 |
| Wyoming | 182,428 | 4,731 | -- | -- | -- | 187,159 |
| Undistributed | -- | -- | 3/ | -- | 83,127 | 83,127 |
| Total | 2,568,735 | 238,876 | 125,664 | 145,725 | 130,884 | 3,209,884 |

^{1/}Some quantities of this use are included in "Undistributed" to avoid disclosing company proprietary data.
^{2/}Included with Maryland.
^{3/}Undistributed quantity for this use is included with undistributed "All other purposes."