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NITROGEN [ADVANCE RELEASE]

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NITROGEN

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In 2007, U.S. ammonia production was 8.84 million metric tons (Mt) of contained nitrogen, about an 8% increase from production in 2006, and apparent consumption increased about 6% from that in 2006. Imports of ammonia were higher than those in 2006; however, exports were lower. Most of the imports in 2007 were from Canada, Russia, and Trinidad and Tobago. About 89% of the domestically produced ammonia consumed in the United States was used in fertilizer applications. Global ammonia production in 2007, which was estimated to be 131 Mt of contained nitrogen, was higher than that estimated in 2006. China, India, Russia, and the United States were the leading producers, together accounting for about 55% of the total.

Legislation and Government Programs

In June, the U.S. International Trade Commission (ITC) completed its full 5-year review of the antidumping duty order on certain ammonium nitrate imports from Ukraine. The decision determined that revocation of the antidumping duty order on ammonium nitrate from Ukraine would likely lead to continuation or recurrence of material injury to the industry in the United States. The suspension agreement, which limited the quantity of solid, fertilizer grade ammonium nitrate products, whether prilled, granular or in other solid form, with or without additives or coating, and with a bulk density equal to or greater than 53 pounds per cubic foot from Ukraine, had been in effect since September 12, 2001. Specifically excluded from this suspension agreement was solid ammonium nitrate with a bulk density of less than 53 pounds per cubic foot (commonly referred to as industrial or explosive grade ammonium nitrate) (U.S. International Trade Commission, 2007).

In November, the Agricultural Retailers Association (ARA) and a coalition of national, regional, and State agricultural organizations sent a letter to the ITC urging the removal of trade restrictions on solid urea fertilizer from Russia and Ukraine. The ITC was reviewing its 2005 sunset review decision to continue antidumping duty orders on urea imports from Russia and Ukraine. In 2005, antidumping duty orders on urea from Russia and Ukraine were continued as it was determined that lifting the suspension would likely cause material injury to the domestic urea industry because of imports being traded at below fair market value. ARA and the coalition organizations indicated that there have been significant changes in both the domestic and international fertilizer marketplace that warranted the elimination of these outdated trade restrictions (Green Markets, 2007a).

The Department of Homeland Security (DHS) released in November the list of chemicals of concern, known as "Appendix A," which includes ammonium nitrate, anhydrous ammonia, aqua ammonia, potassium nitrate, and sodium nitrate. The Appendix A list is part of the Chemical Facility Anti-Terrorism Standards (CFATS). If a facility possesses or plans to possess, at any relevant point in time, a quantity of a chemical on the DHS list, the facility will have to fill out an online form known as a "Top-Screen" that DHS will use to determine a facility's risk (Fertilizer Week America, 2007c).

The "Secure Handling of Ammonium Nitrate Act of 2007" was part of an appropriations measure signed in December by the President. The bill would require the DHS to create a regulatory system to help keep ammonium nitrate out of the hands of those with criminal intent. In addition, the bill would require all producers, purchasers, and sellers who take custody of ammonium nitrate products to register with DHS (Vertabedian, 2007).

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 2007, production of anhydrous ammonia (82.2% nitrogen) increased by 8% to 8.84 Mt of contained nitrogen compared with a revised figure of 8.19 Mt in 2006 (table 1). Of the total production, 89% was for use as a fertilizer; the remaining 11% 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 9.39 Mt of contained nitrogen, with urea accounting for 28% of the total and ammonium nitrate and ammonium phosphates accounting for 26% and 22%, respectively, of the production (table 3).

Ammonia producers in the United States operated only at about 84% of design capacity in 2007; this percentage included capacities at plants that operated during any part of the year and does not include plants that were idle for all of 2007. Of the total available U.S. ammonia production capacity, more than 58% was concentrated in the States of Louisiana (34%), Oklahoma (20%), and Texas (5%), where there are large reserves of feedstock natural gas. Koch Nitrogen Co., Terra Industries Inc., CF Industries, Inc., PCS Nitrogen, Inc., L.P., and Agrium Inc., in descending order, accounted for 80% of total U.S. ammonia production capacity (table 4).

Rentech Inc. signed a contract with Peabody Energy Corp. for the initial coal supply for Rentech's ultraclean fuels conversion project in East Dubuque, IL. Rentech plans to convert the 278,000-metric-ton-per-year (t/yr) ammonia plant from natural gas-fed to coal-fed by installing coal-gasification technology by

2009. The term calls for Peabody to provide up to approximately 7.2 Mt of Illinois coal beginning sometime between August 2009 and January 2010 and continue through December 2017 (Green Markets, 2007h).

Koch Nitrogen began construction and engineering work to enable its Enid, OK, nitrogen complex to manufacture at least an additional 114,000 t/yr urea in 2008. This would increase the total urea capacity at the complex to 590,000 t/yr (Fertilizer Week America, 2007d).

Faustina Hydrogen Products LLC (an affiliate of US TransCarbon LLC) planned to proceed with a major $1.6 billion gasification facility in Louisiana that would produce 1.2 million metric tons per year (Mt/yr) of anhydrous ammonia. Completion of the facility could take place in 2010. The facility, located next to Mosaic Fertilizer LLC's phosphate manufacturing plant near Convent in St. James Parish, would use petroleum coke and high-sulfur coal as feedstocks to produce anhydrous ammonia for agricultural use and methanol, sulfur, and industrial-grade carbon dioxide. The carbon dioxide would be sold as an industrial feedstock and for enhanced recovery of "stranded" oil reserves in oil fields along the Gulf Coast. Mosaic sold the site to Faustina and was scheduled to receive 60% of the ammonia offtake. Mosaic also agreed to purchase all sulfur produced by the project for use in its fertilizer operations (Green Markets, 2007g). Agrium announced in June that it signed a 15-year agreement with Faustina to take the remaining 40% of the ammonia to be produced at the plant (Fertilizer Week America, 2007b).

Southeast Idaho Energy LLC, American Falls, ID, announced in June that it planned to construct a $2 billion nitrogen and energy facility in Power County, ID. The nitrogen plant would produce 1,500 metric tons per day (t/d) of anhydrous ammonia, 450 metric tons (t) for sale and the rest for urea production. Urea production at the plant would be 1,360 t/d, of which 1,100 t/d would be granulated urea. In addition, the plant would produce 1,270 t/d of urea ammonium nitrate (UAN) solution (Green Markets, 2007e).

Rising security costs and concerns continued to prompt some companies to stop marketing ammonium nitrate. Terral RiverService Inc., in Alexandria, LA, opted to drop ammonium nitrate from its fertilizer line because of the security regulations enforced by the U.S. Coast Guard. At one time, Terral had sold as much as 18,000 t/yr of ammonium nitrate at its Alexandria facility (Green Markets, 2007j).

Dyno Nobel Ltd. reported delays and higher costs in its ammonium nitrate expansion at its Cheyenne, WY, facility. The cost of the expansion was estimated to have increased to $80 million from the initial $50 million. Dyno Nobel revised its existing plan to include expanding the ammonium nitrate solution (AMSOL) capacity to 230,000 t/yr and the new ammonium nitrate prill tower to a capacity of about 230,000 t/yr. The AMSOL and nitric acid plants were expected to be commissioned in the second quarter of 2008, and the ammonium nitrate prill tower would be deferred until 2010 (Green Markets, 2007m).

Agrium's Kenai, AK, nitrogen facility was permanently closed in September owing to the shortage of natural gas supply to Alaska's Cook Inlet. Agrium purchased 55 trillion British thermal units (Btu) of natural gas in 2001 and this availability steadily diminished to only 10,000 Btu in 2007. The facility produced about 325,000 t of urea and ammonia in 2007 during the 5 months that it was operational (Agrium Inc., 2007a). Agrium investigated the feasibility of converting the plant to use fuel from a proposed coal gasification plant as feedstock; however, in March 2008, it was determined that it was not economically feasible to proceed with a coal gasification facility (Agrium Inc., 2008).

In September, Eastman Chemical Co. exercised its option to purchase Terra Industries' Beaumont, TX, facility. The Beaumont facility has the capacity to produce 225,000 t/yr of ammonia and 852 million liters of methanol and includes ammonia and methanol storage capacity (Green Markets, 2007c). Eastman Chemical and Green Rock Energy Ltd. have formed an agreement to invest in gasification projects. They will develop and construct the industrial gasification facility in Beaumont, worth about $1.6 billion to feed the plant purchased from Terra. Petroleum coke will be used as the primary feedstock in order to produce ammonia, hydrogen, and methanol. Design and financial closure is expected by yearend 2008, and the facility is expected to come online in 2011 (Nitrogen + Syngas, 2008c).

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 refers to the phenomenon that 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. Some studies postulated that nitrate runoff from fertilizers is the principal cause of hypoxia, while others cited other causes for the hypoxic zone.

Dead zones in coastal oceans have now been reported in more than 400 systems, affecting a total area of more than 245,000 square kilometers. More recently, dead zones have developed in continental seas, such as the Baltic, Black Sea, East China Sea, Gulf of Mexico, and Kattegat (Diaz and Rosenberg, 2008).

The U.S. Environmental Protection Agency (EPA), which chairs the Gulf Hypoxia Task Force, released a revised Gulf Hypoxia Action Plan in November. The plan identified efforts to track progress, update the science, and adapt actions to reduce nutrients flowing from 31 States into the Mississippi River. The goal of the plan is to reduce or make significant progress toward reducing the 5-year running average of the Gulf of Mexico dead zone to less than 5,000 square kilometers by 2015. The hypoxic zone in the Gulf of Mexico is the second largest hypoxic zone in the world (U.S. Environmental Protection Agency, 2007). The Fertilizer Institute, early in the year, had disputed several recommendations of the report, including the implementation of fertilizer taxes, and a 40% reduction in phosphorus loadings to the Gulf (Green Markets, 2007k).

Consumption

In 2007, apparent consumption of ammonia was 15.2 Mt of contained nitrogen, about 6% higher than that in 2006. Apparent consumption is calculated as the production plus imports minus exports, adjusted to reflect any changes in stocks. Consumption of nitrogen fertilizers in the United States for the 2007 crop year (ending June 30, 2007) is listed in table 5. Consumption was estimated to be 12 Mt of contained nitrogen, which was higher than that of 2006. Anhydrous ammonia and nitrogen solutions, mostly UAN solutions containing 29.8% to 29.9% nitrogen, were the principal fertilizer products, representing 26% and 27%, respectively, of fertilizer consumption. Urea (45.9% nitrogen) constituted 20% of fertilizer consumption during the 2007 crop year. Ammonium nitrate (33.9% nitrogen) constituted 3% of 2007 nitrogen fertilizer consumption. Fertilizer consumption of ammonium sulfate, based on nitrogen content, was 2% of the total U.S. nitrogen-base fertilizer market. The leading nitrogen-consuming States in the 2007 crop year were, in descending order, Iowa, Illinois, Kansas, Nebraska, and Minnesota.

Stocks

Stocks of ammonia at yearend 2007 were 155,000 t, a decrease of 9% from comparable revised stocks at yearend 2006, 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.

On April 2, Valero L.P. and Valero GP Holdings LLC officially changed their names to NuStar Energy L.P. and NuStar GP Holdings LLC, respectively, as a result of their separation from Valero Energy Corp. (Green Markets, 2007l). NuStar Energy L.P. continued to operate the Gulf Central ammonia pipeline. The 3,200-km ammonia pipeline originates in the Louisiana Delta area and has access to three marine terminals on the Mississippi River. The capacity of this pipeline was about 2 Mt/yr, with a storage capacity of more than 1 Mt. In 2007, about 1.7 Mt of ammonia was shipped through the Gulf Central ammonia pipeline (NuStar Energy L.P., 2008).

Tampa Pipeline Corp. operated the 135-km Tampa Bay Pipeline (TBP) system. The TBP moved ammonium phosphate and nitrogen compounds for fertilizer producers in Hillsborough and Polk Counties, FL. In 2007, 650,000 t of ammonia was shipped through Magellan's pipeline compared with 659,000 t in 2006 (Magellan Midstream Partners L.P., 2008, p. 33).

Prices

Midyear and yearend prices for nitrogen materials are listed in table 7. The average Gulf Coast ammonia price began the year at $345 per short ton ($380 per metric ton), and in general declined through the beginning of August to reach the low for the year of $265 per short ton ($292 per metric ton). The price drop followed a general decline in the Henry Hub natural gas price, which was at its lowest at the end of August. By mid-September, the average ammonia price began to increase again in response to increasing natural gas prices. At yearend, the ammonia price was about $350 per short ton ($386 per metric ton).

The average granular urea price fluctuated for the first half of 2007, beginning the year at $310 per short ton ($342 per metric ton). The average price decreased to $300 per short ton ($331 per metric ton) at the beginning of August. The average price trended upward through the rest of 2007, with a sharp increase in early November to reach $440 per short ton ($485 per metric ton) at yearend.

The average ammonium nitrate price, which began the year at $255 per short ton ($281 per metric ton), generally increased throughout 2007. The average price rose to $383 per short ton ($422 per metric ton) by mid-December and remained at that level until yearend.

Typically, ammonium sulfate prices do not follow the same trend of 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. The average price began the year at about $163 per short ton ($180 per metric ton) and increased steadily throughout the first half of 2007 to reach a high of $245 per short ton ($270 per metric ton) in mid-May. At the end of July, the average price decreased to about $218 per short ton ($240 per metric ton) and increased to reach an average of $248 per short ton ($273 per metric ton) by yearend.

Foreign Trade

Ammonia exports were about 25% lower than those in 2006 (table 8). Although the Republic of Korea continued to be the leading destination for U.S. exports of ammonia, the total quantity decreased by 30% from that in 2006. Most of the material shipped to the Republic of Korea was produced at the Agrium plant in Alaska, and with reduced production and final closure of the plant, there was less ammonia available for export. The Republic of Korea represented the destination for 66% of total U.S. exports of ammonia in 2007.

Ammonia imports were 10% higher than those in 2006 and were more than 40 times greater than the quantity of exports. The average value of ammonia imports increased to $339 per metric ton from $326 per metric ton in 2006 (table 9). Trinidad and Tobago (55%) continued to be the leading import source. Russia (21%) and Canada (12%) were the remaining significant import sources.

Tables 10 and 11 list trade data for other nitrogen materials and include information on principal source or destination countries. Exports of nitrogen materials decreased in 2007, with the exception of ammonium nitrate and MAP. Changes in import quantities of nitrogen materials were mixed compared with imports in 2006. The materials with the largest quantity of imports (ammonia, nitrogen solutions, and urea) had higher

imports compared with those in 2006. Ammonium nitrate imports were about the same as those in 2006.

World Review

Anhydrous ammonia and other nitrogen materials were produced in more than 70 countries. Global ammonia production in 2007 of 131 Mt was about 4% higher than that in 2006 (table 12). China, with 32% 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 10% of the total; Middle East and Western Europe, 7% each; Central and South America, 6%; and Africa, Eastern Europe, and Oceania together contributed the remaining 7%.

In 2007, world ammonia exports of 15.8 Mt of contained nitrogen were slightly lower than those in 2006. Canada, Indonesia, Russia, Trinidad and Tobago, and Ukraine accounted for 64% of the world export total. North America (primarily the United States) imported 41% of global ammonia trade, followed by Asia (24%) and Western Europe (20%) (International Fertilizer Industry Association, 2008).

European Union.—The European Commission began an expiration review into antidumping measures on imports of ammonium nitrate from Russia, following a request by the European Fertilizer Manufacturer's Association (EFMA) in January. EFMA claimed that the expiration of the measures would likely result in the continuation or recurrence of dumping or injury to European Union (EU) producers of ammonium nitrate. In addition, EFMA maintained that if the duties were to be removed, ammonium nitrate imports into the EU would be likely to increase. The investigation was scheduled to be concluded by July 2008 (Nitrogen + Syngas, 2007a).

The EU on July 23 lifted a tariff on Russian urea that had been in place since 1995, claiming Russia urea exporters are no longer dumping their product at below fair market value, and therefore, no longer present a threat to EU urea producers (Green Markets, 2007d).

Algeria.—Spanish Industrial group Grupo Villar Mir S.L. announced in March that it planned to build a 1.1-Mt/yr ammonia plant in Algeria, with completion scheduled for the end of 2010. The cost for the new plant, which will be built through Algerian fertilizer producer Fertial S.P.A., was estimated to be $850 million. Grupo Villar Mir holds a 66% controlling stake in the Algerian company. In addition to the construction of the new ammonia plant, Grupo Villar Mir is implementing a $167 million investment program to upgrade Fertial's two existing plants at Annaba and Arzew (FertilizerWEEK Online, 2007d).

In June, Orascom Construction Industries (OCI) signed an agreement with the Algerian state-owned oil and gas company Sonatrach to establish an ammonia and urea production unit of 1.1 Mt/yr and a second ammonia production unit with a capacity of 770,000 t/yr near Arzew at a cost of €1.17 billion (1 euro ≈ 1.4 dollars) plus an additional $160 million. Sorfert Algeria is the joint venture between OCI and Sonatrach, which was incorporated in early 2007 to develop the nitrogen complex. Germany's Uhde GmbH will design, develop, and construct the ammonia and urea complex. The first unit was expected to start operations at the yearend 2010, and the second unit will start operations 6 months later (Fertilizer Week, 2007j).

Canada.—Saskferco Products Inc. (a joint-venture nitrogen producer owned by Mosaic and Investment Saskatchewan Inc.) announced in October that they would begin a 200-t/d ammonia capacity expansion and a 400-t/d urea capacity expansion at the Belle Plaine, Saskatchewan complex. The planned $84 million expansion was to begin immediately and slated to be finished during a planned shutdown in June 2009. The current capacity at Saskferco is 968,000 t/yr of urea, 648,000 t/yr of ammonia, and 230,000 t/yr of UAN solution (Green Markets, 2007i).

China.—Four companies in China began the process of increasing their nitrogen capacity. Shanxi Lanhua Coal Industrial Group Co. Ltd., affiliated with Jincheng Coal Chemical Co. Ltd., began construction of a 300,000-t/yr ammonia and methanol and 520,000-t/yr urea project, which was expected to be completed by yearend 2009. Shandong Lianmeng Chemical Group Co. Ltd. completed the first phase of construction of a $155 million project to produce 360,000 t/yr of ammonia and 600,000 t/yr of urea in two trains. The first train of 180,000 t/yr of ammonia and 300,000 t/yr of urea was completed in 2007. Chengdu KoYo Chemical Co. Ltd., a fertilizer producer based in Chengdu in Sichuan Province, began work on a 400,000-t/yr ammonia and 450,000-t/yr urea complex at the Natural Gas Chemical Industrial Zone in Dazhou City, Sichuan Province. When completed, this complex was expected to double the company's nitrogen capacity. Finally, Guizhou Kaiyang Chemical Co. Ltd. began work on a 500,000-t/yr ammonia project at Huanbaijing, Guizhou Province. The $300 million project will supply ammonia to Guizhou Kailin's Group new 1.2 Mt/yr DAP project (Nitrogen + Syngas, 2007e).

Three Chinese fertilizer producers owned by Sinopec Corp. converted to the Shell coal gasification process—Anqing Petrochemical Co., Baling Petrochemical Co., and the Hubei Fertilizer Co. All three fertilizer producers have completed their conversions to 2,000-t/d coal gasification units. Project costs were estimated to be about $160 million, but Sinopec expects feedstock costs to be reduced by 70% (Nitrogen + Syngas, 2007g).

Henan Yingqing Chemical Co. planned to expand its ammonia and methanol plant to a combined capacity of 500,000 t/yr from the existing capacity of 120,000 t/yr of ammonia. The project was expected to cost nearly $260 million. The company planned to use Shell's gasification technology (FertilizerWEEK Online, 2007e).

Egypt.—In May, Agrium began construction of a $1.2 billion nitrogen facility at Damietta, with completion expected in 2010. The EAgrium joint-venture plant, of which Agrium will have a 60% interest, will consist of two ammonia and urea trains with a combined capacity of 1.3 Mt/yr of urea and 100,000 t/yr of net (merchant) ammonia. Egyptian Government-owned entities Egyptian PetroChemicals Holding Co. and Egyptian Natural Gas Holding Co. will hold a 24% interest in the joint venture, and Egyptian Co. for Natural Gas, the national operator of the gas distribution grid, will hold a 9% interest. The Arab Petroleum Investment Corp. will hold the remaining 7% interest (Agrium Inc., 2007b; Fertilizer Week America, 2007a).

In May, Egypt Basic Industries Corp.'s anhydrous ammonia plant based south of the Suez Canal was 60% complete. The plant was expected to produce 2,000 t/d ammonia, with a total investment for the facility of about $540 million and was expected to begin production at yearend 2008 (FertilizerWEEK Online, 2007a).

France.—In February, Yara International ASA announced a natural gas deal with Gazprom (Russian natural gas company) to supply its plant in Le Havre, France. Ammonia production at the 400,000-t/yr plant was halted temporarily in July 2006 because of high natural gas prices. The ammonia plant was expected to restart in March (FertilizerWEEK Online, 2007j).

India.—In December, Gail Ltd. and Rashtriya Chemicals and Fertilizers Ltd. (RCF) entered into a memorandum of understanding for Gail to build a coal gasification project and then use the coal gas produced from this project as feedstock for a fertilizer plant operated by RCF at Talcher, Orissa. The project will produce an estimated 3,000 t/d of ammonia and 3,500 t/d of urea (Nitrogen + Syngas, 2008b).

Indonesia.—Incitec Pivot Ltd. announced in June that it planned to investigate the feasibility of building a coal gasification plant in Indonesia to boost the output of three fertilizer plants in Aceh. The three fertilizer plants have a capacity of 1.7 Mt/yr but are only producing 300,000 t/yr owing to limited supplies of natural gas. The feasibility study was expected to be completed by the first quarter of 2008 (Fertilizer Week, 2007e).

Iran.—The Indonesia Government planned to construct an ammonia and urea complex in Iran to meet Indonesia's rising demand for fertilizers. The complex was to be built at Asiah in northern Iran at a total cost of $700 million and consist of ammonia and urea units each having a capacity of 3,000 t/d (Nitrogen + Syngas, 2007c).

Iran Petrochemical Commercial Co.'s (IPPC) Razi III ammonia plant was expected to come online in September. The plant has a 677,000-t/yr ammonia capacity. In addition, IPPC's Ghadir II ammonia/urea plant was expected to become operational at yearend 2007 or early 2008 (FertilizerWEEK Online, 2007f).

Iraq.—Iraq's State Co. for Fertilizers at Khor Al-Zubair received a $150,000 loan from the Government of Japan to revamp its ammonia and urea units located near the Shat-al-Arab waterway near Basra. The unit is currently producing 300,000 t/yr urea and 200,000 t/yr ammonia (Nitrogen + Syngas, 2007d).

Libya.—A 50-50 joint venture between Libya's National Oil Corp. (NOC) and Norway's Yara International ASA to revamp NOC's ammonia and urea complex at Marsa el Brega was approved by the Libyan Government. Yara was to be the marketer for the export of products from the Marsa el Brega site. The complex has a capacity of 700,000 t/yr for ammonia, of which approximately 150,000 t/yr is available for sale, and 900,000 t/yr for prilled urea (FertilizerWEEK Online, 2007k).

Netherlands.—Yara planned to invest about $426 million in a 3,500-t/d urea unit at its Sluiskil plant. Construction of the plant was scheduled to begin in 2008 and was expected to be completed by 2011 (Fertilizer Week, 2007l).

Nigeria.—Notore Chemical Industries Ltd. secured financing to rehabilitate and revamp its ammonia, urea, and NPK blending facilities at Onne, Port Harcourt, Rivers State, in southern Nigeria. Work at these sites was expected to begin in March and be completed by yearend 2007 (FertilizerWEEK Online, 2007i).

Oman.—Krishak Bharati Cooperative Ltd. planned to set up a second joint-venture urea plant in Oman with the Oman Oil Co. The two companies signed a memorandum of understanding in December to build a 2-Mt/yr plant (Fertilizer Week, 2007g).

Pakistan.—Engro Chemical Pakistan Ltd. finalized its plans to construct a new ammonia and urea fertilizer complex at Daharki, district Ghotki, Sindh. The 745,000-t/yr ammonia and 1.25-Mt/yr prilled urea plant was scheduled to begin operations in the second quarter of 2010. The cost of the project was estimated to be $70 million (FertilizerWEEK Online, 2007b).

Fauji Fertilizer Co. Ltd. implemented debottlenecking of its existing plant III, at Mirpur Mathelo, to add from 60,000 to 75,000 t/yr to its total urea capacity by yearend 2007. The expansion would increase the total urea capacity to 1.96 Mt (Green Markets, 2007f).

M.W. Kellogg Ltd. (a subsidiary of KBR Inc.) was awarded a contract to provide a basic engineering design package for an ammonia plant revamp. The ex-Kemira GrowHow plant was being relocated from Rotterdam, Netherlands, to Pakistan by Fatima Fertilizer Co. Ltd. and was to form part of a new fertilizer complex to be owned and operated by Fatima at Sadiqabad. The ammonia plant was being redesigned to achieve the desired 1,500-t/d production of ammonia (KBR Inc., 2007).

Ruwais Fertiliser Industries awarded a contract for the urea debottlenecking and expansion project at its ammonia and urea complex to Descon Engineering Ltd. The project involves the installation of a 2,500-t/d urea granulation unit. In addition, modification work was expected to be carried out on the existing urea synthesis plant, allowing for conversion of surplus ammonia to urea (Fertilizer Week, 2007c).

Papua New Guinea.—India's Oswal Chemicals Ltd. and Fertilizers Ltd. signed a memorandum of understanding with Australian-based Oil Search to undertake a feasibility study in a joint-venture ammonia and urea project at Konebada, in southeastern Papua New Guinea. The project would include the construction of an 825,000-t/yr ammonia plant and a 1.5-Mt/yr granular urea unit. Oswal will invest $1 billion in the ammonia and urea project. The project was scheduled for completion in 2010 (Nitrogen + Syngas, 2007h).

Peru.—Terra Industries and Orica Ltd. announced their combined interest in a new $1 billion petrochemical complex located in Pisco, southern Peru. The facility would produce 1,600 t/d ammonia and ammonium nitrate (Nitrogen + Syngas, 2007f). Orica would use the ammonia for the production of industrial-grade ammonium nitrate to serve its mining customers in South America. Terra expected the balance of the ammonia would be marketed in Mexico, South America, and the U.S. west coast (Green Markets, 2007b).

In November, CF Industries took the first steps in the development of a new state-of-the-art nitrogen fertilizer complex to be built in Peru. The ammonia plant would have a capacity of 2,100 t/d and the urea plant would have a capacity of

3,300 t/d. CF Industries was awaiting a successful negotiation of a natural gas supply agreement; completion of necessary engineering, development, and financing; and board of directors and other approvals (Nitrogen + Syngas, 2008a).

Poland.—Zaklady Azotowe Pulawy S.A. was expanding its urea production capacity by 270,000 t/yr. The project, which will increase the total urea production capacity to 1.22 Mt/yr, was planned in two stages. The first stage involved the installation of a new oxygen generating plant, and the second stage involved revamping the urea production unit. The work was scheduled to be completed by 2009 at a cost of $65 million (Fertilizer Week, 2007i).

Qatar.—Qatar Fertiliser Co. (Qafco) signed a letter of intent with Snamprogetti S.p.A. (Italy) and Hyundai Corp. (Republic of Korea) for construction of the Qafco-5 expansion project at Mesaieed. Total cost for the project was estimated to be $3.2 billion. The Quafco-5 project includes the construction of two ammonia plants with a total production capacity of 4,600 t/d and a urea plant with a production capacity of 3,850 t/d, which would increase Qafco's ammonia capacity by 73% and urea capacity by 43%. The project also included upgrades of existing facilities and infrastructure that will facilitate future expansion. Completion of the expansion project was scheduled for the end of the first quarter of 2011 (Green Markets, 2007n).

Russia.—Gazprom announced plans to raise natural gas prices with the approval of the new domestic gas tariff plan by the Russian cabinet. New natural gas customers expected to pay up to 60% more in 2007; prices could increase by another 50% in 2008 and by 10% per year thereafter. In the Russian natural gas-based chemical sector, the companies most likely to be affected were those that were using more natural gas because of increasing production capacity, such as EuroChem Mineral and Chemical Co. and JSC Acron. Both companies have invested millions of dollars in expanding production capacity for ammonia, methanol, and urea, and their natural gas usage had risen accordingly (Nitrogen + Syngas, 2007b).

EuroChem announced that it launched two investment projects to improve manufacturing processes for ammonia production at is Novomoskovsk production site. The first phase of the project would replace old equipment and expand ammonia production to 1,550 t/d, and the second phase would reduce natural gas consumption to 58 cubic meters per day in order to improve energy efficiency. The expected cost for the two projects was about $13.2 million (FertilizerWEEK Online, 2007c).

Russian fertilizer group Kuibyshevazoto OJSC announced that it would invest $500 million by 2015 to upgrade its facilities. Expansion of its facilities included raising ammonia production by 15% and setting up a connection to a major natural gas pipeline in order to purchase natural gas at a lower cost (FertilizerWEEK Online, 2007g).

Saudi Arabia.—Saudi Arabian Mining Co.'s Ma'aden Phosphate Co. awarded Samsung Engineering Co. Ltd. of the Republic of Korea a contract for $960 million to construct an ammonia plant for its proposed phosphate fertilizer complex at Ras Az Zawr on the Kingdom's Arabian Gulf Coast. Work on the project was to begin in the fourth quarter of 2007 and was scheduled for completion by the end of 2010. The plant, which was designed with a capacity of 3,300 t/d of ammonia, based on Germany's Uhde technology, was expected to be one of the world's largest single ammonia trains. The primary purpose of the ammonia plant was to supply feedstock for the production of DAP. Surplus ammonia of more than 400,000 t/yr was planned for export (Fertilizer Week, 2007h).

Spain.—Fertiberia S.A. was forced to close two of its Spanish plants located in Palos de la Frontera and Puertollano as a result of a 75% increase in natural gas prices. The company indicated that it would no longer manufacture nitrogen-based fertilizers in Spain, focusing instead on the operations that its parent company, Grupo Villar Mar, was setting up with Fertial in Algeria (Fertilizer Week, 2007b).

Trinidad and Tobago.—MAN Ferrostaal AG of Germany indicated that the facility it was building in Trinidad for Methanol Holdings Ltd. at a cost of $1.5 billion would have melamine and UAN production. The complex was to consist of seven plants — UAN solutions (4,300 t/d), urea (2,100 t/d), ammonium nitrate (1,930 t/d), ammonia (1,850 t/d), nitric acid (1,520 t/d), melamine (180 t/d), and a methanol unit. The project was scheduled for completion in 2009 (FertilizerWEEK Online, 2007h).

Turkmenistan.—JSA Turkmendokun and China's CITIC Group signed an agreement to build a 230,000-t/yr ammonia and 400,000-t/yr urea plant at Maryazot. The total cost of the project was estimated to be $266 million and was to largely be financed by a loan from China Export and Import Bank. Construction of the plant was to begin in 2007 and expected to be completed in late 2010 (Nitrogen + Syngas, 2007i).

United Kingdom.—The United Kingdom Competition Commission approved the Terra Industries and Kemira GrowHow Oyj joint venture that would combine their fertilizer and associated chemicals businesses in the United Kingdom. The joint venture would be owned 50-50 by each company and will include Terra's nitrogen operations at Billingham (capacities of 550,000 t/yr ammonia, 500,000 t/yr ammonium nitrate, 250,000 t/yr merchant ammonia, and 250,000 nitric acid), Kemira GrowHow's site at Ince (capacities of 370,000 t/yr ammonia, 400,000 t/yr ammonium nitrate, 630,000 t/yr nitric acid, and 630,000 t/yr NPK's), and Severnside (capacities of 265,000 t/yr ammonia and 500,000 t/yr ammonium nitrate) (Fertilizer Week, 2007a).

In October, GrowHow UK Ltd. announced it was closing the Severnside plant near Bristol because the plant could not operate cost effectively. Severnside plant had the capacity to produce 500,000 t/yr ammonium nitrate. Production of ammonia, carbon dioxide, and nitric acid associated with the ammonium nitrate facility were to be closed also. The company expected to idle production at the facility by the end of January 2008 (Fertilizer Week, 2007d).

Venezuela.—KBR Inc., the Houston engineering, construction, and services company, was awarded a $57 million contract by Germany's MAN Ferrostaal to provide engineering services for Petroquimica de Venezuela (Pequiven) SA for a new 1,800-t/d ammonia plant that would be the first in Venezuela to utilize KBR's Kellogg Advanced Ammonia Process technology.

The plant was to be part of a fertilizer complex that is being built next to Pequiven's existing petrochemical complex in Moron, Carabobo State (Fertilizer Week, 2007f).

Vietnam.—The Vietnam National Chemical Corp. (Vinachem) awarded a contract for its new coal-based ammonia and urea project in the country's northern Ninh Binh Province to China's Huanqiu Contracting & Engineering Corp. Vinachem and Haunqiu signed a $432 million agreement in November to construct the coal-based ammonia and urea project, which was approved by the Government. The proposed complex would have production capacities of 320,000 t/yr of ammonia and 560,000 t/yr of prilled urea. Vinachem's plant in Ninh Binh would be the second coal-based urea plant to be built in the country. The country's existing coal-based unit, in Ha Bac Province, was operated by Nitrogenous Fertilizer and Chemical Co. (Hanichemco). Ha Bac, which was owned by Vinachem, was also looking into a 480,000-t/yr urea project in Bac Giang (Fertilizer Week, 2007k).

Outlook

According to the U.S. Department of Agriculture (USDA), U.S. corn growers intended to plant 34.8 million hectares (Mha) of corn for all purposes in the 2008 crop year (July 1, 2007, to June 30, 2008), an 8% decrease from that in 2007 and 10% higher than that in 2006 (U.S. Department of Agriculture, National Agricultural Statistical Service, 2008, p. 1). The decrease in projected plantings was in response to favorable prices for other crops, high input cost for corn, and crop rotation considerations that are motivating some farmers to plant fewer acres of corn. Despite the decrease, corn acreage is expected to remain at historically high levels owing to the continued expansion of ethanol production.

According to long-term projections from the USDA, projected plantings for the eight major field crops in the United States decreased from about 99.8 Mha in 2007 to about 98.7 Mha during most of the projection period (2007-17), as higher prices and producer net returns hold land into production. Corn, soybeans, and wheat account for about 88% of acreage for the eight major field crops during the projection period. During the 10-year period, the crop mix was expected to shift to corn and away from soybeans. Large increases are projected in corn used for ethanol production during the next several years. Relatively high prices for crude oil would contribute to favorable returns for ethanol production, which, when combined with Government programs, would provide economic incentives for a large expansion in ethanol production capacity. Feed and residual use of corn was projected to decline in the initial years and then rise only moderately as increased feeding of distillers grains (a coproduct of dry mill ethanol production) helps meet livestock feed demand. Gains in food and industrial uses of corn (other than for ethanol production) were projected to be smaller than increases in population. Consumer dietary concerns and other changes in tastes and preferences would 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. U.S. corn exports were expected to decrease during the next several years from the record 2007-08 level as more corn is used domestically in the production of ethanol. After growth in ethanol production in the United States slows, U.S. corn exports would rise in response to stronger global demand for feed grains to support growth in meat production. In addition, U.S. corn exports to Mexico were projected to increase because of the elimination of tariffs on corn imports from the United States (U.S. Department of Agriculture, Economic Research Service, 2008).

Natural gas prices have risen significantly in many key nitrogen-producing regions of the world, because of the rising cost of energy—particularly crude oil. Natural gas prices in the United States typically are higher than those in the rest of the world. This means that ammonia capacity at older, higher cost U.S. plants is still at risk of closure. Natural gas can account for approximately 90% of the U.S. cash cost of producing ammonia, depending on the cost of natural gas. For example, natural gas costs in Algeria and the Middle East were estimated to be about $0.60 and $0.80 per million Btu, respectively, and in Trinidad and Tobago, the cost was estimated to be $5.30 per million Btu (Potash Corp. of Saskatchewan, 2008, p. 47). Trinidad and Tobago is a favorable import source for ammonia as it has a lower natural gas cost than European and U.S. producers, and its supply can reach the United States cheaper and quicker than from the Middle East. The U.S. Department of Energy projected that the Henry Hub natural gas spot price in the United States was expected to average $10 per thousand cubic feet in 2008 ($9.71 per million Btu), $2.83 above the 2007 average, and $9 per thousand cubic feet in 2009 ($8.74 per million Btu) (U.S. Department of Energy, Energy Information Administration, 2008).

From the beginning of 2001, when natural gas prices began to spike in the winter and have continued to increase through yearend 2007, U.S. ammonia production capacity has declined by 4.5 Mt/yr, or 26% of the 2001 capacity. The futures market is projecting that U.S. natural gas prices will remain strong in the medium term. The interest that U.S. firms have shown in constructing new plants outside the United States, particularly in Trinidad and Tobago, indicates that in the future, much of the U.S. supply of ammonia was expected to be met by foreign production.

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TABLE 1
SALIENT AMMONIA STATISTICS[1, 2]

(Thousand metric tons of contained nitrogen unless otherwise specified)

	2003	2004	2005	2006	2007
United States:					
Production	8,450	8,990	8,340	8,190 [r]	8,840 [p]
Exports	400	381	525	194	145
Imports for consumption	5,720	5,900	6,520	5,920	6,530
Consumption, apparent[3]	13,900	14,400	14,400	14,000 [r]	15,200 [p]
Stocks, December 31, producers'	195	298	254	170 [r]	155
Average annual price, free on board Gulf Coast[4] dollars per short ton	245	274	304 [r]	302	309
Net import reliance as a percentage of apparent consumption[5]	39	38	42	41 [r]	42 [p]
Natural gas price, wellhead, average price[6] dollars per thousand cubic feet	4.88	5.46	7.33	6.40 [r]	6.39
World:					
Production	110,000	117,000	123,000 [r]	126,000 [r]	131,000 [e]
Trade[7]	13,900	14,600	15,600	15,900	15,800

[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)

	2005	2006	2007[p]
Production:			
Fertilizer:			
January-June	4,160	3,450 [r]	3,960
July-December	3,300	3,820 [r]	3,930
Total	7,450	7,270 [r]	7,890
Nonfertilizer:			
January-June	402	463 [r]	488
July-December	482	458 [r]	461
Total	884	921 [r]	949
Grand total	8,340	8,190 [r]	8,840
Imports for consumption:			
January-June	3,250	3,000	3,320
July-December	3,270	2,920	3,210
Total	6,520	5,920	6,530
Exports:			
January-June	250	116	56
July-December	275	78	89
Total	525	194	145
Stocks, end of period:			
January-June	227	234	222
July-December	254	170 [r]	155
Apparent consumption:[2]			
January-June	7,640	6,820 [r]	7,660
July-December	6,740	7,180 [r]	7,580
Total	14,400	14,000 [r]	15,200

[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)

	2006						2007[p]					
	January-June		July-December		Total		January-June		July-December		Total	
	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight[r]	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content
Urea	2,550	1,170	2,860 [r]	1,310 [r]	5,410	2,480 [r]	2,850	1,310	2,780	1,280	5,630	2,590
Ammonium nitrate	3,040 [r]	1,030 [r]	3,360 [r]	1,140	6,400	2,170 [r]	3,710	1,260	3,610	1,220	7,320	2,480
Ammonium phosphates[3]	6,400	1,270 [r]	6,900 [r]	1,150 [r]	13,300	2,420 [r]	6,540	1,040	6,870	1,060	13,400	2,100
Nitric acid	3,090 [r]	681 [r]	3,540 [r]	779 [r]	6,630	1,460	3,690	813	3,690	811	7,380	1,620
Ammonium sulfate[4]	1,300 [r]	275 [r]	1,310	278	2,610	553 [r]	1,360	288	1,460	309	2,820	597

[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 2007[1]

(Thousand metric tons per year of ammonia)

Company	Location	Capacity[2]
Agrium Inc.	Borger, TX	490
Do.	Kenai, AK[3]	280
CF Industries, 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
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[4]	1,110
LSB Industries, Inc.	Cherokee, AL	159
Do.	Pryor, OK[4]	300
Mosaic Co., The	Faustina (Donaldsonville), LA	508
PCS Nitrogen, Inc., LP	Augusta, GA	688
Do.	Geismar, LA[4]	483
Do.	Lima, OH	542
Do.	Memphis, TN[4]	371
Rentech Energy Midwest Corp.	East Dubuque, IL	278
Terra Industries Inc.	Beaumont, TX[4]	231
Do.	Donaldsonville, LA[4]	360
Do.	Port Neal, IA	336
Do.	Verdigris, OK	953
Do.	Woodward, OK	399
Do.	Yazoo City, MS	454
Total		13,400

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]Closed in 2007.

[4]Idle.

TABLE 5
U.S. NITROGEN FERTILIZER CONSUMPTION, BY PRODUCT TYPE[1, 2]

(Thousand metric tons of nitrogen)

Fertilizer material[3]	2006	2007[p]
Single-nutrient:		
Anhydrous ammonia	2,840	3,160
Nitrogen solutions[4]	2,750	3,260
Urea	2,240	2,380
Ammonium nitrate	296	325
Ammonium sulfate	231	262
Aqua ammonia	75	71
Other[5]	341	341
Total	8,770	9,800
Multiple-nutrient[6]	2,240	2,240
Grand total	11,000	12,000

[p]Preliminary.
[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: Terry, D.L., and Kirby, B.J., 2008, Commercial fertilizers 2007: Lexington, KY, Association of American Plant Control Officials Inc. and The Fertilizer Institute, 41 p.

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

(Thousand metric tons of contained nitrogen)

Material[1]	2006	2007[p]
Ammonia:		
January-June	234	222
July-December	170 [r]	155
Nitrogen solutions:[2]		
January-June	132	113
July-December	139	128
Urea:		
January-June	67	37
July-December	47	53
Ammonium phosphates:[3]		
January-June	78	59
July-December	50 [r]	53
Ammonium nitrate:		
January-June	54	44
July-December	52	44
Ammonium sulfate:		
January-June	30	13
July-December	27	34
Yearend total[4]	485 [r]	467

[p]Preliminary. [r]Revised.

[1]Ranked in relative order of importance.

[2]Urea-ammonium nitrate and ammoniacal solutions.

[3]Diammonium and monoammonium phosphates.

[4]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)

	2006		2007	
Compound	June	December	June	December
Ammonium nitrate, free on board (f.o.b.) Corn Belt[1]	255-260	250-260	325	380-385
Ammonium sulfate, f.o.b. Corn Belt[1]	150-152	160-165	205-240	245-250
Anhydrous ammonia:				
F.o.b. Corn Belt[1]	330-355	360-385	415-450	590-620
F.o.b. Gulf Coast[2]	242-245	315-320	280	350
Diammonium phosphate, f.o.b. central Florida	225-232	220-221	370-372	500
Urea:				
F.o.b. Corn Belt,[1] prilled and granular	232-255	295-305	350-365	465-490
F.o.b. Gulf Coast, granular[2]	190-195	265-280	318-322	435-445

[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)

Country	2006	2007
Canada	33	42
Chile	17	--
Korea, Republic of	166	116
Mexico	2	3
Taiwan	10	7
Other	8	9
Total	236	177

-- Zero.
[1]Value data suppressed by U.S. Census Bureau.

Source: U.S. Census Bureau.

TABLE 9
U.S. IMPORTS OF ANHYDROUS AMMONIA, BY COUNTRY[1]

(Thousand metric tons of ammonia and thousand dollars)

	2006		2007	
Country	Gross weight	Value[2]	Gross weight	Value[2]
Canada	1,010	389,000	920	400,000
Latvia	--	--	75	26,400
Russia	670	217,000	1,640	560,000
Trinidad and Tobago	4,070	1,280,000	4,360	1,390,000
Ukraine	976	305,000	347	111,000
Venezuela	252	76,600	272	94,200
Other	218 [r]	77,800	329	108,000
Total	7,200	2,350,000	7,940	2,690,000

[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)

	2006		2007		
Compound	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Principal destinations, 2007
Ammonium nitrate[2]	127	43	194	66	Mexico, 67%; Canada, 32%.
Ammonium sulfate[2]	1,010	272	846	228	Brazil, 69%; Argentina, 7%; Canada, 6%.
Anhydrous ammonia	236	194	177	145	Republic of Korea, 66%; Canada, 24%.
Diammonium phosphate	5,660	1,020	4,180	752	India, 39%; Mexico, 9%; Brazil, 7%.
Monoammonium phosphate	2,310	254	2,450	270	Canada, 37%; Australia, 19%; Brazil, 14%.
Urea	656	301	310	142	Mexico, 34%; Chile, 17%; Republic of Korea, 17%.
Total	9,990	2,080	8,160	1,600	

[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	2006 Gross weight	2006 Nitrogen content	2006 Value[2]	2007 Gross weight	2007 Nitrogen content	2007 Value[2]	Principal sources, 2007
Ammonium nitrate[3]	1,110	376	263,000	1,110	376	278,000	Canada, 41%; Netherlands, 21%.
Ammonium nitrate-limestone mixtures	4	1	253	81	22	18,800	Belgium, 50%; Greece, 26%.
Ammonium sulfate[3]	339	72	56,400	405	86	67,900	Canada, 99%.
Anhydrous ammonia[4]	7,200	5,920	2,350,000	7,940	6,530	2,690,000	Trinidad and Tobago, 55%; Russia, 21%; Canada, 12%.
Calcium nitrate	157	27	17,200	188	32	21,400	Norway, 93%.
Diammonium phosphate	54	10	32,000	15	3	10,100	Mexico, 55%; Belgium, 14%; Russia, 12%; China, 12%.
Monoammonium phosphate	96	11	35,600	58	6	31,000	Canada, 50%; Mexico, 19%.
Nitrogen solutions	1,980	591	383,000	3,200	957	769,000	Russia, 21%; Canada, 19%; Romania, 19%.
Potassium nitrate	150	21	59,900	136	19	56,000	Chile, 71%; Israel, 27%.
Potassium nitrate-sodium nitrate mixtures	(5)	(5)	193 r	(5)	(5)	174	Canada, 68%; Jordan, 32%.
Sodium nitrate	75	12	20,500 r	82	14	19,100	Chile, 82%; Germany, 12%.
Urea	5,030	2,310	1,340,000	6,550	3,006	2,220,000	Canada, 26%; China, 11%; Kuwait, 9%; Venezuela, 8%.
Total	16,200	9,350	4,560,000 r	19,800	11,100	6,180,000	

rRevised.
[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: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons of contained nitrogen)

Country	2003	2004	2005	2006[e]	2007[e]
Afghanistan[e]	20	20	20	20	20
Albania[e]	10	10	10	10	10
Algeria	578	543	550	470	500
Argentina	726 [r]	705 [r]	655 [r]	727 [r, 3]	700
Australia[e]	787 [3]	790	790	1,200	1,200
Austria[e]	440	440	440	440	440
Bahrain	312	311	330	360 [r]	350
Bangladesh[4]	1,389	1,380	1,380	1,250	1,300
Belarus	766 [r]	767 [r]	774 [r]	815 [r]	830
Belgium	874	857	860	850	850
Bosnia and Herzegovina[e]	1 [r]	1 [r]	1 [r]	1 [r]	1
Brazil	939	1,077	950 [e]	950	950
Bulgaria	321	320 [r]	320 [r]	309 [r]	350
Burma[e]	63 [3]	35	30	30	30
Canada	3,662	4,107	4,100	4,100 [r]	4,100
China	31,500	34,770	37,850	40,660 [r, 3]	42,480 [3]
Colombia	108	98	100	100	100
Croatia	264	332	404 [r]	400 [r]	400
Cuba[e]	21	51	28	42 [r, 3]	42
Czech Republic	235	233	250 [r]	250 [r]	235
Denmark[e]	2	2	2	2	2
Egypt	1,790	1,675	1,640	1,800	1,750
Estonia	81	166	170	170	170
Finland[e]	77	61	63	62	62
France	1,153	1,120	1,206 [r]	616 [r, 3]	800
Georgia[e]	125 [3]	130	130	140	150
Germany	2,803	2,741 [r]	2,789 [r]	2,718 [r, 3]	2,746 [3]
Greece	123	132	130	130	130
Hungary	232	274 [r]	275 [r]	275 [r]	300
India[5]	10,048	10,718	10,800 [e]	10,900	11,000
Indonesia	4,250	4,120	4,400	4,300	4,400
Iran	1,115	1,088	1,020	1,020	2,000
Iraq[e]	--	30	30 [r]	10 [r]	10
Italy	475	532	525 [r]	480 [r, 3]	460
Japan	1,061	1,101	1,083	1,091 [r, 3]	1,090
Korea, North[e]	100	100	100	100	100
Korea, Republic of	119	163	165 [e]	90	100
Kuwait	444	413	467	470	450
Libya[e]	577	577	580 [3]	520	520
Lithuania	462	424	430	453 [r, 3]	936 [3]
Malaysia	910	843	920 [e]	950	960
Mexico	439	560	423	487 [r, 3]	487 [3]
Netherlands[e]	1,750	1,970	1,700 [3]	1,800	1,800
New Zealand	128	124	120	120	125
Norway	354	420	300	350	350
Oman	--	--	620	1,000 [r]	1,300
Pakistan	2,357	2,114	2,114	2,200	2,250
Peru[e]	5	5	5	5	5
Poland	1,906	1,984	2,080	2,100	1,900

See footnotes at end of table.