



2013 Minerals Yearbook

EXPLOSIVES [ADVANCE RELEASE]

EXPLOSIVES

By Lori E. Apodaca

In 2013, U.S. explosives consumption was 3.05 million metric tons (Mt), about 10% less than that of 2012; sales of explosives were reported in all States. Coal mining, with about 69% of total consumption, continued to be the dominant use for explosives in the United States. Wyoming was the leading explosives-consuming State, accounting for 26% of total U.S. explosives sales. West Virginia, Indiana, and Nevada together accounted for an additional 25% of the total U.S. explosive sales.

Legislation and Government Programs

On August 1, the President issued Executive Order (EO) 13650 (Improving Chemical Facility Safety and Security) to improve chemical facility safety and security with owners and operators. The EO established an interagency Occupational Safety and Security working group, cochaired by the U.S. Department of Homeland Security, the U.S. Environmental Protection Agency (EPA), and the Occupational Safety and Health Administration (OSHA). The goals of the working group were to improve operational coordination with State, local, and tribal governments; enhance Federal agency coordination and information sharing; modernize regulations and policies; and identify best practices for chemical facility safety and security (White House, The, 2013).

In addition, in August, the EPA, OSHA, and the Bureau of Alcohol, Tobacco, Firearms and Explosives issued an advisory for ammonium nitrate as part of an ongoing federal effort to improve chemical risk management and to advance safety and protect human health and the environment. The advisory contains information on recent and past accidents involving ammonium nitrate, the hazards of ammonium nitrate, and appropriate steps for community emergency planning and proper emergency response (U.S. Environmental Protection Agency, 2013).

Production

Sales of ammonium-nitrate-based explosives (blasting agents and oxidizers) were 3.02 Mt, a 10% decrease from that of 2012, and accounted for about 99% of U.S. industrial explosives sales. Sales of permissibles (explosives approved for use in gassy and dusty environments) were slightly lower than those in 2012 and sales of other high explosives increased by 5% (table 1). Permissibles and other high explosives accounted for the other 1% of U.S. industrial explosive sales.

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 USA, Inc.
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.

Dyno Nobel began construction of an \$850 million ammonia manufacturing plant at Cornerstone Chemical Co.'s complex in Waggaman, LA. The plant would have the capacity to produce 800,000 metric tons per year (t/yr) of ammonia. Dyno Nobel planned to use the ammonia to make explosives at its plants elsewhere in the United States. In addition, Cornerstone Chemical would use some of the ammonia produced from this plant instead of imported ammonia. The plant was expected to begin production in 2016 (Dyno Nobel, Inc., 2013).

Consumption

The principal application for explosives in the United States was coal mining, accounting for about 69% of the total explosives sales for consumption (table 2). U.S. coal production decreased by 3.2% to 922 Mt in 2013 from that of 2012, according to preliminary data from the U.S. Energy Information Administration (EIA). Coal production in the Appalachian region decreased by 7.5% compared with production in 2012. In the Midwest, coal production increased slightly, and in the Western United States, coal production decreased by 2.5%. 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 and West Virginia were also the leading explosives-consuming States (U.S. Energy Information Administration, 2014a, p. 7; table 2).

Construction work and quarrying and nonmetal mining each accounted for 10% of total explosives sales, metal mining accounted for 9%, and miscellaneous uses were about 2%. Wyoming, West Virginia, Indiana, Nevada, 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 63% 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 2013 increased by about 6% compared with that in 2012 (U.S. Census Bureau, 2014). Based on monthly data, the seasonally adjusted industry

growth rate from 2012 to 2013 for metal mining decreased slightly, and the growth rate for quarrying and nonmetallic mineral mining increased by 2% (Federal Reserve Board, 2014).

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 2013, about 97% of the total blasting agents and oxidizers sales was in bulk form.

World Review

European Union.—The European Commission accepted an application from the European Union's ammonium nitrate industry for an investigation into the likelihood of recurrence of dumping and injury from imports of ammonia nitrate from Russia. The ammonium nitrate industry argues that the primary threat is Russia's dual gas pricing, such that natural gas prices to producers are fixed by the state at a price lower than the actual cost of production. The last time the European Union renewed the ammonium nitrate anti-dumping duties against Russia was July 2008 (Nitrogen + Syngas, 2013a).

Zambia.—Nitrogen Chemicals of Zambia, Ltd. (NCZ) was to restart its ammonium nitrate plant in Kafue. The plant, which had been idled for 11 years, was revamped at a cost of \$5 million. The plant was expected to produce 150,000 t/yr of ammonium nitrate. NCZ was to produce ammonium nitrate solutions, which would be used by African Explosives Ltd. in their mining operations (Nitrogen + Syngas, 2013b, c).

Outlook

According to the EIA, U.S. coal production in 2014 is expected to increase slightly from that of 2013. In 2015, production is projected to remain about the same, a result of decreased domestic coal consumption as some coal-fired powerplants close in response to the implementation of the EPA's Mercury and Air Toxic Standards, an increase in commercial and industrial but a decrease in residential electricity sales, and low natural gas prices (U.S. Energy Information Administration, 2014b, p. 10). Based on coal production projections, explosives consumption is expected to increase slightly in 2014, but decrease in 2015 resulting from the expected decrease in domestic coal demand.

References Cited

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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 STATES¹

(Metric tons)

Class	2009	2010	2011	2012	2013
Permissibles	1,610	990	1,020	1,470	1,440
Other high explosives	23,700	22,600	21,900	31,400	32,900
Blasting agents and oxidizers	2,240,000	2,650,000	2,980,000	3,350,000	3,020,000
Total	2,270,000	2,680,000	3,000,000	3,380,000	3,050,000

¹Data 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^{1,2}

(Thousand metric tons)

Class	Coal mining	Quarrying and nonmetal mining	Metal mining	Construction work	All other purposes	Total
2012:						
Permissibles	2	(3)	(3)	(3)	--	2
Other high explosives	4	11	1	14	1	31
Blasting agents and oxidizers	2,300	336	293	338	87	3,350
Total	2,300	347	294	351	88	3,380
2013:						
Permissibles	2	(3)	(3)	(3)	--	2
Other high explosives	4	11	1	15	1	33
Blasting agents and oxidizers	2,110	288	259	287	77	3,020
Total	2,110	299	260	302	78	3,050

-- Zero.

¹Distribution 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.

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

³Less than ½ unit.

TABLE 3
INDUSTRIAL EXPLOSIVES AND BLASTING AGENTS SOLD FOR CONSUMPTION IN THE UNITED STATES, BY STATE AND CLASS¹

(Metric tons)

State	2012				2013			
	Fixed high explosives			Total	Fixed high explosives			Total
	Permissibles	Other high explosives	Blasting agents and oxidizers		Permissibles	Other high explosives	Blasting agents and oxidizers	
Alabama	4	378	101,000	101,000	1	200	68,200	68,400
Alaska	--	856	14,600	18,500	2	932	10,100	11,000
Arizona	13	432	33,200	33,700	34	145	27,800	28,000
Arkansas	--	75	17,100	17,100	--	55	18,700	18,800
California	3	428	22,600	23,000	--	428	24,700	25,100
Colorado	16	514	95,500	96,000	15	657	86,300	86,900
Connecticut	--	236	3,860	4,100	--	281	3,010	3,290
Delaware	--	--	--	--	--	(3)	(3)	1
Florida	--	103	14,100	14,200	--	149	20,300	20,400
Georgia	--	400	20,800	21,200	--	290	20,200	20,500
Hawaii	--	--	238	238	--	--	191	191
Idaho	--	405	16,700	17,100	--	101	6,310	6,410
Illinois	--	801	59,500	60,300	3	628	66,300	66,900
Indiana	1	1,040	254,000	255,000	1	2,820	262,000	265,000
Iowa	6	1,110	38,600	39,700	--	839	33,400	34,200
Kansas	--	62	9,340	9,400	--	53	6,660	6,720
Kentucky	260	2,060	227,000	229,000	152	1,890	191,000	193,000
Louisiana	--	348	1,860	2,210	--	503	1,970	2,470
Maine	--	113	3,420	3,540	--	268	2,710	2,980
Maryland ²	6	120	16,600	16,700	--	107	13,600	13,700
Massachusetts	--	176	6,000	6,180	--	175	5,250	5,430
Michigan	--	192	41,600	41,800	--	158	47,900	48,000
Minnesota	--	262	122,000	123,000	--	147	109,000	109,000
Mississippi	--	7	(3)	7	--	22	--	22
Missouri	265	2,120	89,600	92,000	163	3,790	91,000	94,900
Montana	--	4,220	69,500	73,700	--	4,690	35,300	40,000
Nebraska	--	103	1,780	1,890	--	39	215	254
Nevada	427	1,130	217,000	219,000	469	840	214,000	215,000
New Hampshire	--	549	5,430	5,980	--	534	6,580	7,110
New Jersey	--	23	8,480	8,510	--	47	12,000	12,100
New Mexico	5	229	68,800	69,000	--	186	68,000	68,200
New York	1	1,290	27,200	28,500	(3)	820	22,100	22,900
North Carolina	--	360	18,300	18,700	--	339	20,500	20,800
North Dakota	--	21	1,450	1,480	--	29	1,280	1,310
Ohio	--	647	64,300	64,900	--	458	54,700	55,200
Oklahoma	1	291	32,400	32,600	--	982	29,800	30,800
Oregon	--	110	8,950	9,060	--	85	13,300	13,400
Pennsylvania	73	2,750	133,000	136,000	96	2,160	98,400	101,000
Rhode Island	--	35	1,040	1,070	--	52	1,150	1,200
South Carolina	--	73	4,550	4,630	--	34	5,350	5,390
South Dakota	--	10	3,410	3,420	--	46	4,240	4,280
Tennessee	49	1,560	25,300	26,900	208	1,740	28,400	30,300
Texas	3	721	56,200	56,900	--	1,030	64,900	65,900
Utah	59	939	68,300	69,300	23	697	70,300	71,000
Vermont	7	161	2,550	2,720	7	80	2,280	2,370
Virginia	87	1,010	103,000	104,000	192	1,020	74,900	76,100
Washington	53	576	10,600	11,200	34	528	10,300	10,800
West Virginia	130	1,400	324,000	326,000	40	1,070	267,000	269,000
Wisconsin	1	429	11,000	11,400	--	215	12,500	12,700
Wyoming	--	562	870,000	871,000	(3)	577	784,000	785,000
Total	1,470	31,400	3,350,000	3,380,000	1,440	32,900	3,020,000	3,050,000

See footnotes at end of table.

TABLE 3—Continued
INDUSTRIAL EXPLOSIVES AND BLASTING AGENTS SOLD FOR CONSUMPTION IN THE UNITED STATES, BY STATE AND CLASS¹

-- Zero.

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

²Includes the District of Columbia.

³Less than ½ unit.

Source: Institute of Makers of Explosives.