



# 2014 Minerals Yearbook

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## EXPLOSIVES [ADVANCE RELEASE]

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# EXPLOSIVES

By Lori E. Apodaca

In 2014, U.S. explosives consumption was 3.1 million metric tons (Mt), slightly more than that of 2013; sales of explosives were reported in all States, except Delaware. Coal mining, with about 66% of total consumption, continued to be the dominant use for explosives in the United States. Wyoming was the leading explosives-consuming State, accounting for 28% of total U.S. explosives sales. Indiana, Nevada, and West Virginia together accounted for an additional 24% of the total U.S. explosive sales.

## Legislation and Government Programs

The U.S. Environmental Protection Agency (EPA) requested input on a number of proposed changes to its Risk Management Program (RMP). One change would involve expanding the list of regulated substances under the RMP. Products that the EPA was considering adding to the RMP rule would include reactive substances and hazards, certain types of high and (or) low explosives, and ammonium nitrate. In addition, the EPA was seeking threshold quantities should any of these substances be included in the RMP (Green Markets, 2014a).

On December 18, 2014, the President of the United States signed into law the Protecting and Securing Chemical Facilities from Terrorist Attacks Act of 2014 (“The CFATS Act of 2014”), which recodifies and reauthorizes the Chemical Facility Anti-Terrorism Standards (CFATS) program for 4 years. The new legislation lays the foundation for continued refinement of the CFATS program by adding new provisions while preserving most of the existing regulations. One new aspect of the legislation was that it establishes an expedited approval program for chemical facilities in Tiers 3 and 4 to implement an approved site security plan more quickly. Ammonium nitrate was one of the chemicals covered under the CFATS program (U.S. Department of Homeland Security, 2015).

## Production

Sales of ammonium-nitrate-based explosives (blasting agents and oxidizers) were 3.06 Mt, a slight increase from that of 2013, and accounted for about 99% of U.S. industrial explosives sales. Permissibles and other high explosives accounted for the remaining 1% of U.S. industrial explosive sales. Sales of permissibles (explosives approved for use in gassy and dusty environments) were 66% higher than those in 2013, and sales of other high explosives increased by 8% (table 1).

Companies contributing data to this report, which are members of the Institute of Makers of Explosives (IME), are as follows:

Accurate Energetic Systems, LLC  
Austin Powder Co.  
Baker Hughes Inc.  
Davey Bickford North America  
DYNAenergetics US Inc.

Dyno Nobel Inc.  
GEODynamics, Inc.  
Hunting Titan, Ltd.  
Jet Research Center (a division of Halliburton Co.)  
Maine Drilling & Blasting  
Maxam North America, Inc.  
Nelson Brothers, Inc.  
Orica USA Inc.  
Owen Oil Tools LP (a division of Core Laboratories N.V.)  
Senex Explosives, Inc.  
Vet’s Explosives, Inc.  
W.A. Murphy, Inc.

## Consumption

The principal application for explosives in the United States was coal mining, accounting for about 66% of the total explosives sales for consumption (table 2). U.S. coal production increased slightly to 907 Mt in 2014 from that of 2013, according to preliminary data from the U.S. Energy Information Administration (EIA). Coal production in the Appalachian region decreased by 1.1% compared with production in 2013. In the Midwest, coal production increased by 3.1%, and in the Western United States, coal production increased by 2.4%. Three States (Wyoming, West Virginia, and Kentucky, in descending order of tonnage) led the Nation in coal production, accounting for 59% of the total. Wyoming was the leading explosives-consuming State (U.S. Energy Information Administration, 2015a, p. 7; table 2).

Construction work and quarrying and nonmetal mining each accounted for 11% of total explosives sales, metal mining accounted for 9%, and miscellaneous uses were about 3% (table 2). Wyoming, Indiana, Nevada, West Virginia, Kentucky, Minnesota, and Pennsylvania were, in descending order, the leading explosives-consuming States (greater than 100,000 metric tons sold), with a combined total of 64% of U.S. sales (table 3).

Explosives are used in the mining industry and many segments of the manufacturing and major construction industry; therefore, changes in the consumption of explosives would be reflected in the decrease or increase in these applications. The dollar value of new construction (residential and nonresidential) put in place in 2014 increased by about 5% compared with that in 2013 (U.S. Census Bureau, 2015). Based on monthly data, the seasonally adjusted industry growth rate from 2013 to 2014 for metal mining increased by 2.1%, and the growth rate for quarrying and nonmetallic mineral mining increased by 6.5% (Federal Reserve Board, 2015).

**Classification of Industrial Explosives and Blasting Agents.**—Apparent consumption of commercial explosives used for industrial purposes is defined in this report as sales reported to the IME. Commercial explosives imported for industrial uses were also included in sales. 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 were minor and were last reported in 1971. The production classifications used in this report are those adopted by the IME.

**High Explosives—Permissibles.**—The Mine Safety and Health Administration (MSHA) approved grades by brand name as originally established by the National Institute for Occupational Safety and Health (NIOSH) testing.

**Other High Explosives.**—These include all high explosives except permissibles.

**Blasting Agents and Oxidizers.**—These include ammonium nitrate-fuel oil (ANFO) mixtures, regardless of density; slurries, water gels, or emulsions; ANFO blends containing slurries, water gels, or emulsions; and ammonium nitrate in prilled, grained, or liquor (water solution) form. Bulk and packaged forms of these materials are included in this category. In 2014, about 97% of the total blasting agents and oxidizers sales was in bulk form.

## World Review

**European Union.**—On September 23, the European Commission extended the antidumping duty on Russian ammonium nitrate. The Commission ruled that low-priced imports from Russia as well as the elimination of tariffs would likely result in “material injury” to producers of ammonium nitrate in the European Union. The antidumping duty varies by producer and ammonium nitrate grade and ranges from €28.8 to €47.047 per metric ton (Fertilizer Week, 2014).

**Australia.**—Orica Ltd.’s multimillion-dollar program to improve the environmental performance of its Kooragang Island site was approved by the New South Wales government. The program included the construction of three ammonia flaring systems, upgrades to ammonia storage vessels, and a new nitric acid tank. The additional nitric acid storage capacity would increase Orica’s production of ammonium nitrate from 430,000 metric tons per year (t/yr) to 500,000 t/yr. The project was expected to be completed in 3 years (Orica Ltd., 2014).

**Sweden.**—Yara International ASA board of directors approved a \$220 million investment to sustain and increase technical ammonium nitrate (TAN) production at its K oping site. The project would involve the construction of a new nitric acid plant to replace the existing plant. The total TAN capacity would increase to 450,000 t/yr. Construction was to begin in 2015, with completion expected in late 2017 (Green Markets, 2014b).

## Outlook

According to the EIA, U.S. coal production in 2015 is expected to decrease in all coal-producing regions. Changes

in the global coal market have contributed to slower growth in world coal demand, lower international coal prices, and higher coal output in other coal-exporting countries, which led to a 2-year decline in U.S. coal exports. In 2016, production is projected to increase by about 1%, a result of modest production growth in the interior and western regions, as coal use increases in the electric power sector (U.S. Energy Information Administration, 2015b, p. 10–11). Based on coal production projections, explosives consumption is expected to decrease in 2015 but increase slightly in 2016 resulting from the expected increased coal consumption in the electric power sector.

## References Cited

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- U.S. Energy Information Administration, 2015b, Short-term energy outlook: U.S. Energy Information Administration, August 11, 50 p. (Accessed September 2, 2015, via <http://www.eia.gov/forecasts/steo/report/coal.cfm>.)

## GENERAL SOURCES OF INFORMATION

### Other

Institute of Makers of Explosives

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

(Metric tons)

Class	2010	2011	2012	2013	2014
Permissibles	990	1,020	1,470	1,440	2,400
Other high explosives	22,600	21,900	31,400	32,900	35,700
Blasting agents and oxidizers	2,650,000	2,980,000	3,350,000	3,020,000	3,060,000
Total	2,680,000	3,000,000	3,380,000	3,050,000	3,100,000

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

Source: Institute of Makers of Explosives.

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

(Thousand metric tons)

Class	Coal mining	Quarrying and nonmetal mining	Metal mining	Construction work	All other purposes	Total
2013:						
Permissibles	2	(3)	(3)	(3)	--	2
Other high explosives	3 <sup>r</sup>	12 <sup>r</sup>	1	15	1	33
Blasting agents and oxidizers	2,030 <sup>r</sup>	313 <sup>r</sup>	266 <sup>r</sup>	328 <sup>r</sup>	79 <sup>r</sup>	3,020
Total	2,040 <sup>r</sup>	325 <sup>r</sup>	267 <sup>r</sup>	343 <sup>r</sup>	80 <sup>r</sup>	3,050
2014:						
Permissibles	2	(3)	(3)	(3)	--	2
Other high explosives	4	12	1	19	1	36
Blasting agents and oxidizers	2,040	331	269	335	79	3,060
Total	2,050	343	270	354	80	3,100

<sup>r</sup>Revised. -- Zero.

<sup>1</sup>Distribution of industrial explosives and blasting agents by consuming industry estimated from indices of industrial production and economies as reported by the U.S. Department of Energy, the Federal Reserve Board, the U.S. Department of Transportation, and the U.S. Census Bureau.

<sup>2</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>3</sup>Less than ½ unit.

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

(Metric tons)

State	2013				2014			
	Fixed high explosives		Blasting agents and oxidizers	Total	Fixed high explosives		Blasting agents and oxidizers	Total
	Permissibles	Other high explosives			Permissibles	Other high explosives		
Alabama	1	200	68,200	68,400	9	275	9,080	9,360
Alaska	2	932	10,100	11,000	--	621	9,950	10,600
Arizona	34	145	27,800	28,000	--	616	63,700	64,300
Arkansas	--	55	18,700	18,800	--	418	18,800	19,200
California	--	428	24,700	25,100	--	333	33,900	34,200
Colorado	15	657	86,300	86,900	--	684	61,700	62,400
Connecticut	--	281	3,010	3,290	--	211	2,950	3,160
Delaware	--	(2)	(2)	1	--	--	--	--
Florida	--	149	20,300	20,400	--	257	21,700	22,000
Georgia	--	290	20,200	20,500	--	330	24,400	24,800
Hawaii	--	--	191	191	--	(2)	248	248
Idaho	--	101	6,310	6,410	--	208	5,690	5,900
Illinois	3	628	66,300	66,900	4	512	62,100	62,600
Indiana	1	2,820	262,000	265,000	--	1,110	278,000	279,000
Iowa	--	839	33,400	34,200	--	1,030	39,000	40,000
Kansas	--	53	6,660	6,720	--	48	6,750	6,790
Kentucky	152	1,890	191,000	193,000	207	1,920	174,000	176,000
Louisiana	--	503	1,970	2,470	--	236	2,490	2,730
Maine	--	268	2,710	2,980	--	126	3,300	3,420
Maryland <sup>3</sup>	--	107	13,600	13,700	--	98	12,700	12,800
Massachusetts	--	175	5,250	5,430	--	141	5,680	5,820
Michigan	--	158	47,900	48,000	--	179	41,700	41,800
Minnesota	--	147	109,000	109,000	--	148	120,000	120,000
Mississippi	--	22	--	22	--	9	3	12
Missouri	163	3,790	91,000	94,900	159	3,050	88,400	91,600
Montana	--	4,690	35,300	40,000	--	5,360	35,800	41,100
Nebraska	--	39	215	254	--	37	1,890	1,920
Nevada	469	840	214,000	215,000	152	1,190	226,000	228,000
New Hampshire	--	534	6,580	7,110	--	331	8,070	8,400
New Jersey	--	47	12,000	12,100	--	37	6,760	6,790
New Mexico	--	186	68,000	68,200	--	142	68,000	68,200
New York	(2)	820	22,100	22,900	1	1,250	27,400	28,600
North Carolina	--	339	20,500	20,800	--	351	18,700	19,100
North Dakota	--	29	1,280	1,310	--	15	1,590	1,610
Ohio	--	458	54,700	55,200	--	1,060	69,400	70,400
Oklahoma	--	982	29,800	30,800	1	655	30,000	30,700
Oregon	--	85	13,300	13,400	--	85	9,760	9,850
Pennsylvania	96	2,160	98,400	101,000	53	2,000	98,600	101,000
Rhode Island	--	52	1,150	1,200	--	32	1,620	1,650
South Carolina	--	34	5,350	5,390	--	40	6,160	6,200
South Dakota	--	46	4,240	4,280	--	5	5,840	5,840
Tennessee	208	1,740	28,400	30,300	1,180	4,750	20,000	25,900
Texas	--	1,030	64,900	65,900	1	1,090	72,700	73,800
Utah	23	697	70,300	71,000	61	575	67,800	68,500
Vermont	7	80	2,280	2,370	6	77	2,630	2,720
Virginia	192	1,020	74,900	76,100	264	1,190	85,100	86,600
Washington	34	528	10,300	10,800	215	648	13,500	14,400
West Virginia	40	1,070	267,000	269,000	42	1,210	220,000	222,000
Wisconsin	--	215	12,500	12,700	--	436	19,300	19,700
Wyoming	(2)	577	784,000	785,000	46	549	854,000	855,000
Total	1,440	32,900	3,020,000	3,050,000	2,400	35,700	3,060,000	3,100,000

TABLE 3—Continued

INDUSTRIAL EXPLOSIVES AND BLASTING AGENTS SOLD FOR CONSUMPTION IN THE UNITED STATES, BY STATE AND CLASS<sup>1</sup>

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-- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Less than ½ unit.

<sup>3</sup>Includes the District of Columbia.

Source: Institute of Makers of Explosives.