2009 Minerals Yearbook

NITROGEN [ADVANCE RELEASE]

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NITROGEN

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In 2009, U.S. ammonia production contained 7.70 million metric tons (Mt) of nitrogen, a slight decrease from production in 2008, and apparent consumption decreased by about 9% from that in 2008. Exports of ammonia were significantly lower than those in 2008. Imports decreased by about 25% compared with those of 2008. Most of the imports in 2009 were from Canada, Russia, and Trinidad and Tobago. About 84% of the domestically produced ammonia consumed in the United States was used in fertilizer applications. Global ammonia production in 2009, which was estimated to contain 130 Mt of nitrogen, was the same as in 2008. China, India, Russia, and the United States were the leading producers, together accounting for about 55% of the total.

Legislation and Government Programs

The U.S. Environmental Protection Agency (EPA) was proposing revisions to the National Renewable Fuel Standard (RFS) program that would shift U.S. ethanol production away from its reliance on corn. Existing ethanol production would be grandfathered in under the proposed rules, but EPA wanted to boost consumption of cellulose and other sources of renewable fuel in response to the Energy Independence and Security Act (EISA) of 2007. EISA established specific volume standards for advanced biofuel, biomass-based diesel, cellulosic biofuel, and total renewable fuel that must be used in transportation fuel each year (Fertilizer Week, 2009f).

The National Association of Wheat Growers, the Agricultural Retailers Association, and others requested that the U.S. Department of Commerce remove trade restrictions that are in place against ammonium nitrate from Russia. The reason for removing trade restrictions was that many domestic manufacturers and distributors have ceased production and sales of ammonium nitrate for liability and safety reasons. As a result, in periods of high ammonium nitrate demand in the United States, agricultural retailers, distributors, and farmers must pay a higher price for the product (Green Markets, 2009c).

Production

Industry statistics for anhydrous ammonia and derivative products were developed by the U.S. Census Bureau. A summary of the production of principal inorganic fertilizers by quarter was reported in the series MQ325B. In 2009, production of anhydrous ammonia (82.2% nitrogen) decreased slightly to 7.70 Mt of contained nitrogen compared with a revised figure of 7.87 Mt in 2008 (table 1). Of the total production, 84% was for use as a fertilizer; the remaining 16% was used in other chemical and industrial sectors (table 2).

The United States was a leading producer and consumer of elemental and fixed types of nitrogen. In declining order, urea, ammonium nitrate, ammonium phosphates [diammonium phosphate (DAP) and monoammonium phosphate (MAP)], nitric acid, and ammonium sulfate were the major downstream products derived from domestic and imported ammonia in the United States. Their combined production was 8.07 Mt of contained nitrogen, with urea accounting for 29% of the total, ammonium nitrate accounting for 26% of the total, and ammonium phosphates and nitric acid accounting for 23% and 16%, respectively, of the production (table 3).

Ammonia producers in the United States operated only at about 72% of design capacity in 2009; this percentage included capacities at plants that operated during any part of the year and did not include plants that were idle for all of 2009. Of the total available U.S. ammonia production capacity, more than 59% was concentrated in the States of Louisiana (35%), Oklahoma (19%), and Texas (5%), where there are large reserves of feedstock natural gas. Koch Nitrogen Co., LLC, Terra Industries Inc., PCS Nitrogen, Inc., CF Industries Holdings, Inc., and Agrium Inc., in descending order, accounted for 79% of total U.S. ammonia production capacity (table 4).

Beginning in 2009, CF Industries' board of directors approved and proposed the acquisition of all the outstanding common shares of Terra Industries Inc. and submitted a merger proposal to Terra Industries. The CF Industries and Terra Industries merger would have the capacity to produce 5.7 Mt of nitrogen and 2.1 Mt of phosphates and would account for about 16% of North American fertilizer capacity. Terra Industries was a nitrogen producer and had no phosphate capability. In February, Agrium sought to buy CF Industries to boost its capacity to make nitrogen-based crop nutrients, while CF Industries was attempting to acquire Terra Industries (Fertilizer Week, 2009d). At yearend, CF Industries was still in negotiations to acquire Terra Industries, and Agrium remained interested in acquiring CF Industries.

In February, The Mosaic Co. restarted its Faustina, LA, ammonia complex, which had been shut down in late 2008 as a result of the economic slowdown. The plant had the capacity to produce 508,000 metric tons per year (t/yr) of anhydrous ammonia (Fertilizer Week, 2009q).

Agrium's Borger, TX, nitrogen plant resumed production in February. The Borger plant had the capacity to produce 490,000 t/yr of ammonia and 99,000 t/yr of urea (Green Markets, 2009f).

Terra Industries resumed production in February at its Woodward, OK, facility after the plant was idled in December 2008. The Woodward facility had the capability to produce 399,000 t/yr of ammonia with about 277,000 t/yr sold as a finished product (Terra Industries Inc., 2009).

Koch Nitrogen completed enhancements to its Enid, OK, facility to increase urea production. The project provided an additional estimated 127,000 t/yr of urea capacity and significantly enhanced the plant's rail load out capability (Koch Nitrogen Co., LLC, 2009).

Terra Industries restarted its 454,000-t/yr Donaldsonville, LA, ammonia plant in April as market conditions improved

(Nitrogen + Syngas, 2009f). However, on July 1, Terra Industries again idled the plant owing to a decrease in industrial demand, the end of the spring agricultural season, and lower ammonia prices (Green Markets, 2009g).

Eastman Chemical Co. discontinued its $1.6 billion Beaumont, TX, industrial gasification project. Several factors contributed to this decision, which included high capital costs, current and projected decrease in the spread between natural gas, oil, and petroleum coke prices, and the continued uncertainty in U.S. energy and environmental public policy. The petroleum coke-based gasification plant would have helped run the idled anhydrous ammonia (231,000 t/yr production capacity) and methanol units that Eastman had purchased from Terra Industries in 2007 (Green Markets, 2009b).

LSB Industries, Inc. experienced many startup delays at its Pryor, OK, urea ammonia nitrate plant in 2009. In January 2010, LSB Industries began production of anhydrous ammonia but at production rates much lower than the targeted rates. The Pryor facility was expected to produce and sell approximately 295,000 t/yr of urea and 32,000 t/yr of anhydrous ammonia when fully operational (LSB Industries Inc., 2009, 2010).

Southeast Idaho Energy LLC was issued a revised air quality permit that imposed new limits on CO_2 emissions for its proposed $1.5 billion nitrogen facility near American Falls, ID. The nitrogen plant, using advanced clean-coal gasification technology, would produce 453 metric tons per day (t/d) of anhydrous ammonia, 1,630 t/d of granular urea, and 1,450 t/d of UAN. Construction of the plant was anticipated to begin in 2011 (Green Markets, 2009h).

SynGest Inc. planned to build a $102 million corn-based anhydrous ammonia plant near Menlo, IA. The plant was expected to use about 118,000 t/yr of corn cobs to produce 45,000 t/yr of ammonia. Plant construction was anticipated to start in the first half of 2010 (Green Markets, 2009d).

Environment

Hypoxia has become a controversial environmental concern for the fertilizer industry and an issue that spawned significant research efforts to determine its cause. Hypoxia happens where water near the bottom of an affected area in a large body of water, such as the Gulf of Mexico, contains less than 2 parts per million of dissolved oxygen. Hypoxia can cause stress or death in bottom-dwelling organisms that cannot move out of the hypoxic or “dead” zone.

Dead zones in coastal oceans have been reported in more than 400 ecosystems, affecting a total area of more than 245,000 square kilometers worldwide. The number of dead zones has approximately doubled each decade since the 1960s. More recently, dead zones have developed in continental seas, such as the Baltic Sea, the Black Sea, the East China Sea, the Gulf of Mexico, and the Kattegat (Diaz and Rosenberg, 2008).

In January, the Gulf of Mexico Hypoxia Monitoring Implementation Plan was completed. The plan provided a multistep, tiered approach to improve monitoring of the Gulf of Mexico in support of the 2008 Gulf Hypoxia Action plan. Included in the plan were detailed core monitoring system requirements, details for expanded observing systems, and needs for advancing the understanding of hypoxia causes and impacts. Also provided were specific directions for improved data availability and outreach. Several Federal and State partners have committed to implementing many of the system requirements of the plan (Gulf of Mexico Hypoxia Monitoring Implementation Plan Steering Committee, 2009, p. 9).

U.S. Department of Agriculture (USDA) announced an initiative to improve water quality and the overall health of the Mississippi River Basin. The Mississippi River Basin Healthy Watersheds Initiative (MRBI) would provide approximately $320 million during the next 4 years to projects in priority watersheds located in Arkansas, Kentucky, Illinois, Indiana, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Ohio, Tennessee, and Wisconsin. The goal of the MRBI was to help farmers and landowners implement conservation practices that would avoid, control, and trap nutrient runoff. Participation in the initiative, which was managed by USDA’s Natural Resources Conservation Service and funded by the Cooperative Conservation Partnership Initiative and other Farm Bill Conservation Title programs, would be made available through a competitive process for potential partners at the local, State, and national levels (Green Markets, 2009i).

Consumption

In 2009, apparent consumption of ammonia was 12.3 Mt of contained nitrogen, about 9% lower than that in 2008. Apparent consumption is calculated as production plus imports minus exports, adjusted to reflect any changes in stocks. Consumption of nitrogen fertilizers in the United States for the 2009 crop year (ending June 30, 2009) is listed in table 5. Consumption was estimated to be 11.6 Mt of contained nitrogen, which was slightly higher than that of 2008. Anhydrous ammonia and nitrogen solutions, mostly UAN solutions containing 29.8% to 29.9% nitrogen, were the principal fertilizer products, representing 30% and 25%, respectively, of fertilizer consumption. Urea (45.9% nitrogen) constituted 20% of fertilizer consumption during the 2009 crop year. Ammonium nitrate (33.9% nitrogen) and ammonium sulfate each constituted 2% of 2009 nitrogen fertilizer consumption. The leading nitrogen-consuming States in the 2009 crop year were California, Iowa, Illinois, Kansas, and Nebraska.

Stocks

Stocks of ammonia at yearend 2009 were 167,000 metric tons (t), a decrease of 45% from comparable revised stocks at yearend 2008, according to data published by the U.S. Census Bureau (table 6).

Transportation

Ammonia was transported by refrigerated barge, rail car, pipeline, and tank truck. Three companies served 11 States with 5,090 kilometers (km) of pipelines and 4,800 km of river barge transport; rail and truck were used primarily for interstate or local delivery.

NuStar Energy L.P. continued to operate the Gulf Central ammonia pipeline. The 3,200-km ammonia pipeline originated in the Louisiana Delta area, where it had access to three marine terminals and three anhydrous ammonia plants on the

Mississippi River. The capacity of this pipeline was about 2 million metric tons per year (Mt/yr) of ammonia, with a storage capacity of more than 1 Mt. In 2009, about 1.1 Mt of ammonia was shipped through the Gulf Central ammonia pipeline (NuStar Energy L.P., 2010, p. 13).

Magellan Midstream Partners, L.P. owned a common carrier ammonia pipeline system. The 1,750-km pipeline system, which transported and distributed ammonia from production facilities in Oklahoma and Texas to various distribution plants in the Midwest, had a delivery capacity of about 820,000 t/yr. In 2009, 583,000 t of ammonia was shipped through Magellan's pipeline compared with 746,000 t in 2008 (Magellan Midstream Partners L.P., 2010, p. 34). Tampa Pipeline Corp. operated the 135-km Tampa Bay Pipeline system, which moved ammonium phosphate and nitrogen compounds for fertilizer producers in Hillsborough and Polk Counties, FL.

Prices

Midyear and yearend prices for nitrogen materials are listed in table 7. The average gulf coast ammonia price began 2009 at $120 per short ton ($132 per metric ton), and in September reached the high for the year of $325 per short ton ($358 per metric ton), where it remained until early November. At yearend, the ammonia price was $275 per short ton ($303 per metric ton), a 15% decrease in price from the average high for 2009.

The average granular urea price fluctuated throughout 2009, beginning the year at $215 per short ton ($237 per metric ton). The average price reached a high of $318 per short ton ($351 per metric ton) at the beginning of December. At yearend, the urea price was $311 per short ton ($343 per metric ton).

The average ammonium nitrate price, which began 2009 at $275 per short ton ($303 per metric ton), remained fairly consistent throughout the year. The average price rose to $318 per short ton ($351 per metric ton) by early July and then decreased to $268 per short ton ($295 per metric ton) by yearend.

Typically, ammonium sulfate prices do not follow the same trend as other nitrogen products, which correlate to natural gas prices, mainly because a substantial portion of the material is produced as a byproduct of caprolactam production. Caprolactam, an organic compound, is the precursor to Nylon 6, a widely used synthetic polymer. The average price began 2009 at about $205 per short ton ($226 per metric ton) and fluctuated, reaching a high of $235 per short ton ($259 per metric ton) in mid-March and remaining at this level through June. By yearend, the price reached an average of $198 per short ton ($218 per metric ton).

In 2009, the annual average prices paid for fertilizers decreased by about 30%. One reason for the decline in fertilizer prices was that the annual average cost of natural gas, the primary feedstock for nitrogen fertilizers, was down 54% in 2009 compared with the annual average in 2008 (U.S. Department of Agriculture, Economic Research Service, 2010a).

Foreign Trade

Ammonia exports were about 91% lower than those in 2008 (table 8). Canada was the leading destination for U.S. exports of ammonia; the total quantity exported to Canada decreased by 93% from that in 2008. Canada represented the destination for 75% of total U.S. exports of ammonia in 2009.

Ammonia imports were about 25% lower than those in 2008 and dwarfed the quantity of exports. The average value of ammonia imports decreased to $285 per metric ton from $597 per metric ton in 2008 (table 9). Trinidad and Tobago (68%) continued to be the leading import source. Canada (15%) and Russia (8%) were the remaining significant import sources.

Tables 10 and 11 list trade data for other nitrogen materials and include information on principal destination or source countries. Exports of nitrogen materials decreased in 2009, with the exception of ammonium nitrate and DAP. Import quantities of nitrogen materials were lower than imports in 2008 for most nitrogen compounds. The exceptions were ammonium nitrate and limestone mixtures and potassium nitrate and sodium nitrate mixtures.

World Review

Anhydrous ammonia and other nitrogen materials were produced in more than 70 countries. Global ammonia production in 2009, estimated to be 130 Mt, was about the same as that in 2008 (table 12). China, with 33% of total production, was the leading world producer of ammonia. Asia contributed 49% of total world ammonia production, and the Commonwealth of Independent States (CIS), Estonia, and Lithuania produced 14% of the global total. North America represented 9% of the total; Middle East and Western Europe, 7% each; Central America and South America together, 6%; and Africa, Eastern Europe, and Oceania together contributed the remaining 8%.

In 2009, world ammonia exports, estimated to be 14.4 Mt of contained nitrogen, were lower than those in 2008. Canada, Indonesia, Russia, Saudi Arabia, and Trinidad and Tobago accounted for about 66% of the world export total. North America (primarily the United States) imported 32% of global ammonia import trade, followed by Asia (27%) and Western Europe (19%) (International Fertilizer Industry Association, 2010).

European Union.—At the request of the European Fertilizer Manufacturers Association (EFMA) on behalf of the Community Ammonium Nitrate industry, the European Union (EU) opened a review investigation into the dumping of ammonium nitrate imports from Ukraine in April. EFMA supplied evidence to show that there was continued dumping activity by Ukraine and that there was a likelihood of the recurrence of dumping if the existing measures were allowed to lapse. The antidumping duty amounted to $46 per metric ton. The ammonium nitrate restrictions were first imposed in 2001 (Fertilizer Week, 2009j).

Algeria.—Sorfert Algerie (a joint venture between Orascom Construction Industries and Sonatrach) reported that construction on the ammonia and urea plant at Arzew was on track for commissioning during late 2010. The plant would have a production capacity of 800,000 t/yr of ammonia and 1.2 Mt/yr

of urea. Most, if not all, of the output would be targeted toward the export market (Fertilizer Week, 2009p).

Australia.—Perdaman Chemicals and Fertilisers Pty. Ltd. announced plans to build a $2.8 billion urea manufacturing facility in Collie, about 200 km south of Perth, Western Australia. The plant would use gasification technologies to turn subbituminous coal into 1.6 Mt/yr of ammonia and 2 Mt/yr of urea. The first shipment of urea was expected by 2013. The plant would be built in a new 246-hectare industrial park recently opened by the Western Australian state government (Nitrogen + Syngas, 2009a). Denmark's Haldor Topsøe A/S was providing the ammonia synthesis technology, and Netherlands-based Stamicarbon B.V. would supply the urea melt and granulation technology for the plant. Royal Dutch Shell plc would provide the coal gasification technology for the new facility. The urea produced would be targeted primarily toward the export market (Fertilizer Week, 2009n).

Brazil.—Petróleo Brasiliero S.A. (Petrobras) planned to locate its proposed ammonia and urea plant at Tres Lagoas in Mato Grosso do Sul State. The production capacity of the plant would be 760,000 t/yr of ammonia and 1 Mt/yr of urea. Cost for the plant was estimated to be $1.5 billion. The plant was expected to be completed by 2013 (Fertilizer Week, 2009m).

Canada.—In January, Agrium announced the restart of its Fort Saskatchewan, Alberta, nitrogen facility and resumption of urea production at its other Canadian facilities owing to the improvement in urea demand. Agrium's Fort Saskatchewan nitrogen facility has the capacity to produce 465,000 t/yr of ammonia and 430,000 t/yr of urea (Fertilizer Week, 2009b).

China.—Hangfeng Evergreen Inc. planned to build an additional polymer-coated urea (PCU) production line with its 50–50 joint-venture partner Shandong Mingshui Great Chemical Group. The new PCU line would have a production capacity of 100,000 t/yr and would share the infrastructure, utility supplies, and operational management with the existing PCU and sulfur-coated urea units located in Shandong Province. The new line was scheduled for completion in the third quarter of 2010 at a cost of $5 million (Fertilizer Week, 2009i).

Sichuan Hongda Co. Ltd. planned to invest $141 million in chemical projects through its subsidiary Sichuan Mianzhu Chuanrun Chemical Co. Ltd. Plans were to construct a 200,000-t/yr ammonia plant, 300,000-t/yr urea plant, and a 300,000-t/yr compound fertilizer unit. No timetable for construction was announced (Fertilizer Week, 2009o).

In December, the Chinese Government released its 2010 tariff rates for many products, including urea, to discourage exports during periods of high domestic demand. The surcharge for urea would be 110% during the high seasons, which were from February 1 through June 30 and September 16 through October 15 (Fertilizer Week America, 2009).

Egypt.—Egypt's Industrial Development Authority approved the construction of a nitrogen fertilizer production line, which would be located at Egyptian Chemical Industries' (KIMA) Aswan facility. The new line would produce 600,000 t/yr of urea and 600,000 t/yr of ammonium nitrate. No timetable for construction was identified (Daily News Egypt, 2009).

Egyptian Nitrogen Products Co. SAE secured financing of $1.05 billion to support the construction of second and third urea trains at the existing Misr Oil Processing Co. (MOPCO) nitrogen facility in Damietta. Total production at the MOPCO site would increase to 1.95 Mt/yr of urea and 150,000 t/yr of merchant ammonia. Construction of both trains was expected to be completed in the first half of 2012 (Fertilizer Week, 2009a).

Estonia.—Nitrofert JSC suspended ammonia and urea production at its Ida-Viruuma plant in February owing to market conditions and high raw material costs. The plant had one ammonia train with a capacity to produce 200,000 t/yr and two urea trains, each with a production capacity of 108,000 t/yr (Fertilizer Week, 2009k).

France.—In mid-March, Yara International ASA restarted ammonia and urea production at its Le Havre plant following an improvement in international urea prices and lower energy costs. Production capacity at the plant was 400,000 t/yr ammonia and 350,000 t/yr urea when fully operational (Nitrogen + Syngas, 2009i).

India.—Krishak Bharati Cooperative Ltd. awarded KBR Inc. a contract to provide licensing and basic engineering services to upgrade two ammonia plants located in Hazari, Surat. KBR was to increase the capacity of each ammonia plant to 1,890 t/d and to reduce the overall energy consumption at these plants. The upgrade of the ammonia plants began in 2009 (KBR Inc., 2009).

Fertilisers and Chemicals Travancore Ltd. secured permission from India's Department of Fertilisers to establish a new 500,000-t/yr urea plant. The plant would be based on natural gas feedstock at a cost of about $130 million. No timetable for construction was announced (Nitrogen + Syngas, 2009b).

Italy.—Yara restarted ammonia and urea production at its Ferrara plant in northern Italy in late February. The plant was restarted based on improvement in international urea markets and increased seasonal demand for urea in Italy. The plant had a production capacity of 600,000 t/yr of ammonia and 500,000 t/yr of urea (Nitrogen + Syngas, 2009i).

Libya.—Yara, National Oil Corp. of Libya (NOC), and the Libyan Investment Authority (LIA) signed the final agreements to create the fertilizer joint-venture Libyan Norwegian Fertilizer Co. (Lifeco). Yara, NOC, and LIA would have ownership shares in the new company of 50%, 25%, and 25%, respectively. NOC would transfer to Lifeco the existing Marsa El Brega fertilizer assets, valued at $225 million, while Yara would contribute to Lifeco the corresponding value in cash. NOC would supply natural gas to Lifeco under a long-term agreement. Yara would handle all urea and ammonia exports from Lifeco. The transferred plant would produce 900,000 t/yr of urea and 150,000 t/yr of merchant ammonia (Green Markets, 2009j).

Lithuania.—In June, Achema Group successfully started a 1,050-t/d urea production plant at its site in Jonava. The plant was previously located elsewhere in Europe and had been shut down since the mid-1980s. Technical and equipment modifications were made in order to increase the efficiency of the plant (Nitrogen + Syngas, 2009c).

Nigeria.—Notore Chemical Industries Ltd. began ammonia production in January and urea production in July at its plant in Onne, Rivers State. The plant had the capacity to produce 1,100 t/d of ammonia and 1,500 t/d of granular urea. About $400

million was estimated to have been invested in the extensive rehabilitation of the plant, which had been idled for more than a decade (Fertilizer Week, 2009l).

Oman.—Sohar International Urea and Chemical Industries Co. (SIUCI) (a subsidiary of Suhail Bahwan Group) started production at its $638 million urea and ammonia plant at the Sohar Industrial Port, 250-km northwest of Muscat. The natural gas-feedstock complex would have a 660,000-t/yr ammonia plant and two granular urea plants with a combined capacity of 1.1 Mt/yr (Nitrogen + Syngas, 2009e).

Pakistan.—Engro Chemical Pakistan Ltd. was building a new 745,000-t/yr ammonia and 1.2-Mt/yr prilled urea plant in Dharki, Sindh Province. The plant was expected to begin production in July 2010 (Fertilizer Week, 2009e).

Fatima Fertilizer Co. Ltd. (a joint venture between Fatima Group and Pakistan's Arif Habib Group) planned to start production in December of urea and calcium ammonium nitrate at its new plant at Sadiquabad in the Rahim Yar Khan District of Punjab. The new plant has the capacity to produce 297,000 t/yr of urea and 276,000 t/yr of calcium ammonium nitrate and would use natural gas as the feedstock (Fertilizer Week, 2009h).

Peru.—CF Industries Holdings Inc. signed an agreement for the supply of natural gas to its proposed nitrogen fertilizer complex in San Juan de Marcona. CF Industries would purchase up to 2.8 million cubic meters of natural gas on a take-or-pay basis from a consortium of companies in Peru. The cost for the natural gas used to produce petrochemicals at the facility would be based on the index price for urea. The estimated cost for the project ranged from $1.5 to $2 billion. The expected production capacities were 910,000 t/yr of anhydrous ammonia and 1.3 Mt/yr of urea (Green Markets, 2009a).

Qatar.—The Qatar Fertilizer Co. (Qafco) signed a letter of intent to build a sixth urea plant at its Mesaieed site in eastern Qatar. The Qafco VI urea plant would have a production capacity of 1.27 Mt/yr of urea and would use ammonia feed and share utilities and export arrangements with the Qafco V project. The plant was expected to begin production in late 2012 (Nitrogen + Syngas, 2010b).

Indian Farmers Fertilizer Cooperative Ltd. (IFFCO) and Qafco signed a memorandum of understanding to establish a joint-venture ammonia and urea complex in Qatar. Qafco would have 51% stake in the proposed joint venture, and IFFCO would hold a 49% stake. No timetable for construction was identified (Fertilizer Week, 2009g).

Russia.—Azot Cherepovets, part of the PhosAgro Group, began building infrastructure facilities for a 1,500-t/d urea plant at Cherepovets. The urea plant, which would use surplus urea from Azot Cherpovet's existing facilities, was expected to start production by the beginning of 2012 (Fertilizer Week, 2009c).

Saudi Arabia.—KBR was awarded a contract by Al-Jubail Fertilizer Co. to upgrade the Al-Bayroni ammonia plant. KBR would provide engineering design, procurement, and installation support services for a new auxiliary boiler and a reformer convection section for the ammonia plant. The plant was originally built in the 1980s utilizing KBR's ammonia technology (Green Markets, 2009e).

Ukraine.—In January, the natural gas cost dispute between Russia and Ukraine led to a number of fertilizer plants shutting down as well as a decrease in fertilizer production in Ukraine and across Europe. In June, Ukraine paid $475 million to OAO Gazprom (Russia's national energy company) to stop another potential crisis over debts and another shutdown of natural gas supplies. They also agreed upon a 2009 natural gas price that would be paid by Ukraine. Ukrainian fertilizer producers still faced high gas prices in spite of negotiations between the Ukranian national energy company Naftogaz Ukrainy and Gazprom. Ukrainian producers appealed to their Government to buy directly from Gazprom, but the proposal was not approved by the Government (Nitrogen + Syngas, 2009g).

United Arab Emirates.—Ruwais Fertilizer Industries (Fertil) awarded Samsung Engineering Co., Ltd. a contract to build its Fertil II ammonia-urea plant at Ruwais. Fertil II was projected to have a capacity of 660,000 t/yr of ammonia and 1.15 Mt/yr of urea. The plant was scheduled to come online in January 2013 at a cost of $1.2 billion (Nitrogen + Syngas, 2010a).

Uzbekistan.—Uzbek Chemical Industry and International Petroleum Investment Co. planned to build an industrial complex to produce ammonia and carbamide. The complex would have a capacity to produce 900,000 t/yr of ammonia and 1 Mt/yr of carbamide at a cost of $1.34 billion. Construction was planned to begin in 2010 and be completed by 2013 (Trend News Agency, 2009).

Venezuela.—Pequiven (Petroquimica de Venezuela) S.A. (a subsidiary of Venezuela's oil company Petróleos de Venezuela S.A.) awarded two contracts to Stamicarbon to provide the license and process design package for two new urea plants, one in Jose and the other in Puerto Nutrias. Production was expected to start at the Jose plant in 2011. The Jose plant would have two lines, each with a production capacity of 2,200 t/d of urea. The Puerto Nutrias was expected to begin production in 2012 with one line having a production capacity of 2,200 t/d of urea (Nitrogen + Syngas, 2009h).

Zimbabwe.—Sable Chemicals Industries Ltd. closed the ammonia line at its nitrogen fertilizer plant in Kwekwe. Sable had used the ammonia to produce ammonium nitrate onsite, but would import ammonia instead. The 76,000-t/yr ammonia plant was built in the 1960s (Nitrogen + Syngas, 2009d).

Outlook

According to the USDA, U.S. corn growers intended to plant 34.4 million hectares (Mha) of corn for all purposes in the 2010 crop year, an increase of 3% from that in 2009 and 2008 (U.S. Department of Agriculture, National Agricultural Statistical Service, 2010, p. 1). Expected corn acreage utilization was up in many States because of reduced winter wheat acreage utilization and expectations of higher selling prices.

According to long-term projections from the USDA, projected plantings for the eight major field crops (barley, corn, oats, rice, sorghum, soybeans, upland cotton, and wheat) in the United States were expected to decrease slightly to about 100 Mha during the projection period (2010–19) from about 101 Mha in 2009. Increased cropland availability (resulting from the reduction in the allowable acreage enrolled in the Conservation Reserve Program) and sustained high commodity prices were expected to keep projected U.S. cropland use high, although overall plantings would be somewhat reduced from the 2009

and 2008 levels. Corn, soybeans, and wheat were expected to account for about 89% of acreage utilization for the eight major field crops during the projection period. During the

10-year period, the crop mix was expected to keep corn acreage high. Soybean planting would initially fall but as stocks are reduced, prices would improve, and plantings increase. Wheat plantings would decline as a result of weak demand and significant quantities of stocks. Continued increases were projected for corn used to produce ethanol during the next 10 years; however, the pace was expected to slow from the rapid gains of 2007 and 2008. Most ethanol production used corn as a feedstock, with nearly one-third of total corn use expected to go to ethanol production in 2009 and 2010. Projected gains were largely in line with moderate expected increases in overall gasoline usage in the United States. Relatively high prices for crude oil would be favorable for ethanol production, which, when combined with Government programs, would provide economic incentives for ethanol producers.

Feed and residual use of corn was projected to bottom out in the initial years owing to reduced meat production and increased feeding of distillers grains (a coproduct of dry mill ethanol production). Feed use was expected to rise through the rest of the period as meat production increases and growth in availability of distillers grains slows with the decrease in corn-based ethanol expansion. Gains in food and industrial uses of corn (other than for ethanol production) were projected to rise during the next decade. Consumer dietary concerns and other changes in tastes and preferences limit increases in the combined use of corn for dextrose, glucose, and high-fructose corn syrup to about one-half the rate of population gain. Other food uses of corn are also projected to rise more slowly than the increase in population. U.S. corn exports rise in response to stronger global demand for feed grains to support growth in meat production, with the U.S. share of global corn trade decreasing below 60%. Larger corn plantings increase the demand for nitrogen fertilizers (U.S. Department of Agriculture, Economic Research Service, 2010b, p. 58).

In 2009, natural gas prices fell to their lowest level in 7 years as a result of a weakened economy, a reduced heating demand, as well as higher than usual production and storage levels. Natural gas prices in the United States typically are higher than those in the rest of the world, but lower natural gas prices make U.S. ammonia production more competitive with offshore imports. Depending on its price, natural gas can account for approximately 75% to 90% of the U.S. cash cost of producing ammonia, and this means that the ammonia capacity at older, higher cost U.S. plants is still at risk for closure. For example, in 2009, natural gas costs in Algeria and the Middle East were estimated to be about $0.60 per million British thermal units (Btus) and $0.80 per million Btus, respectively, and in Trinidad and Tobago, the cost was estimated to be $2.60 per million Btus (Potash Corp. of Saskatchewan, 2009, p. 55). The U.S. Department of Energy projected that the Henry Hub natural gas spot price in the United States would average $4.54 million Btus in 2010, a $0.06 increase from the 2009 average, and $4.76 per million Btus in 2011 (U.S. Department of Energy, Energy Information Administration, 2010, p. 1).

In the winter of 2001, natural gas prices began to spike and continued to increase through the third quarter of 2008, and as a result, U.S. ammonia production capacity has declined by 4.1 Mt/yr, or 24% of the 2001 capacity. In the third quarter of 2008, natural gas prices declined sharply as a result of the downturn in the global economy. During 2009, natural gas prices were relatively low owing to weak industrial demand and competition from shale gas. In 2009, lower natural gas prices made domestic nitrogen production more competitive with imports from major nitrogen-exporting regions. The future of U.S. ammonia production depends on the variability in natural gas prices. The interest that U.S. firms have in constructing new plants outside the United States, particularly in Trinidad and Tobago where natural gas prices are lower, indicates that in the future, much of the U.S. supply of ammonia was expected to be met by foreign production.

References Cited

Daily News Egypt, 2009, Egypt approves LE 400 mln fertilizer line: Daily News Egypt, October 6. (Accessed October 8, 2009, at http://www.thedailynewsegypt.com/index.php?option=com_content&view=article&id=106350&catid=1&Itemid=183'.)

Diaz, R.J., and Rosenberg, Rutger, 2008, Spreading dead zones and consequences for marine ecosystems: Science, v. 321, no. 5891, February 15, p. 926–929.

Fertilizer Week, 2009a, Agrium, other MOPCO partners secure loans to triple urea output: Fertilizer Week, v. 23, no. 36, December 18, p. 1–2.

Fertilizer Week, 2009b, Agrium restarts nitrogen plants on improved demand: Fertilizer Week, v. 22, no. 39, January 16, p. 5.

Fertilizer Week, 2009c, Azot Cherepovets starts work on new urea plant: Fertilizer Week, October 23, v. 23, no. 28, p. 5.

Fertilizer Week, 2009d, CF prepares ground for Terra takeover: Fertilizer Week, v. 22, no. 39, January 16, p. 1–2.

Fertilizer Week, 2009e, Engro, IFC agree $50m loan, urea plant on track for July: Fertilizer Week, v. 23, no. 34, December 4, p. 2–3.

Fertilizer Week, 2009f, EPA plans shift in biofuel production: Fertilizer Week, v. 23, no. 6, May 15, p. 5.

Fertilizer Week, 2009g, IFFCO & Qafco sign Qatar ammonia & urea j.v. MoU: Fertilizer Week, v. 22, no. 45, February 27, p. 2–3.

Fertilizer Week, 2009h, Fatima Fertilizer plans to start urea later this month: Fertilizer Week, v. 23, no. 34, December 4, p. 3–4.

Fertilizer Week, 2009i, Hanfeng-Minghua to build polymer coated urea unit: Fertilizer Week, v. 23, no. 9, June 12, p. 11.

Fertilizer Week, 2009j, NFU believes AN anti-dumping duties detrimental to UK farming: Fertilizer Week, v. 23, no. 23, June 19, p. 4–5.

Fertilizer Week, 2009k, Nitrofert closes ammonia and urea unit: Fertilizer Week, v. 22, no. 42, February 6, p. 8.

Fertilizer Week, 2009l, Notore produces urea at refurbished Onne plant: Fertilizer Week, v. 23, no. 16, July 31, p. 2–3.

Fertilizer Week, 2009m, Petrobras to locate planned N units in Mato Grosso do Sul state: Fertilizer Week, v. 23, no. 33, November 27, p. 5–6.

Fertilizer Week, 2009n, Samsung C&T to take stake in Collie: Fertilizer Week, v. 23, no. 19, August 21, p. 4.

Fertilizer Week, 2009o, Sichuan Hongda plans nitrogen investment: Fertilizer Week, v. 23, no. 7, May 22, p. 11.

Fertilizer Week, 2009p, Sofert Algeria on track for late 2010 start-up; OCI income 58% down: Fertilizer Week, v. 23, no. 22, September 11, p. 2–3.

Fertilizer Week, 2009q, Spring season activates US production start-ups: Fertilizer Week, v. 22, no. 43, February 11, p. 5.

Fertilizer Week America, 2009, Urea—China: Fertilizer Week America News Update, December 16, 2 p.

Green Markets, 2009a, CF signs gas deal in Peru, final decision on new nitrogen plant expected in early 2010: Green Markets, v. 33, no. 42, October 19, p. 1, 16.

Green Markets, 2009b, Eastman axes gasification project: Green Markets, v. 33, no. 51, December 21, p. 11.

Green Markets, 2009c, Groups seek to lift Russia fertilizer restrictions: Green Markets, v. 33, no. 36, September 7, p. 10.
Green Markets, 2009d, Heartland Co-op may get SynGest ammonia: Green Markets, v. 33, no. 37, September 14, p. 14–15.
Green Markets, 2009e, KBR wins ammonia plant contract: Green Markets, v. 33, no. 43, October 26, p. 11.
Green Markets, 2009f, Producers bring plants up, give updates: Green Markets, v. 33, no. 7, February 16, p. 9.
Green Markets, 2009g, Terra to temporarily idle Donaldsonville: Green Markets, v. 33, no. 26, June 29, p. 10.
Green Markets, 2009h, Tougher emissions standards required for proposed Idaho nitrogen plant: Green Markets, v. 33, no. 49, December 7, p. 13–14.
Green Markets, 2009i, USDA announces gulf "dead zone" initiative: Green Markets, v. 33, no. 39, September 28, p. 12–13.
Green Markets, 2009j, Yara completed 50 percent JV with NOC/LIA of Libya: Green Markets, v. 33, no. 7, February 16, p. 11.
Gulf of Mexico Hypoxia Monitoring Implementation Plan Steering Committee, 2009, Gulf of Mexico hypoxia monitoring implementation plan: Gulf of Mexico Hypoxia Monitoring Implementation Plan Steering Committee, January, 37 p. (Accessed September 23, 2010, via http://www.ncddc.noaa.gov/activities/gulf-hypoxia-stakeholders/view.)
International Fertilizer Industry Association, 2010, Statistics: Paris, France, International Fertilizer Industry Association.
KBR Inc., 2009, KBR awarded contract by Krishak Bharati Cooperative Limited (KRIBHCO) to provide licensing of KBR purifier™ ammonia technology for first time in India: KBR Inc. news article, February 17. (Accessed September 13, 2010, at http://investors.kbr.com/phoenix.zhtml?c=198137&p=irol-newsArticle&ID=1257316&highlight=.)
Koch Nitrogen Co., LLC, 2009, Koch Nitrogen Company, LLC enhances Enid facility to increase urea production: Koch Nitrogen Co., LLC press release, March 18, 1 p.
LSB Industries Inc., 2009, LSB Industries receives regulatory permits to operate its Pryor, Oklahoma chemical plant: LSB Industries Inc. press release, February 26, 2 p.
LSB Industries Inc., 2010, LSB Industries Inc. reports results for the 2009 fourth quarter and year: LSB Industries Inc. press release, March 8, 10 p.
Magellan Midstream Partners L.P., 2010, Form 10K—2009: U.S. Securities and Exchange Commission, 126 p.
Nitrogen + Syngas, 2009a, Australia—New urea facility: Nitrogen + Syngas, no. 298, March–April, p. 6.
Nitrogen + Syngas, 2009b, India—Approval for new urea plant: Nitrogen + Syngas, no. 301, September–October, p. 8.
Nitrogen + Syngas, 2009c, Lithuania—Relocated urea plant restarts: Nitrogen + Syngas, no. 301, September–October, p. 8.
Nitrogen + Syngas, 2009d, Sable Chemicals shuts ammonia plant: Nitrogen + Syngas, no. 302, November–December, p. 9.
Nitrogen + Syngas, 2009e, Sohar starts nitrogen facility: Nitrogen + Syngas, no. 299, May–June, p. 8.
Nitrogen + Syngas, 2009f, Terra restarts Donaldsonville plant: Nitrogen + Syngas, no. 298, March–April, p. 8.
Nitrogen + Syngas, 2009g, Ukraine—Producers face continued gas price woes: Nitrogen + Syngas, no. 301, September–October, p. 8.
Nitrogen + Syngas, 2009h, Venezuela—New urea contracts: Nitrogen + Syngas, no. 299, May–June, p. 9.
Nitrogen + Syngas, 2009i, Yara re-starts fertilizer plants: Nitrogen + Syngas, no. 298, March–April, p. 6.
Nitrogen + Syngas, 2010a, Contracts awarded for new Fertil plant: Nitrogen + Syngas, no. 303, January–February, p. 8.
Nitrogen + Syngas, 2010b, Qafco to build sixth urea plant: Nitrogen + Syngas, no. 303, January–February, p. 8.
NuStar Energy L.P., 2010, 2009 annual report & 10–K: San Antonio, TX, NuStar Energy L.P., 167 p. (Accessed June 27, 2010, at http://www.nustarenergy.com/Investors/Pages/FinancialReportsAndSECFilings.aspx.)
Potash Corp. of Saskatchewan, 2009, Overview of PotashCorp and its industry 2009: Saskatoon, Saskatchewan, Canada, Potash Corp. of Saskatchewan, 68 p.
Terra Industries Inc., 2009, Terra restarts Woodward facility: Sioux City, IA, Terra Industries Inc. press release, February 13, 1 p.
Trend News Agency, 2009, IPIC to establish joint venture on ammonia production in Uzbekistan: Trend News Agency, March 19. (Accessed March 23, 2009, at http://en.trend.az/capital/entrepreneurship/1443455.html.)
U.S. Department of Agriculture, Economic Research Service, 2010a, Farm income and costs—2009 farm sector income estimates: U.S. Department of Agriculture, August 31. (Accessed September 3, 2010, at http://www.ers.usda.gov/Briefing/FarmIncome/2009incomeaccounts.htm.)
U.S. Department of Agriculture, Economic Research Service, 2010b, USDA agricultural baseline projections to 2019: U.S. Department of Agriculture, February 11, 106 p.
U.S. Department of Agriculture, National Agricultural Statistical Service, 2010, Prospective plantings: U.S. Department of Agriculture, March 31, 36 p. (Accessed September 2, 2010, at http://usda.mannlib.cornell.edu/usda/current/ProsPlan/ProsPlan-03-31-2010.pdf.)
U.S. Department of Energy, Energy Information Administration, 2010, Short-term energy outlook: U.S. Department of Energy, September 10, 43 p.

GENERAL SOURCES OF INFORMATION

U.S. Geological Survey Publications

Evaporites and Brines. Ch. in United States Mineral Resources, Professional Paper 820, 1973.
Fertilizers—Sustaining Global Food Supplies. Fact Sheet 155–99, 1999.
Historical Statistics for Mineral Commodities in the United States. Data Series 140.
Mineral Commodity Profiles—Nitrogen. Open-File Report 2004–1290, 2004.
Nitrogen. Ch. in Mineral Commodity Summaries, annual.
Nitrogen in the Mississippi Basin—Estimating Sources and Predicting Flux to the Gulf of Mexico. Fact Sheet 135–00, 2000.
Nonpoint and Point Sources of Nitrogen in Major Watersheds of the United States. Water-Resources Investigations Report 94–4001, 1994.
Nutrients in the Nation's Waters—Too Much of a Good Thing?. Circular 1136, 1996.
Nutrients in the Nation's Streams and Groundwater, 1992–2004. Circular 1350, 2010.

Other

Amber Waves. U.S. Department of Agriculture, monthly.
Fertilizer Institute, The.
International Fertilizer Development Center.
International Fertilizer Industry Association.
Nitrogen + Syngas. BCInsight Ltd., bimonthly.

TABLE 1

SALIENT AMMONIA STATISTICS[1, 2]

(Thousand metric tons of contained nitrogen unless otherwise specified)

		2005	2006	2007	2008	2009
United States:						
Production		8,340	8,190	8,540	7,870 r	7,700 p
Exports		525	193 r	145	192	16
Imports for consumption		6,520	5,920	6,530	6,020	4,530
Consumption, apparent[3]		14,400	14,000	15,000	13,600 r	12,300 p
Stocks, December 31, producers		254	201	157	302 r	167
Average annual price, free on board gulf coast[4]	dollars per short ton	304	302	307 r	590	251
Net import reliance as a percentage of apparent consumption[5]		41 r	41	43	41 r	38 p
Natural gas price, wellhead, average price[6]	dollars per thousand cubic feet	7.33	6.39	6.25 r	7.96 r	3.71 e
World:						
Production[e]		122,000	126,000	131,000 r	130,000 r	130,000
Trade[7]		15,600	15,900	15,800	15,400	14,600 e

[e]Estimated. [p]Preliminary. [r]Revised.

[1]Data are rounded to no more than three significant digits.

[2]Synthetic anhydrous ammonia, excluding coke oven byproduct; data are for calendar year and are from the U.S. Census Bureau unless otherwise noted.

[3]Calculated from production plus imports minus exports and industry stock changes.

[4]Source: Green Markets.

[5]Defined as imports minus exports; adjusted for industry stock changes.

[6]Source: Monthly Energy Review, U.S. Department of Energy.

[7]Source: International Fertilizer Industry Association Statistics, World Anhydrous Ammonia Trade.

TABLE 2

ANHYDROUS AMMONIA SUPPLY AND DEMAND IN THE UNITED STATES[1]

(Thousand metric tons of contained nitrogen)

	2007	2008	2009[p]
Production:			
Fertilizer:			
January–June	3,890	3,520 [r]	3,040
July–December	3,720	3,210 [r]	3,430
Total	7,610	6,730 [r]	6,470
Nonfertilizer:			
January–June	478	542 [r]	603
July–December	452	594 [r]	632
Total	930	1,140 [r]	1,240
Grand total	8,540	7,870 [r]	7,700
Exports:			
January–June	56	53	9
July–December	89	139	7
Total	145	192	16
Imports for consumption:			
January–June	3,310 [r]	3,290 [r]	2,180
July–December	3,210	2,720	2,340
Total	6,530	6,020	4,530
Stocks, end of period:			
January–June	222	193 [r]	201
July–December	157	302 [r]	167
Apparent consumption:[2]			
January–June	7,630	7,330 [r]	5,810
July–December	7,340	6,250 [r]	6,530
Total	15,000	13,600 [r]	12,300

[p]Preliminary. [r]Revised.

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

[2]Calculated from production plus imports minus exports and industry stock changes.

Source: U.S. Census Bureau.

TABLE 3

MAJOR DOWNSTREAM NITROGEN COMPOUNDS PRODUCED IN THE UNITED STATES[1, 2]

(Thousand metric tons)

	2008						2009[p]					
	January–June		July–December		Total		January–June		July–December		Total	
	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content
Urea	2,690	1,240	2,550	1,170	5,240	2,410	2,490	1,140	2,600	1,190	5,080	2,330
Ammonium nitrate	3,640	1,230	3,470	1,180	7,110	2,410	2,920	991	3,380	1,140	6,300	2,140
Ammonium phosphates[3]	6,200	963	5,160	815	11,400 [r]	1,780	5,090	815	6,310	1,010	11,400	1,820
Nitric acid	3,460 [r]	762 [r]	3,220 [r]	709 [r]	6,690 [r]	1,470 [r]	2,560	562	3,370	741	5,930	1,300
Ammonium sulfate[4]	1,410	298	1,120 [r]	237 [r]	2,530 [r]	535 [r]	1,160	246	1,110	235	2,270	481

[p]Preliminary. [r]Revised.

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

[2]Ranked in relative order of importance by nitrogen content.

[3]Diammonium phosphate and monoammonium phosphate.

[4]Excludes coke plant ammonium sulfate.

Source: U.S. Census Bureau, Current Industrial Reports MQ325B.

TABLE 4

DOMESTIC PRODUCERS OF ANHYDROUS AMMONIA IN 2009[1]

(Thousand metric tons per year of ammonia)

Company	Location	Capacity[2]
Agrium Inc.	Borger, TX	490
Do.	Kennewick, WA[3]	180
CF Industries Holdings, Inc.	Donaldsonville, LA	2,040
Coffeyville Resources Nitrogen Fertilizers, LLC	Coffeyville, KS	375
Dakota Gasification Co.	Beulah, ND	363
Dyno Nobel Inc.	Cheyenne, WY	174
Do.	St. Helens, OR	101
Eastman Chemical Co.	Beaumont, TX[3]	231
Green Valley Chemical Corp.	Creston, IA	32
Honeywell International Inc.	Hopewell, VA	530
Koch Nitrogen Co.	Beatrice, NE	265
Do.	Dodge City, KS	280
Do.	Enid, OK	930
Do.	Fort Dodge, IA	350
Do.	Sterlington, LA[3]	1,110
LSB Industries, Inc.	Cherokee, AL	159
Do.	Pryor, OK[3]	210
Mosaic Co., The	Faustina (Donaldsonville), LA	508
PCS Nitrogen, Inc.	Augusta, GA	688
Do.	Geismar, LA[3]	483
Do.	Lima, OH	542
Do.	Memphis, TN[3]	372
Rentech Energy Midwest Corp.	East Dubuque, IL	278
Terra Industries Inc.	Donaldsonville, LA	454
Do.	Port Neal, IA	336
Do.	Verdigris, OK	953
Do.	Woodward, OK	399
Do.	Yazoo City, MS	454
Total		13,300

Do. Ditto.

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

[2]Engineering design capacity adjusted for 340 days per year of effective production capability.

[3]Idle.

TABLE 5

U.S. NITROGEN FERTILIZER CONSUMPTION, BY PRODUCT TYPE[1, 2]

(Thousand metric tons of nitrogen)

Fertilizer material[3]	2008[r]	2009[e]
Single-nutrient:		
Anhydrous ammonia	3,440	3,480
Nitrogen solutions[4]	2,890	2,930
Urea	2,260	2,290
Ammonium nitrate	267	271
Ammonium sulfate	250	254
Aqua ammonia	85	86
Other[5]	355	360
Total	9,540	9,670
Multiple-nutrient[6]	1,950	1,970
Grand total	11,500	11,600

[e]Estimated. [r]Revised.

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

[2]Fertilizer years ending June 30.

[3]Ranked in relative order of importance by product type.

[4]Principally urea-ammonium nitrate solutions, 29.9% nitrogen.

[5]Includes other single-nutrient nitrogen materials, all natural organics, and statistical discrepencies.

[6]Various combinations of nitrogen (N), phosphate (P), and potassium (K): N-P-K, N-P, and N-K.

Source: Slater, J.V. and Kirby, B.J., 2010, Commercial Fertilizers 2008: Columbia, MO, Association of American Plant Food Control Officials Inc. Fertilizer/Ag Lime Control Service, University of Missouri, 41 p.

TABLE 6
U.S. PRODUCER STOCKS OF FIXED NITROGEN
COMPOUNDS AT END OF PERIOD

(Thousand metric tons of contained nitrogen)

Material[1]	2008	2009 [p]
Ammonia:		
January–June	193 [r]	201
July–December	302 [r]	167
Nitrogen solutions:[2]		
January–June	212 [r]	153
July–December	286 [r]	95
Urea:		
January–June	32	(3)
July–December	53	(3)
Ammonium phosphates:[4]		
January–June	51 [r]	17 [5]
July–December	30 [5]	44
Ammonium nitrate:		
January–June	48	48
July–December	58 [r]	32
Ammonium sulfate:		
January–June	27	20
July–December	65 [r]	26
Yearend total[6]	794 [r]	364

[p]Preliminary. [r]Revised.
[1]Ranked in relative order of importance.
[2]Urea-ammonium nitrate and ammoniacal solutions.
[3]Urea data withheld.
[4]Diammonium and monoammonium phosphates.
[5]Diammonium phosphates data withheld.
[6]Calendar year ending December 31.

Source: U.S. Census Bureau, Current Industrial Reports MQ325B.

TABLE 7
PRICE QUOTATIONS FOR MAJOR NITROGEN COMPOUNDS AT END OF PERIOD

(Dollars per short ton)

	2008		2009	
Compound	June	December	June	December
Ammonium nitrate, free on board (f.o.b.) corn belt[1]	400–410	300–330	265–270	265–270
Ammonium sulfate, f.o.b. corn belt[1]	400–420	200–210	225–245	185–210
Anhydrous ammonia:				
F.o.b. corn belt[1]	725–860	450–650	300–345	340–390
F.o.b. gulf coast[2]	500–520	120	255	275
Diammonium phosphate, f.o.b. central Florida	1,025–1,070	300–305	250–255	320
Urea:				
F.o.b. corn belt,[1] prilled and granular	685–705	270–330	270–285	350–360
F.o.b. gulf coast, granular[2]	680–715	190–210	240–245	307–315

[1]Illinois, Indiana, Iowa, Missouri, Nebraska, and Ohio.
[2]Barge, New Orleans, LA.

Source: Green Markets.

TABLE 8

U.S. EXPORTS OF ANHYDROUS AMMONIA, BY COUNTRY[1]

(Thousand metric tons of ammonia and thousand dollars)

Country	2008		2009	
	Gross weight	Value[2]	Gross weight	Value[2]
Belgium	2	385	1	526
Canada	215	31,700 r	15	7,190
Haiti	(3)	118	1	207
Israel	(3)	81	1	288
Other	16 r	3,220 r	2	861
Total	233 r	35,500	20	9,070

[r]Revised.

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

[2]Cost, insurance, and freight value.

[3]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 9

U.S. IMPORTS OF ANHYDROUS AMMONIA, BY COUNTRY[1]

(Thousand metric tons of ammonia and thousand dollars)

Country	2008		2009	
	Gross weight	Value[2]	Gross weight	Value[2]
Australia	--	--	80	22,200
Canada	933	736,000	822	357,000
Egypt	--	--	96	29,400
Russia	1,440	827,000	438	133,000
Trinidad and Tobago	3,810	2,140,000	3,720	936,000
Ukraine	553	339,000	67	20,400
Venezuela	213	117,000	158	36,900
Other	371	214,000 r	126	36,000
Total	7,320	4,370,000	5,510	1,570,000

[r]Revised. -- Zero.

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

[2]Cost, insurance, and freight value.

Source: U.S. Census Bureau.

TABLE 10

U.S. EXPORTS OF MAJOR NITROGEN COMPOUNDS[1]

(Thousand metric tons)

Compound	2008 Gross weight	2008 Nitrogen content	2009 Gross weight	2009 Nitrogen content	Principal destinations in 2009
Ammonium nitrate[2]	189	64	364	123	France, 46%; Canada, 21%; Mexico, 20%.
Ammonium sulfate[2]	1,620	343 r	963	204	Brazil, 39%; Peru, 13%; Mexico, 12%.
Anhydrous ammonia	234 r	192	20	16	Canada, 78%; Belgium, 6%.
Diammonium phosphate	4,530	816 r	5,530	996	India, 58%; China, 6%.
Monoammonium phosphate	2,490	274	2,110	232	Canada, 29%; Brazil, 24%; Australia, 12%; Argentina, 11%.
Urea	302	139	289	133	Canada, 35%; Colombia, 12%; Mexico, 12%.
Total	9,370 r	1,830 r	9,280	1,700	

[r]Revised.

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

[2]Includes industrial chemical products.

Source: U.S. Census Bureau.

TABLE 11

U.S. IMPORTS OF MAJOR NITROGEN COMPOUNDS[1]

(Thousand metric tons and thousand dollars)

Compound	2008 Gross weight	2008 Nitrogen content	2008 Value[2]	2009 Gross weight	2009 Nitrogen content	2009 Value[2]	Principal sources in 2009
Ammonium nitrate[3]	707	240	230,000	451	153	98,900	Canada, 79%; Netherlands, 15%.
Ammonium nitrate and limestone mixtures	6	2	2,540	51	14	11,100	Greece, 39%; Russia, 38%; Lithuania, 14%.
Ammonium sulfate[3]	395	84	99,100	324	69	67,300	Canada, 99%.
Anhydrous ammonia[4]	7,320	6,020	4,370,000	5,510	4,530	1,570,000	Trinidad and Tobago, 68%; Canada, 15%.
Calcium nitrate	205	35	29,200	123	21	14,600	Norway, 97%.
Diammonium phosphate	31	6	13,400	22	4	9,710	Mexico, 75%; Germany 15%.
Monoammonium phosphate	176	19	158,000	57	6	34,500	Canada, 63%; Russia, 15%.
Nitrogen solutions	6,950	2,080	930,000	1,170	349	257,000	Russia, 51%; Canada, 33%.
Potassium nitrate	133	19	80,200	74	10	48,500	Chile, 87%.
Potassium nitrate and sodium nitrate mixtures	(5)	(5)	191	1	(5)	274	Germany, 66%; Canada, 30%.
Sodium nitrate	157	26	31,700	84	14	20,600	Chile, 95%.
Urea	5,460	2,510	2,870,000	4,730	2,170	1,440,000	Canada, 35%; Saudi Arabia, 11%; Qatar, 10%.
Total	21,500	11,000	8,810,000	12,600	7,330	3,570,000	

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

[2]Cost, insurance, and freight value.

[3]Includes industrial chemical products.

[4]Includes industrial ammonia.

[5]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 12

AMMONIA: ESTIMATED WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons, contained nitrogen)

Country	2005	2006	2007	2008	2009
Afghanistan	20	20	20	20	20
Albania	10	10	10	10	10
Algeria	550 [3]	470	524	500	614
Argentina	655 [3]	727 [3]	726	726	726
Australia	790	1,200	1,200	1,200	1,200
Austria	440	440	440	440	400
Bahrain	330 [3]	370 [3]	344 [3]	350	350
Bangladesh[4]	1,380 [3]	1,250	1,300	1,300	1,300
Belarus	774 [3]	815	830	805 [3]	750
Belgium	860 [3]	850	850	850	850
Bosnia and Herzegovina	1	1	1	1	1
Brazil	950	950	950	950	950
Bulgaria	320 [3]	309	310	310	310
Burma	30	30	30	30	30
Canada	4,100	4,100	4,498 [3]	4,781 [3]	4,000
China[3]	37,850	40,660	42,480	41,140 [r]	42,290
Colombia	-- [r]	-- [r]	-- [r]	-- [r]	--
Croatia	320 [3]	319 [3]	320	320	320
Cuba	28	42 [3]	47 [3]	42 [r]	42
Czech Republic	250 [3]	250	225	200	200
Denmark	2	2	2	2	2
Egypt	1,640 [3]	1,800	1,750	1,750	2,000
Estonia	170 [3]	170	170	170	170
Finland	63	62	62	62	62
France	1,206 [3]	616 [3]	800	800	800
Georgia	130	140	150	150	150
Germany[3]	2,789	2,718	2,746	2,819	2,363
Greece	130 [3]	130	130	130	125
Hungary	275 [3]	275	300	300	300
India[5]	10,800	10,900	11,000	11,100	11,200
Indonesia	4,400 [3]	4,300	4,400	4,500	4,600
Iran	1,020 [3]	1,020	2,000	2,000	2,000
Iraq	30	10	10	10	10
Italy	525 [3]	480 [3]	460	460	460
Japan	1,083 [3]	1,091 [3]	1,114 [3]	1,110	1,120
Korea, North	100	100	100	100	100
Korea, Republic of	165	90	-- [r]	-- [r]	--
Kuwait	467 [3]	495 [r]	485 [r]	485 [r]	475
Libya	507	518 [r, 3]	523 [r, 3]	417 [r, 3]	500
Lithuania	430 [3]	453 [3]	936 [3]	950	950
Malaysia	920	950	960	950	950
Mexico	423 [3]	487 [3]	487 [3]	625 [3]	624
Netherlands	1,700 [3]	1,800	1,800	1,800	1,800
New Zealand	120 [3]	120	125	125	125
Norway	300 [3]	350	350	350	350
Oman	620 [3]	1,000	1,000	1,000	1,000
Pakistan	2,114 [3]	2,200	2,250	2,300	2,300
Peru	5	5	5	5	5
Poland	2,080 [3]	2,007 [3]	1,995 [3]	1,995 [r, 3]	1,990
Portugal	244 [3]	244	244	244	244
Qatar	1,754 [3]	1,784 [3]	1,800	1,800	1,800
Romania	1,300	1,300	1,300	1,300	1,300

See footnotes at end of table.

TABLE 12—Continued

AMMONIA: ESTIMATED WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons, contained nitrogen)

Country	2005	2006	2007	2008	2009
Russia	10,000 [3]	10,500 [3]	10,500	10,425 [3]	10,441 [3]
Saudi Arabia	1,780 [3]	2,000	2,600	2,600	2,600
Serbia	111 [3, 6]	80	85	85	85
Slovakia	236 [3]	241 [3]	260 [r]	260 [r]	260
South Africa	460 [3]	480	480	480	430
Spain	460 [3]	400	400	400	400
Switzerland	32 [3]	32	32	32	32
Syria	120	120	120	120	210
Taiwan	11	12	12	12	12
Tajikistan	45	35	25	25	20
Trinidad and Tobago	5,187 [3]	5,111 [3]	5,129 [3]	5,130	5,100
Turkey	305 [3]	92 [3]	-- [3]	50	100
Turkmenistan	220	250	270	270	270
Ukraine	4,300 [3]	4,200	4,200	4,200 [r]	4,200
United Arab Emirates	360 [3]	380	380	380	380
United Kingdom	1,080 [3]	750	1,050	1,100	1,100
United States[3, 7]	8,338	8,190	8,538	7,867 [r]	7,704
Uzbekistan	880 [3]	940	1,000	1,000	1,000
Venezuela	900 [3]	1,160	1,160	1,160	1,160
Vietnam	220	230	300	300	300
Zimbabwe	30	10	35	25 [r]	20
Total	122,000	126,000	131,000 [r]	130,000 [r]	130,000

[r]Revised. -- Zero.

[1]World totals, U.S. data, and estimated data have been rounded to no more than three significant digits; may not add to totals shown.

[2]Table includes data available through June 10, 2010.

[3]Reported figure.

[4]May include nitrogen content of urea.

[5]Data are for years beginning April 1 of that stated.

[6]Montenegro and Serbia formally declared independence in June 2006 from each other and dissolved their union.

[7]Synthetic anhydrous ammonia; excludes coke oven byproduct ammonia.