

EXPLOSIVES

By Deborah A. Kramer

Worldwide attention was focused on explosives in 1995 as a result of the April 19 bombing of the Federal Building in Oklahoma City, OK, that killed 168 people. As a result of the bombing, proposals were made by U.S. lawmakers to include identifying taggants in explosives and to include additives to reduce or eliminate the explosive potential of ammonium nitrate, and lawsuits were filed against explosives manufacturers by victims of the bombing.

Total U.S. explosives production of 2.28 million metric tons declined slightly in 1995, after significant growth in 1994. Coal mining was the principal application for explosives, and explosives sales were recorded in all 50 States. U.S. demand for explosives is expected to decline as coal production shifts from Eastern and Midwestern States to the Western States, which have a lower overburden-to-matrix ratio.

Legislation and Government Programs

In a settlement with the Department of Justice's Antitrust Division, Dyno Nobel Inc. agreed to plead guilty and pay \$15 million in criminal fines for conspiring to fix prices of commercial explosives sold in Illinois, Indiana, and Kentucky from 1988 to 1992. The company also admitted to a charge of eliminating competition in the sale of commercial explosives to three limestone quarries in Texas.¹ ICI Explosives USA also agreed to plead guilty to conspiracy to fix prices of commercial explosives sold in Kentucky from 1988 to 1992. The fine set by Justice was \$10 million and was subject to court approval.²

In August, a jury in Texas awarded Thermex Energy Corp. \$488.5 million in its case against ICI Explosives. Thermex claimed that ICI Explosives violated antitrust laws and conspired with others to violate these laws, which drove Thermex to file for Chapter 7 bankruptcy in 1990. The award is believed to be the largest antitrust award in Texas history.³ Under a settlement with Thermex, reached in September, ICI Explosives agreed to pay Thermex \$36 million to settle the litigation.

Following the bombing in Oklahoma City, OK, a bill was introduced in the House of Representatives (H. R. 1568) to require explosive materials to contain taggants. This measure was an attempt to enable law enforcement authorities to trace the source of the material, either before or after detonation. The bill was referred to the Committee on the Judiciary.

Four survivors of the bombing filed a lawsuit in Federal court against ICI Explosives alleging that the company did not attempt to reduce the potential for fertilizer-grade ammonium nitrate to be used as an explosive material. The suit requested certification as a class action on behalf of all the injured parties.

More than \$50,000 in damages per plaintiff was requested by the suit if class action status was granted.⁴ This lawsuit later was amended to include charges that ICI Explosives violated Kansas and Federal law by selling explosive-grade ammonium nitrate as fertilizer-grade products. ICI Explosives has petitioned that the lawsuit be dismissed.⁵

Production

Ammonium-nitrate base explosives sales were 2.24 million tons, accounting for 98% of U.S. industrial explosives consumption. High explosives sales essentially were unchanged.

Companies covered by this report, including Institute of Makers of Explosives (IME) members, are as follows:

- * Apache Nitrogen Products Inc.—Benson, AZ
- * Arcadian Corp.—Memphis, TN
 - Austin Powder Co.—Cleveland, OH
- * Coastal Chem Inc.—Cheyenne, WY
 - Amos L. Dolby Co.—Corsica, PA
 - Dyno Nobel Inc.—Salt Lake City, UT
 - El Dorado Chemical Co.—St. Louis, MO
 - The Ensign-Bickford Co.—Simsbury, CT
 - Explosives Technologies International Inc. (ETI)—Wilmington, DE
 - ICI Explosives Canada—Ontario, Canada
 - ICI Explosives USA Inc.—Dallas, TX
 - LaRoche Industries Inc.—Atlanta, GA
 - Mining Services International—Salt Lake City, UT
- * Nitram Inc.—Tampa, FL
 - Nitrochem Inc.—Montreal, Quebec, Canada
 - St. Lawrence Explosive Corp.—Adams Center, NY
 - SENEX Explosives Inc.—Cuddy, PA
 - Sierra Chemical Co.—Reno, NV
 - Slurry Explosive Corp.—Oklahoma City, OK
 - Trojan Corp.—Salt Lake City, UT
- * Unocal Corp.—Los Angeles, CA
 - Viking Explosives and Supply Co.—Rosemount, MN

*Indicates non-IME members.

LaRoche Industries Inc. purchased a low-density, blasting-grade, ammonium nitrate manufacturing facility from ETI in late December. ETI will continue to operate its other manufacturing and distribution operations at the Seneca, IL, site.⁶

Consumption

Coal mining was estimated to account for 65% of the explosives sales in the United States in 1995. Quarrying and

nonmetal mining accounted for 14% of sales; metal mining, 11%; construction, 7%; and miscellaneous uses, 3%. Six States, Kentucky, Nevada, West Virginia, Wyoming, Arizona, and Virginia, in declining order, accounted for 53% of the U.S. explosives demand.

According to the U.S. Department of Energy (DOE), coal production decreased by 0.4% in 1995. Three States, Wyoming, West Virginia, and Kentucky, in declining order, represented 56% of coal production. According to the Federal Reserve Board, production indices for metal mining activity in 1995 increased by 3.5% from the 1994 level, and quarrying and nonmetal mining also increased by 4.8%. The U.S. Department of Commerce reported that the value of new construction in 1995 increased by 0.4%, based on constant 1992 dollars.

Classification of Industrial Explosives and Blasting Agents.—Apparent consumption of commercial explosives used for industrial purposes in this report is defined as sales reported to the IME by members and furnished to the U.S. Geological Survey (USGS) on a proprietary basis, together with sales directly reported to the USGS by nonmember manufacturers. Commercial explosives imported for industrial uses are included in sales. Certain explosives sales may be concealed under “unprocessed ammonium nitrate” to avoid disclosure of individual company proprietary data.

The principal distinction between high explosives and blasting agents is their sensitivity to initiation. High explosives are cap-sensitive, whereas blasting agents are not. Black powder sales are minor and were last reported in 1971.

The production classifications used in this report are the same as those adopted by IME.

High explosives:

Permissibles—Grades approved by brand name by the Mine Safety and Health Administration, as established by U.S. Bureau of Mines testing.

Other high explosives—All high explosives except permissibles.

Blasting agents:

Ammonium nitrate-fuel oil (ANFO)—All mixtures, regardless of density.

Bulk slurries, water gels, and emulsions—All bulk slurries, water gels, emulsions and ANFO mixtures containing slurries, waters gels and emulsions.

Unprocessed ammonium nitrate—Includes prilled, grained, and water solution (liquor) ammonium nitrate sold for use in the manufacture of commercial explosives

World Review

ICI Explosives announced that it will close an explosives plant in Ardeer, Scotland, as part of its strategy of moving explosives production closer to the customer. The Ardeer unit manufactures initiating systems, and closure of the facility will result in a loss of 200 jobs, nearly one-third of the workforce at the site.⁷ ICI Explosives also reached an agreement in principle with the Uzbekistan company Amantaytau Goldfields to set up a joint venture to manufacture explosives in the country.

Outlook

Phase I of the Clean Air Act Amendments became effective in 1995, requiring reductions in sulfur emissions from coal combustion. This regulation primarily was responsible for and accelerated shift in coal production from the Midwestern and Eastern States to the Western States. According to DOE, coal production in the Appalachian region was down more than 2% in 1995, production in the interior States decreased by 8%, and production in the Western region increased 5%. Low-sulfur coal from the Western States increased its penetration into the Midwestern and Eastern coal markets at the expense of the higher sulfur coal produced in those regions. In addition to having a lower sulfur content, coal in the Western States has a lower overburden-to-matrix ratio, with higher production efficiencies and lower explosives requirements. As a result of this trend, explosives demand in the United States is expected to decline slightly for the next few years.

¹Chemical Marketing Reporter. V. 248, No. 11, Sept. 11, 1995, p. 4.

²Chemical & Engineering News. V. 73, No. 35, Aug. 28, 1995, p. 11.

³Green Markets. V. 19, No. 34, Aug. 21, 1995, pp. 1, 10.

⁴Fertilizer Markets. V. 5, No. 40, May 15, 1995, p. 2.

⁵Green Markets, V. 19, No. 46, Nov. 13, 1995, pp. 1, 12.

⁶Fertilizer Markets. V. 6, No. 22, Dec. 25, 1995, p. 4.

⁷Chemical Marketing Reporter. V. 247, No. 7, Feb. 13, 1995, p. 9.

TABLE 1
SALIENT STATISTICS OF INDUSTRIAL EXPLOSIVES AND BLASTING
AGENTS SOLD FOR CONSUMPTION IN THE UNITED STATES 1/

(Metric tons)

Class	1994	1995
Permissibles	3,730	3,420
Other high explosives	35,500	36,400
Water gels, slurries, emulsions	328,000	356,000
Ammonium nitrate-fuel oil blasting agents	463,000	439,000
Unprocessed ammonium nitrate	1,490,000	1,450,000
Total	2,320,000	2,280,000

1/ Data are rounded to three significant digits; may not add to totals shown.

TABLE 2
INDUSTRIAL EXPLOSIVES AND BLASTING AGENTS SOLD FOR CONSUMPTION IN
THE UNITED STATES, BY CLASS AND USE e/ 1/ 2/

(Thousand metric tons)

Class	Coal Mining	Quarrying and nonmetal mining	Metal Mining	Construction work	All other purposes
1994:					
Permissibles	4	(3/)	--	(3/)	--
Other high explosives	4	14	2	14	2
Water gels and slurries	114	115	51	42	6
Ammonium nitrate-fuel oil blasting agents	276	91	33	59	5
Unprocessed ammonium nitrate	1,140	82	158	53	57
Total	1,540	302	244	168	70
1995:					
Permissibles	3	(3/)	--	(3/)	--
Other high explosives	4	16	2	13	1
Water gels and slurries	122	121	60	47	7
Ammonium nitrate-fuel oil blasting agents	259	86	34	55	6
Unprocessed ammonium nitrate	1,110	85	155	50	54
Total	1,500	308	250	165	68

e/ Estimated.

1/ Distribution of industrial explosives and blasting agents by consuming industry in 1994-95 estimated from indices of industrial production and economies as reported by the Department of Energy, Federal Reserve Board, Department of Transportation, and Bureau of the Census.

2/ Data are rounded to three significant digits; may not add to totals shown.

3/ Less than 1/2 unit.

TABLE 3
INDUSTRIAL EXPLOSIVES AND BLASTING AGENTS SOLD FOR CONSUMPTION
IN THE UNITED STATES, BY STATE AND CLASS, 1995 1/

(Metric tons)

State	Class					Total
	Fixed high explosives		Water gels, slurries, and emulsions	Blasting agents		
	Permissible	Other high explosives		Ammonium nitrate-fuel oil blasting agents	Unprocessed ammonium nitrate	
Alabama	156	753	2,640	3,470	42,100	49,100
Alaska	--	1,030	1,620	929	3,620	7,200
Arizona	--	806	26,900	1,820	122,000	152,000
Arkansas	--	244	3,300	4,830	1,450	9,820
California	--	1,050	5,590	1,920	24,200	32,800
Colorado	114	618	8,080	187	30,100	39,100
Connecticut	--	540	1,400	630	5,190	7,760
Delaware	--	4	605	--	4	612
Florida	--	354	4,950	54	7,200	12,600
Georgia	--	572	8,570	10,100	4,600	23,800
Hawaii	--	6	7	167	158	339
Idaho	--	546	564	1,310	18,100	20,500
Illinois	32	1,660	16,900	26,900	27,400	72,800
Indiana	1	754	18,000	18,400	37,600	74,700
Iowa	--	1,710	2,770	1,210	10,400	16,100
Kansas	--	522	1,740	4,920	17,000	24,200
Kentucky	1,600	2,560	28,700	157,000	156,000	346,000
Louisiana	--	425	1,560	1,760	--	3,740
Maine	--	98	140	274	--	512
Maryland 2/	1	201	940	728	2,440	4,310
Massachusetts	--	597	1,610	1,170	193	3,570
Michigan	--	326	2,380	4,350	23,400	30,400
Minnesota	--	303	26,800	2,130	34,800	64,000
Mississippi	--	50	--	73	--	123
Missouri	12	2,970	7,240	16,500	12,200	39,000
Montana	--	966	12,400	1,150	38,700	53,300
Nebraska	--	65	417	117	1,420	2,020
Nevada	2	1,250	38,000	15,300	139,000	193,000
New Hampshire	--	632	1,630	485	20	2,770
New Jersey	--	139	1,190	2,140	--	3,470
New Mexico	--	717	11,200	2,190	68,000	82,100
New York	1	636	5,300	5,210	1,760	12,900
North Carolina	--	954	8,070	5,800	12,600	27,500
North Dakota	--	149	827	48	1,610	2,630
Ohio	15	1,310	7,870	10,500	50,200	69,800
Oklahoma	1	238	3,260	5,500	8,570	17,600
Oregon	1	626	474	2,580	6,040	9,720
Pennsylvania	248	2,380	19,000	22,800	56,300	101,000
Rhode Island	--	32	269	1,630	--	1,930
South Carolina	--	184	3,370	1,700	5,920	11,200
South Dakota	--	42	771	3,250	2,720	6,780
Tennessee	24	1,560	7,890	10,200	17,100	36,700
Texas	7	739	6,930	16,500	16,700	40,900
Utah	484	967	2,280	101	35,100	38,900
Vermont	--	100	337	53	--	490
Virginia	487	1,190	18,900	19,600	105,000	145,000
Washington	--	619	1,320	8,360	1,410	11,700
West Virginia	230	1,140	14,900	37,700	133,000	187,000
Wisconsin	--	473	4,480	4,650	1,560	11,200
Wyoming	--	558	11,800	838	166,000	180,000
Total	3,420	36,400	356,000	439,000	1,450,000	2,280,000

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes the District of Columbia.